

# DEPARTMENT OF THE ENVIRONMENT, CLIMATE AND COMMUNICATIONS

---

## Irish Offshore Strategic Environment Assessment 6

### Strategic Environmental Assessment - Environmental Report

---



P2510\_R5923\_Rev1 | 25 November 2022

## DOCUMENT RELEASE FORM

### DEPARTMENT OF THE ENVIRONMENT, CLIMATE AND COMMUNICATIONS

**P2510\_R5923\_Rev1**

Irish Offshore Strategic Environment Assessment 6

Strategic Environmental Assessment - Environmental Report

Author/s

Emma Kilbane/Emma Langley/Aodhfin Coyle/Rob Daniels

Project Manager

Authoriser

Emma Langley

Eric Houston

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	02/11/2022	Draft	ESL	LH	LH
Rev 1	25/11/2022	Incorporating client comments	AC	ESL	JEH

Intertek Energy & Water Consultancy Services is the trading name of Metoc Ltd, a member of the Intertek group of companies.

## NON-TECHNICAL SUMMARY

This document has been prepared for the Department of the Environment, Climate and Communications (DECC) by Intertek Energy and Water Consultancy Services (Intertek). It is the Environmental Report (ER) resulting from the Strategic Environmental Assessment (SEA) of the 'Plan for assessment of applications for Petroleum (oil and gas) Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030 (hereafter referred to as 'the Plan').

Article 5, Annex I (j) of the SEA Directive requires a non-technical summary of the information under the headings listed in Annex 1.

### Purpose of the Environmental Report

This Non-Technical Summary (NTS) outlines the process, methods, outcomes, and future stages of the SEA which have been undertaken for the Plan.

SEA is the process for environmental assessment of Plans and Programmes (PP) and is undertaken in parallel with the preparation of the PP to ensure that any environmental effects are considered during the Plan's preparation and adoption. It is required under the European Commission (EC) SEA Directive (2001/42/EC), which has been transposed into Irish law in 2004 through the following:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, (S.I. 435 of 2004) as amended in 2011; and
- Planning and Development (Strategic Environmental Assessment) (Amendment Regulations 2011, (S.I. No. 201 of 2011), amending the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. No. 436 of 2004).

The aim of the NTS is to assist the reader in understanding what the potential environmental effects of implementing the Plan are likely to be, should the Plan be implemented by DECC.

The ER is the main consultation document of the SEA and provides a description of the environment in the Plan Study area, in terms of the environmental baseline and the assessment of potential significant environmental effects, alongside proposed measures to mitigate and monitor environmental effects during the lifetime of the Plan.

The following objectives have been defined for IOSEA6:

- To inform DECC of specific environmental considerations in petroleum activities taking place under both existing petroleum authorisations and any follow-on authorisations that may be granted during the lifetime of the "*Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the Period to 2030*", in line with current policy and legislation.
- To provide petroleum authorisation holders an operational baseline against which they can conduct activities whilst ensuring the protection of the marine environment, in line with current best practice and lessons learned from previous IOSEAs.

### Context and Objectives of the Plan

DECC is preparing a 'Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030' ("the Plan"). The Plan is being considered in the context of both SEA and Appropriate Assessment (AA), with the entire project referred to as Irish Offshore Strategic Environmental Assessment 6 ('IOSEA6'). This Plan will replace the existing Plan (which was the subject of IOSEA5) and will incorporate recent policy and legislative developments. It will set out the approach to the granting of petroleum

authorisations in Irish waters in the period to 2030, and the consenting of the possible offshore activities (seismic surveys and the drilling of wells) that could take place under an authorisation, subject to Ministerial consent.

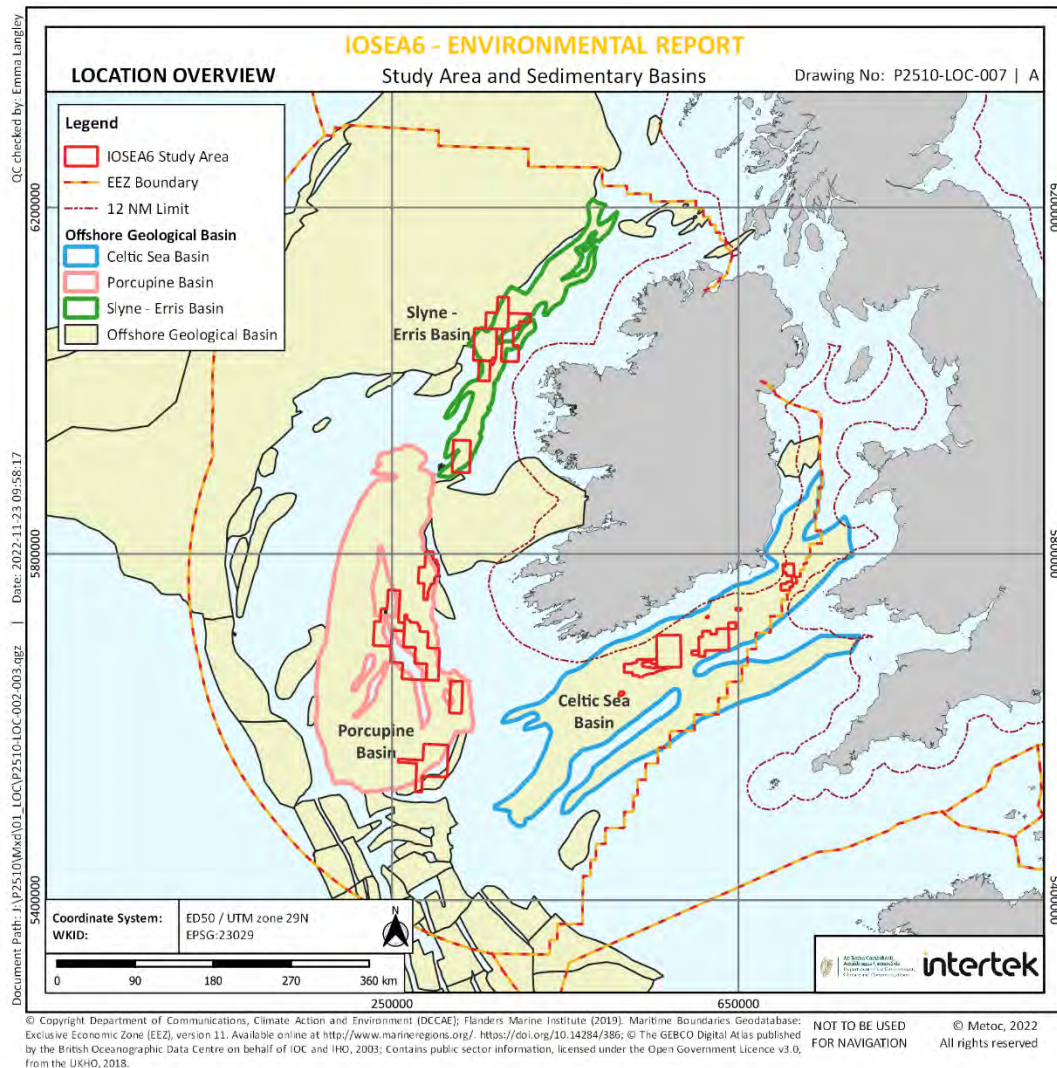
The purpose of the Plan is to provide a framework for the Issuing of Petroleum Authorisations in Irish Offshore Waters that incorporates recent policy and legislative developments. Key activities that could be undertaken under an authorisation include seismic surveys and the drilling of exploration, appraisal and production wells.

Since the publication of the existing Plan, there have been several developments. The “Programme for Government - Our Shared Future” - adopted in June 2020, sets a clear pathway towards less reliance on fossil fuels across every sector of society and specifically contains a commitment to end the issuing of new licences for the exploration and extraction of gas on the same basis as the decision taken in 2019 by the previous Government in relation to oil exploration and extraction.

This commitment was made effective immediately upon the current Government taking office (holders of existing authorisations are not affected by these changes and may apply to progress their authorisations through the licensing stages towards a natural conclusion). This commitment was then placed on a statutory footing through the Climate Action and Low Carbon Development (Amendment) Act 2021 (commenced on 7 September 2021), which resulted in several amendments to the Petroleum and Other Minerals Development Act 1960. A policy statement was published by the Department in August 2022 in relation to petroleum exploration and extraction, which reflects the current policy in light of the Programme for Government commitment, as well as providing clarity to stakeholders in relation to future authorisations which may be granted under legislation.

The Plan to be assessed under IOSEA6 will only grant petroleum (oil and gas) authorisations in areas currently under existing authorisations for petroleum activities to the west, south and south-east of Ireland. Offshore areas which are not currently subject to an authorisation will not be able to be licensed in the future. The IOSEA6 Study Area is shown in Figure 1.

Figure 1 - Area covered by the Plan and SEA ER



The main objectives of the Plan are:

- To set out the proposed approach to the issuing of petroleum authorisations in Ireland, and the consideration of the possible offshore exploration activities that could take place under such authorisations, to reflect the 2020 Programme for Government commitment to end the issuing of new Petroleum Authorisations for the exploration and extraction of gas in line with the 2019 Government Decision on oil exploration and extraction and which was given statutory underpinning in the Climate Action and Low Carbon Development (Amendment) Act 2021, and commenced 7 September 2021.
- To provide petroleum authorisation holders with an operational baseline against which they can conduct activities whilst ensuring the protection of the marine environment, in line with current best practice and lessons learned from previous IOSEAs.

The format and content of the draft Plan issued for consultation is summarised in Table 1.

**Table 1 - Summary of the contents of the draft Plan**

Section	Summary of Content
Section 1: Introduction	The “Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the Period to 2030” sets out the proposed approach to the issuing of petroleum authorisations in Ireland, and the consideration of the possible offshore exploration activities that could take place under such authorisations.
Section 2: Policy and Legislative Background	A policy context including the relevant national, EU and international policy context for oil and gas exploration and the potential impacts and drivers for the sector.
Section 3: Current Status of Petroleum exploration in Ireland	A brief introduction into the current status of petroleum exploration in Ireland, including the geographic scope of the 6th Irish Offshore Strategic Environmental Assessment (IOSEA6) based on the blocks from the Offshore Ireland Petroleum Exploration & Development Concession Map issued on 31st December 2021.
Section 4: Plan for assessment of applications for Petroleum Exploration and Production Authorisations	<ul style="list-style-type: none"> <li>▪ Government Policy for issuing of Petroleum Authorisations</li> <li>▪ Types of Petroleum Authorisation listed under the Petroleum and Other Minerals Development Act 1960 <ul style="list-style-type: none"> <li>▪ Petroleum Prospecting Licence</li> <li>▪ Licensing Option</li> <li>▪ Exploration Licence</li> <li>▪ Lease Undertaking</li> <li>▪ Petroleum Lease</li> </ul> </li> <li>▪ Reserved Area Licence</li> </ul>
Section 5: Offshore Activities	Offshore exploration and production activities under petroleum authorisations will continue to be considered under the relevant legislation (i.e., the 1960 Act for plans for working of petroleum under a lease). Activities under an exploration licence or petroleum prospecting licence are subject to Environmental Impact Assessment (EIA) Screening and assessment procedures provided under Regulations 3 and 4 of the European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (S.I. 134 of 2013), as amended by the European Union (Environmental Impact Assessment) (Petroleum Exploration) (Amendment) Regulations 2019 (S.I. 124 of 2019).
Section 6: Activities Subject to EIA/AA screening [& full assessment if required]	<p>Summary of legislation that requires and EIA/AA screening and full assessment under European and Irish Law:</p> <ul style="list-style-type: none"> <li>▪ European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (as amended) S.I. 134 of 2013 and European Union (Gas Act 1976);</li> <li>▪ Petroleum and Other Minerals Development Act 1960 contain Environmental Impact Assessment (EIA);</li> <li>▪ All applications for offshore activities under a Petroleum Authorisation will continue to be subject to EIA/AA screening [and full assessment if required in accordance with the requirements set out in Directive 2011/92/EU];</li> <li>▪ Regulations 3 and 4 of the European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (S.I. 134 of 2013);</li> <li>▪ European Union (Gas Act 1976) (Environmental Impact Assessment) Regulations 2021 (the 2021 EIA Regulations);</li> <li>▪ Section 13 of the Petroleum and Other Minerals Development Act 1960 (the 1960 Act) for approval of the 'working of petroleum; and</li> </ul>

Section	Summary of Content
	<ul style="list-style-type: none"> <li>The European Communities (Birds and Natural Habitats) Regulations 2011-15, as amended (Birds and Natural Habitats Regulations).</li> </ul>
Section 7: Scenarios and Assumptions for the Plan	<p>Levels of activity for:</p> <ul style="list-style-type: none"> <li>Seismic Survey; and</li> <li>Wells (Exploration, Appraisal and Production).</li> </ul>

A review of the Draft Plan's relationship with other PP was undertaken as part of the assessment, which enabled relevant environmental protection objectives to be identified and taken into account in the preparation of the Plan. Environmental protection objectives which have been identified include: protection of various aspects of biodiversity, flora and fauna, cultural heritage and water quality, controls on emissions and sustainable development, including marine planning.

## Current Environmental Conditions and SEA Objectives

An environmental baseline was prepared for the relevant SEA environmental receptors that were agreed during the scoping stage. The baseline has informed the environmental assessment that evaluates the environmental effects that could result from implementation of the Plan. Environmental receptors, which are the most sensitive to the potential effects of the Plan, are *Air Quality; Biodiversity, Flora and Fauna; Climatic Factors; Cultural, Architectural & Archaeological Heritage; Economy and Material Assets; Geology, Substrates and Coastal Sediments; Landscape and Seascape; Population and Human Health; and Water*. Assessment of likely significant effects on the environment was carried out against a range of SEA objectives for these topics. The agreed upon SEA objectives were kept broad to allow for a wide range of environmental topics to be considered.

The SEA objectives (SEOs) used in the assessment were:

1. Minimise emissions to the air.
2. Avoid damage to the biodiversity, flora and fauna of Ireland, its seas and transboundary waters, particularly EU designated sites and protected species.
3. Contribute to the delivery of the climate action plan and green economy, including the objectives set out in the climate action plan.
4. Prevent damage to or loss of heritage features including maritime heritage.
5. Protect and enhance the existing oil and gas infrastructure and ports servicing the sector.
6. Avoids disruption, disturbance and nuisance to communities and their sources of income (e.g. commercial fishing, aquaculture, tourism and recreation etc).
7. Protect the quality of the seabed, coastline and its sediments.
8. Protect the landscape/seascape character and visual amenity.
9. Ensure no adverse impact on human health and wellbeing.
10. Minimise impacts on water quality and support the achievement of the objectives of the Marine Strategy Framework Directive.

The environmental baseline identified a number of environmental problems that have been deemed relevant for the Plan and the surrounding areas including:

- Greenhouse Gas emissions;
- Atmospheric emissions (PM2.5);

- Air quality not meeting World Health Organisation (WHO) standards;
- Maintenance of condition of designated sites, under the requirements of the EC Habitat and Bird Directives;
- Anthropogenic disturbance in the marine environment e.g. vessel presence and noise, fishing activities) and the pressures (e.g. displacement, disturbance, avoidance or mortality) resulting on marine life;
- Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms;
- Loss and damage (e.g. by fishing activities, anchorage) on non-designated but important habitats and species and Annex I Habitats (including potential habitats);
- Introductions of Invasive Non-Native Species (INNS);
- Marine litter;
- Sea level rise;
- pH level decreasing;
- Sea surface temperature rising;
- Climate change leading to damage to cultural heritage;
- Overfishing;
- Sediment contamination;
- Impacts on Seascape Character Type due to growth in renewables;
- Agriculture impacting water quality;
- Hydromorphology;
- Urban runoff pressures;
- Nutrient input; and
- Wastewater and fouling.

The likely evolution of the environment without implementation of the Draft Plan (i.e. if the previous Plan was to remain in place) would be similar to the current baseline.

## Alternatives Considered

The SEA Directive requires that the assessment identifies and evaluates reasonable 'alternatives' to what is proposed within the Plan. DECC consider that renewable energy will be the main source of energy in the near future, however, there is still a short term need to examine Ireland's offshore hydrocarbon resources, hence there is a requirement for a revised plan for issuing authorisations. The available alternative options have been considered in the context of Irish energy policy.

The continuation of the level of activities as permitted under the previous Plan (i.e. maximum of 10 wells per annum, 25,000km of 2D seismic survey per annum and 20,000km<sup>2</sup> of 3D seismic survey per annum) is not consistent with DECC's policy approach and legislation, therefore, is not a realistic alternative. Cessation of issuing authorisations is also not a viable option. As such the following alternative Options for assessment have been identified.

**Table 2 - Options Considered in the SEA**

Option A			Option B		
Activity	Maximum over duration of plan	Maximum in any one year	Activity	Maximum over duration of plan	Maximum in any one year
Wells drilled	15	3	Wells drilled	23	6
2D seismic survey acquired	8,000km	2,000km	2D seismic survey acquired	12,000km	4,000km
3D seismic survey acquired	4,000km <sup>2</sup>	1,000km <sup>2</sup>	3D seismic survey acquired	6,000km <sup>2</sup>	2,000km <sup>2</sup>

The adopted Option will be subject to modifications from the SEA/AA process.

The above limits are a reduction from the volumes of activities permitted under the Previous Plan. It is possible that actual levels of activity will be lower than these values. The amount of seismic survey and exploration wells undertaken during the period 2015-2020 (which was subject to IOSEA5) was less than the maximum permitted by the Plan. Over the entire duration of the IOSEA5 Plan (i.e. in the period 2015-2020), there was a sum total of three wells drilled, 15,533.5km 2D seismic acquisition and 20,695km<sup>2</sup> 3D seismic acquisition.

## Assessment Methods

SEA is a strategic level assessment; therefore, it is not possible for the environmental assessment to be undertaken in as much detail as at project-level. Each alternative Option was assessed against the SEOs. The baseline for the assessment is determined to be the Previous Plan (i.e. the plan assessed under IOSEA5), therefore, as the two Options being assessed permit a smaller extent of seismic activity and exploration well drilling they have a lesser effect overall environmentally.

The environmental assessment includes a combination of qualitative assessment and expert judgment. GIS has been used for mapping the baseline and the assessment considers the location of these receptors in relation to the IOSEA6 Study Area. The assessment used oil spill modelling undertaken on behalf of the Petroleum Infrastructure Programme (PIP) to inform where an accidental oil spill may spread to.

A number of gaps were identified in the SEA baseline data. These included:

- Gaps in data collation due to COVID 19 pandemic causing surveying and sampling to be disrupted from 2020 to 2021. As a result of the reduced activity in the offshore area, there is a data gap between these years, and the baseline may have changed. Where it was not possible to use surveyed data of the IOSEA6 Study Areas, modelled data was used where applicable.
- There is also a lack of comprehensive sediment analysis within all the blocks of the Study Area. This is not determined to be essential to the assessment at Plan level. At Project level additional seabed information will be collated prior to drilling to characterise the project area.
- Offshore wind turbine visibility to the coast has been assessed, however, there is no visual assessment in relation to oil and gas infrastructure, however, due to the distance offshore it is determined that visual disturbance will be minimal.
- The issue of the lack of overview of commercial fish distributions which was identified in IOSEA5 still remains.
- Since most discharges are terrestrial and marine discharges are generally more concentrated in coastal waters, the Marine Institute (MI's) national monitoring for hazardous substances is risk-based and

predominantly focused on coastal seas (e.g. shipping converging around ports). Monitoring is not routinely extended outside Irish coastal waters if problems are not discovered in inshore waters, unless there is a specific risk, such as specific offshore sources.

## Environmental Assessment Findings

The assessment against the SEOs determined that both Options support the delivery of the SEO or on balance have a neutral contribution. Table 3 summarises the assessment against the SEOs. The assessment was split separately for seismic and drilling activities as both result in different environmental effects. There were several times where the drilling activity could detract from the SEO. These were in relation to hydrocarbon spill (e.g. well blowout) that could lead to the potential for negative effects on the SEOs and receptors.

**Table 3 - Summary of the results of the assessment of Plan Options**

SEA Topic	SEA Objective	Activity	Option A	Option B
Air Quality	1. Minimise emissions to the air.	Seismic	Support SEO	Support SEO
		Drilling	Support SEO	Neutral contribution to SEO
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna of Ireland, its seas and transboundary waters, particularly EU designated sites and protected species.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Detracts from SEO	Detracts from SEO
Climatic Factors	3. Contribute to the delivery of the climate action plan and green economy, including the objectives set out in the climate action plan.	Seismic	Support SEO	Support SEO
		Drilling	Support SEO	Neutral contribution to SEO
Cultural, Architectural & Archaeological Heritage	4. Prevent damage to or loss of heritage features including maritime heritage.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Economy and Material Assets	5. Protect and enhance the existing oil and gas infrastructure and ports servicing the sector.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
	6. Avoids disruption, disturbance and nuisance to communities and their sources of income (e.g. commercial fishing, aquaculture, tourism and recreation etc).	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Geology, substrates and coastal sediments	7. Protect the quality of the seabed, coastline and its sediments.	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Detracts from SEO
		Seismic	Support SEO	Support SEO

SEA Topic	SEA Objective	Activity	Option A	Option B
Landscape and Seascape	8. Protect the landscape/seascape character and visual amenity.	Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Population and Human Health	9. Ensure no adverse impact on human health and wellbeing.	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Water	10. Minimise impacts on water quality and support the achievement of the objectives of the Marine Strategy Framework Directive.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Detracts from SEO	Detracts from SEO

Assessment of the likely significant environmental effects of the two options concluded that there is the potential for negative effects on *Air Quality, biodiversity, Flora and Fauna, Climatic Factors, Economy and Material Assets, Landscape and Seascape, Population and Human Health and Water* from implementation of the Plan. These potential effects on the SEA topics resulting from seismic and drilling activities are summarised below:

- **Air Quality:** Negative effects on air quality due to emissions from vessel and helicopter combustion and flaring, however, less emissions than under the Previous Plan due to reduction in the extent of permitted seismic survey and drilling activity.
- **Biodiversity, Flora and Fauna:** Negative effects on biodiversity, flora and fauna may include underwater noise during seismic survey, contaminated cuttings discharge and chemical/mud/cement/cuttings discharge, disturbance of marine mammals and birds due to presence of vessels and helicopters, habitat disturbance and impact to benthos through anchoring or placement of equipment on the seabed and drilling and disturbance of birds due to flaring. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on biodiversity, flora and fauna in local and transboundary waters.
- **Climatic Factors:** Negative effects on climatic factors due to emissions of greenhouse gases, however, less emissions than under the Previous Plan due to reduction in the extent of permitted seismic survey and drilling activity.
- **Cultural, Architectural & Archaeological Heritage:** Minimal effects predicted on submerged cultural heritage due to physical damage from drilling operations and seismic surveys.
- **Economy and Material Assets:** Negative effects on fishing industry due to exclusions around survey vessels and drilling rigs. Conflict of space during operations for other marine users. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on the economy.
- **Geology, substrates and coastal sediments:** Minimal effects predicted to seabed due to physical damage from drilling operations. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on coastal sediments.
- **Landscape and Seascape:** Seismic surveys and drilling will not impact the landscape/seascape character. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on coastal landscape and seascape.
- **Population and Human Health:** An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on population.
- **Water:** Negative effects on water quality due to accidental release of fuel from vessels and chemical discharges from drilling operations. Negative effects due to release of mud/cement/cuttings to the water column. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on water quality in local and transboundary waters.

## Cumulative and Synergistic Effects

Cumulative and synergistic effects were also considered. Cumulative effects could arise from the combined effects of the IOSEA6 activities and other plans and activities within the area. Synergistic effects could arise from interactions between activities leading to a greater overall effect than the sum of the individual effects. Activities and developments that were considered included Offshore Renewable Energy (ORE) project site investigations, construction, operation activities, fisheries, aquaculture, seaweed harvesting, marine aggregates and mining, port and harbour developments, tourism and recreation, cable installations, wastewater treatment & disposal sites, general shipping and other O&G activities such as geo-technical/geo-physical survey and drilling production wells.

The assessment found that development of the other large projects (such as ORE) and activities permitted by the draft Plan could lead to cumulative negative effects on all SEA topics. It is likely that good planning and timing of works will minimise the potential for negative cumulative and in-combination effects.

These potential cumulative effects on the SEA topics are summarised below:

**Table 4 – Cumulative effects**

SEA Topic	Description of total effects of the plan
Air Quality	<b>Atmospheric emissions:</b> Use of fuel for vessels for activities related to IOSEA6 activities, fishing, shipping, and ORE surveys causes release of SO <sub>2</sub> and NO <sub>x</sub> which can cause cumulative impacts on air quality.
Biodiversity, Flora and Fauna	<p><b>Underwater sound changes and the subsequent effects on birds, fish and marine mammals:</b> Noise generated from air guns during seismic surveys have the potential to impact marine mammals.</p> <p><b>Disturbance to the seabed:</b> Loss and damage on non-designated but important habitats and species</p> <p><b>Atmospheric emissions:</b> Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms.</p> <p><b>Physical presence:</b> There is the potential that seabirds and marine mammals may be physically disturbed by the presence of survey vessels and equipment. Both visual and noise disturbance may result from the presence of the vessels and equipment whilst noise disturbance is likely to be the most significant cause of disturbance during borehole operations</p> <p><b>Accidental events:</b> Loss and damage on non-designated but important habitats and species</p>
Climatic Factors	<b>Atmospheric emissions:</b> Increase in greenhouse gas emissions can result in sea level rise, pH level decreasing and rise of sea surface temperature.
Cultural, Architectural and Archaeological Heritage	<p><b>Disturbance to the seabed:</b> May result in minor impacts where releases occur in close proximity to historic wrecks both known and unknown. Currently unquantifiable due to lack of information on actual well locations and proximity to historic wrecks. Notable that historic wrecks may also act as a contaminant and release chemicals and dangerous substances into the marine environment.</p> <p><b>Physical Presence:</b> Physical damage can occur from associated vessel/rig anchoring. Additionally, loss of access to submerged cultural heritage can occur through loss of access.</p> <p><b>Accidental events:</b> Potential impacts from hydrocarbon spill on coastal archaeology and historic wrecks, which are primarily associated with smothering and damage from clean-up operations rather than from the spill itself.</p>
Economy and Material Assets (Commercial Fisheries / Aquaculture /	<b>Underwater sound changes and the subsequent effects on birds, fish and marine mammals:</b> Potential for disturbance and displacement of mobile marine life. Therefore, affecting Economy and Material Assets.

SEA Topic	Description of total effects of the plan
Marine-related activities and communities / Tourism and Recreation)	<p><b>The temporary displacement of other marine users (including fishing vessels):</b> If multiple sectors are operating in the same area this can impact mobile species ability to move away from disturbance.</p> <p><b>Disturbance to the seabed:</b> Loss and damage on non-designated but important habitats and species</p> <p><b>Atmospheric emissions:</b> Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms.</p> <p><b>Physical presence:</b> There is potential for interactions between fishing vessels and seismic survey operations. No impacts predicted to aquaculture and tourism due to the offshore location of the IOSEA6 Study Areas.</p> <p><b>Accidental events:</b> Potential for impact on / death of marine life due to loss of equipment / collision. Potential impacts on receptors if hydrocarbon spill occurs.</p>
Geology, Substrates and Coastal Sediments	<p><b>Disturbance to the seabed:</b> Localised areas of the seabed will be disturbed by drilling which can take place with OWF activities and IOSEA6 drilling.</p> <p><b>Accidental events:</b> Oil may enter the marine environment during seismic and/or drilling operations as a result an accidental event.</p>
Landscape and Seascape	<p><b>Physical Presence:</b> Potential for negative visual effects which could also affect the Seascape/Landscape character, but likely to be negligible due to the distance from the coast.</p> <p><b>Accidental events:</b> Hydrocarbon contamination from a large event i.e. blowout or from vessel spills can have the potential to effect the quality of the receptors.</p>
Population and Human Health	<p><b>The temporary displacement of other marine users (including fishing vessels):</b> Multiple operations with buffer zones can exclude marine users from certain areas.</p> <p><b>Disturbance to the seabed:</b> Indirect effects of sea water contamination affecting fish/shellfish and then passing into the food chain.</p> <p><b>Atmospheric emissions:</b> Increase in atmospheric emissions contributing to climate change which will indirectly effect populations and human health.</p> <p><b>Physical presence:</b> Potential for death or injury of workers or other users of the sea due to vessel collision.</p> <p><b>Accidental events:</b> A severe hydrocarbon and PAH contamination could lead to direct (e.g. restrictions to activities in the local area) or indirect (e.g. reduced amenity value, impact to water quality or marine life) impacts on recreation and tourism.</p>
Water Quality	<p><b>Disturbance to the seabed:</b> Release of oil and chemicals etc to the water, with a direct effect on the water quality. Impacts on water quality would indirectly impact ecology, recreation value, and also have potential impacts for human health (via food uptake routes).</p> <p><b>Atmospheric emissions:</b> Increase in atmospheric emissions due to cumulative impact from all industries can cause sea surface temperature to rise, changes in salinity and changes in pH levels.</p> <p><b>Accidental events:</b> Release of diesel, chemicals etc. to the water from multiple industries e.g. waste treatment, with a direct effect on the water quality. Impacts on water quality would indirectly impact ecology, recreation value, and also have potential impacts for human health (via food uptake routes). If a large scale blowout occurred these effects may be major.</p>

There is inevitably uncertainty in predicting cumulative and synergistic effects and determining their significance due to the strategic nature of this study and the current lack of detailed proposal plans and timelines. In addition, uncertainty can arise due to the variation in natural systems and their interactions, a lack of reliable and up to date information, sufficient scientific agreement regarding cause-effect relationships and the inability to adequately understand and represent complex systems and the potential implications of cumulative and synergistic effects on these systems.

## Mitigation Measures

Measures envisaged to prevent, reduce and as fully as possible offset any significant adverse environmental effects of implementing the Plan were numerous and include the following to be considered at Project level:

- Under the MARPOL Convention and EU law, as applicable in national law, ships may not cause pollution either by discharge to water or emissions to air, when at sea or when at berth in port.
- Annex VI of MARPOL covers the prevention of air pollution from ships.
- Flaring should only be undertaken when required. Best Available Techniques Guidance on upstream hydrocarbon exploration and production published by the European Commission should be followed.
- Application of mitigation measures listed in relation to seismic survey and drilling in the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014).
- Under Annex IV of the EU Habitats Directive 92/43/EEC cetaceans are listed as requiring strict protection. Therefore seismic surveys should screen for potential impact to Annex IV species and where necessary Appropriate Assessment will be undertaken.
- DECC will act as a central coordinator of seismic activity which will also include surveys carried out under Marine Scientific Research (MSR) provisions on the Irish Continental Shelf. The 100 km separation distance is a standard condition of all survey approvals.
- Design / implementation of schemes should minimise disturbance to biodiversity as well as wildlife protection measures.
- Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
- Surveys could be undertaken to determine European Protected Species (EPS) and basking sharks presence in areas where development is proposed.
- Lighting on-board the vessels will be kept to the minimum level required to ensure safe operations. This will minimise disturbance to seabird species without compromising marine navigation requirements and health and safety of offshore workers.
- Vessels will be travelling at a slow speed during works to minimise impacts of disturbance and minimise the risk injury impacts to marine mammals.
- Flaring should be minimised as much as is practically possible in order to reduce the potential for adverse impacts on seabird populations
- Seabed habitat information should be obtained, using surveys if necessary, prior to any deployment in order to assess the potential for damage, and deployment on the most sensitive habitats should be avoided. The European Communities (Birds and Natural Habitats) Regulations provide for the management of Natura 2000 sites and the strict protection of animal species. Any activity carried out under a petroleum authorisation is, therefore, subject to AA Screening/AA as appropriate.
- Deployment of anchor chains will be kept to a minimum.
- The consideration of potential impact to the benthic community is a component requirement of the EIA Directive and in the Habitats Directive assessments, where there is existence of benthos.
- Appropriate site assessment and planning, to include determination of the location of any potentially sensitive benthic habitats, along with modelling and assessment of the potential for accumulation and dispersal of cuttings, should be carried out prior to selection of final drilling locations in order to reduce the potential for significant impacts.

- Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention).
- Discharge of chemicals is controlled through DECC consenting process for use of chemicals in the O&G industry.
- All petroleum activities, under an exploration licence or petroleum prospecting licence, including seismic surveys are subject to the requirements of the European Communities (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 as amended and European Union( Gas Act 1976) ( Environmental Impact Assessment ) regulations 2021 with respect of EIA.
- As per the MARPOL 73/78 requirement under Annex I, all ships with 400 GT and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization under MEPC (Marine Environmental Protection Committee) act.
- Notification to the Irish Coast Guard if the activity occurs within or near an International Maritime Organisation (IMO) designated Traffic Separation Scheme. Employ the safety measures detailed in 'traffic routing systems' (IMO) wherever possible to reduce the probability for collisions.
- A Fisheries Liaison Officer (FLO) will be employed to manage interactions between vessels, personnel, equipment and fishing activity. This will be managed through the Fisheries Liaison Mitigation Action Plan.
- Notification to fishing vessels and the Sea Fisheries Protection Authority and DECC of the location and timing of seismic surveys and drilling operations. The notices include the time and location of any work being carried out, and emergency event procedures.
- Notice to Mariners (including local), Kingfisher bulletins, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings will be promulgated in advance of any proposed works. The notices include the time and location of any work being carried out, and emergency event procedures.
- Vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ship standards.
- Compliance with all OSPAR Agreements, Recommendations, Strategies, Decisions and Guidelines and MARPOL legislation relating to protection of the marine environment from the potential effects of discharges.
- To use best practice technologies to reduce the concentrations of chemicals discharged,
- Use of OSPAR list of Substances/Preparations Used and Discharged Offshore which are Considered to Pose Little or No Risk to the Environment (PLONOR) in all drilling practices wherever possible.
- Zero discharge of chemicals on the OSPAR List of Chemicals for Priority Action (LCPA).
- Implementation of OSPAR Recommendation 2006/3 to phase out discharge of offshore chemicals that are, or which contain substances identified as candidates for substitution and phasing towards the cessation of these discharges from offshore installations.
- To reduce usage by the best means practicable of chemicals on the OSPAR List of Substance of Possible Concern.
- All drilling operations to ensure compliance with Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- Utilisation of oil-based muds (OBM) or synthetic-based muds (SBM) to be kept to a minimum and all OBM or SBM to be collected through closed system and brought ashore for re-use, recycling or disposal.
- Ensure minimal use of chemicals where biodegradation is less than 20% during 28 days, and specify use of substances that meet the Persistent, Bioaccumulative and Toxic (PBT) criteria. Both of these measures are used by OSPAR as criteria to assess improvement in the industry over time.

- All chemicals used on drilling units must have prior approval according to a system in which chemical formulation is continually reviewed and revised to eliminate or minimise harm to the environment through factors such as toxicity and bioaccumulation.
- An Emergency Spill Response Plan will help to ensure that the potential for release of pollutants from vessels and rigs is minimised.
- Production of this plan will help to ensure that the potential for release of pollutants from construction, operation and decommissioning is minimised.
- Any oil spill, however small, must be reported immediately to the Irish Coast Guard. The level and manner of the required oil spill response will be overseen by the Irish Coast Guard, and determined by the volume and type of oil spilled, and the weather and sea conditions at the time.
- Any oil spill likely to have impacts in UK waters must be reported by the Irish Coast Guard to the relevant UK authorities. The Irish Coast Guard has a close working relationship with the UK Maritime and Coast Guard Agency (MCA) and the two have a draft Service Level Agreement for co-operation on search and rescue and oil spill response in place. The Irish Coast Guard and the UK MCA also regularly conduct joint search and rescue and oil spill response exercises.
- Potentially hazardous operations should be carried out under appropriate weather/tide conditions
- Implementation of an Oil Pollution Emergency Plan (OPEP). The OPEP is designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects. An OSCP is required under the Sea Pollution (Amendment) Act 1999, and this requirement is re-stated in the DCENR Rules and Procedures Manual (DCENR, 2014). The OSCP is designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects. The OSCP must be submitted to the Irish Coastguard for approval.
- Management of ship waste (mainly oil, hazardous and polluting substances, sewage, garbage and polluting emissions to air) and of all cargo residues must be ensured as required under international (IMO), EU and national law. Under existing provisions ships are obliged to discharge waste and cargo residues at port and ports are obliged to provide facilities for their reception from ships.
- The crew of the drilling rig/ship should undergo environmental awareness and safety training. All equipment used on the rig/ship should have safety measures built in to minimise the risks of any oil spillage. All operations where appropriate, shall apply best available technologies, best environmental practice and clean technology. This is the aim of the requirement of DECC (2011) for operators to have accredited and verified environmental management systems.

## Monitoring

Article 5, Annex 1 (i) of the SEA Directive requires a “description of the measures envisaged concerning monitoring in accordance with Article 10”. Article 10 of the SEA Directive requires that monitoring be carried out in order to identify, at an early stage, any unforeseen adverse effects due to implementation of a plan/policy, and to be able to take remedial action. Monitoring is carried out by reporting on a set of targets and indicators, which enable positive and negative impacts on the environment to be measured.

As this is a high-level national Plan and no significant negative environmental effects are predicted monitoring will focus on Project level activities.

Applications for Approval to conduct activities should be submitted to the Geoscience Regulation Office accompanied by a screening for EIA and AA assessing the potential environmental effects of activities in a specific location.

As part of this process, the operator is also required to provide the Geoscience Regulation Office in DECC the most recent and relevant information of the potential environmental impacts of their proposed activities to

ensure that the operations being proposed are not in conflict with the SEA objectives outlined under the draft Plan, while the Geoscience Regulation Office will be responsible for seeking observations from relevant bodies on the details of the application.

DECC is satisfied that under these conditions, alongside the requirement for all applications to comply with international and national conventions, directives and legislation and to apply the best available technologies, best environmental practice, and clean technology, that the monitoring of the activities is accurately captured at the project level of each individual application throughout the life of each such project.

When a project obtains ministerial consent, the operator is required to comply with a list of commitments to ensure environmental protection. DECC will in any event conduct compliance check following conclusion of the project operations. In 2030, should a new plan be initiated, any new SEA process will monitor the effectiveness of the previous SEA.

Following identification of any unforeseen significant adverse effects the IOSEA6 Plan will be modified to provide remedial actions or mitigation measure to prevent, reduce or offset these effects. This will be undertaken in consultation with other bodies and the public where appropriate.

## CONCLUSION

In summary, Option A was determined to be the preferred option:

Activity	Maximum over duration of plan	Maximum in any one year
Wells drilled	15	3
2D seismic survey acquired	8,000km	2,000km
3D seismic survey acquired	4,000km <sup>2</sup>	1,000km <sup>2</sup>

It provides a significant reduction in the extent of permitted seismic survey activity, with a 92% reduction in 2D and 95% reduction in 3D seismic survey activity per year, compared to the Previous Plan. Option A also permits significantly less exploration wells to be drilled than under the Previous Plan with a 70% reduction per year. This reduction in the level of activities minimised the likely significant effects on the environment and supports the most SEO's.

## How to comment on this Report

This Environmental Report has been published alongside the Draft Plan. Both are available to download from <https://www.gov.ie/IOSEA6/>

Hard copies of the Draft Plan and the Environmental Report will be available for viewing, free of charge, at the following location:

**Geoscience Policy Division**  
**Department of the Environment, Climate and Communications**  
**29-31 Adelaide Road**  
**Dublin, D02 X285**  
**Ireland**

The documents are available during the normal opening hours of the facility.

You are hereby invited to express your views on this Environmental Report and the Draft 'Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030. Please send your comments by email to [GSPD@decc.gov.ie](mailto:GSPD@decc.gov.ie) or by post to:

**Geoscience Policy Division  
Department of the Environment, Climate and Communications  
29-31 Adelaide Road  
Dublin, D02 X285  
Ireland**

The consultation period runs from 28 November 2022 to 13 January 2023. Any comments that you wish to make should be submitted by email or in writing no later than **Friday 13<sup>th</sup> January 2023**.

# CONTENTS

	<b>DOCUMENT RELEASE FORM</b>	<b>I</b>
	<b>NON-TECHNICAL SUMMARY</b>	<b>II</b>
	<b>GLOSSARY</b>	<b>XXI</b>
<b>1.</b>	<b>INTRODUCTION AND BACKGROUND</b>	<b>1</b>
1.1	Introduction	1
1.2	Scope and Purpose of IOSEA6	1
1.3	Purpose of this Report	3
1.4	Scoping Report Consultation	3
1.5	Scope of the SEA	5
1.6	Scoping in and out of the SEA Topics	7
1.7	Structure of this Report	7
<b>2.</b>	<b>OUTLINE OF THE PLAN</b>	<b>8</b>
2.1	Background and Plan Overview	8
2.2	Objectives of the Plan	8
2.3	Content of the Draft Plan	9
2.4	Description of Exploration Activities	10
<b>3.</b>	<b>CONTEXT</b>	<b>13</b>
3.1	Policy and Legislative Background	13
3.2	Plan Overview	14
3.3	Relationship with other Plans and Programmes	14
3.4	Environmental Baseline	19
3.5	Limitations of the Data	22
3.6	Environmental Problems	24
3.7	Likely Evolution of the Environment without implementation of Revised Plan	26
3.8	Environmental Topic Inter-Relationships	29
3.9	SEA Objectives	30
<b>4.</b>	<b>ASSESSMENT OF ENVIRONMENTAL EFFECTS</b>	<b>32</b>
4.1	Identification of Alternatives	32
4.2	Assumptions of the Plan	34

4.3	Assessment Methods	34
4.4	Assessment of Alternatives	41
4.5	Summary of Effects	42
4.6	The Preferred Alternative	43
4.7	Cumulative Assessment	43
4.8	Habitats Directive Appropriate Assessment	64
<b>5.</b>	<b>MITIGATION AND MONITORING</b>	<b>67</b>
5.1	Measures Envisaged for the Prevention, Reduction and Offsetting of Any Significant Adverse Effects	67
5.2	Monitoring	72
<b>6.</b>	<b>CONCLUSION AND NEXT STEPS</b>	<b>74</b>
	<b>REFERENCES</b>	<b>75</b>
	<b>APPENDIX A Plans, Programmes and Policy Review</b>	<b>A-1</b>
	<b>APPENDIX B Consultation Responses</b>	<b>B-1</b>
	<b>APPENDIX C Environmental Baseline</b>	<b>C-1</b>
	<b>APPENDIX D Full Assessment Results</b>	<b>D-1</b>

## LIST OF TABLES AND FIGURES

### Tables

Table 1 - Summary of the contents of the draft Plan	V
Table 3 - Summary of the results of the assessment of Plan Options	IX
Table 1-1 Key Stages in the SEA Process	3
Table 2-1 Summary of the contents of the draft Plan	9
Table 3-1 Summary of key plans, programmes and legislation relevant to the Plan	15
Table 3-2 Data sources to inform the baseline assessment	19
Table 3-3 Environmental problems relevant to the Plan	24
Table 3-4 Summary of future baseline for each topic	26
Table 3-5 Potential inter-relationships between SEA topics	30
Table 3-6 Draft SEA Objectives for the assessment of the Plan	31
Table 4-1 Option A maximum levels of activity	32
Table 4-2 Option B maximum levels of activity	33
Table 4-3 Significance criteria for assessment	40
Table 4-4 Summary of the results of the assessment of Plan Options	41
Table 4-5 Task 1 Identification of receptors for potential cumulative effects	45
Table 4-6 Threshold/Limit of each SEA Topic and current state of environments and likely evolution without the plan	51
Table 4-7 Total effects of a plan summarised	58
Table 4-8 Total effects of a plan summarised	59
Table 5-1 Measures envisaged for the prevention, reduction and offsetting of any significant adverse effects	68
Table 6-1 Anticipated plan-making and SEA milestones	74

### Figures

Figure 1-1: IOSEA6 Study Area (Drawing Number: P2510-LOC-006)	2
Figure 1-2: Study Area and Sedimentary Basins (Drawing Number: P2510-LOC-005)	6
Figure 4-1: Oil Spill Modelled Locations (Drawing Number: P2510-OIL-003-A)	37
Figure 4-2: Potential oil spill shoreline impact on Irish and UK (Drawing Number: P2510-OIL-004-A)	38
Figure 4-3: Probability of surface sheen across Irish and UK Waters (Drawing Number: P2510-OIL-005)	39

## GLOSSARY

### AA

Appropriate Assessment

### AIS

Automatic Identification System

### AMOC

Atlantic Meridional Overturning Circulation (AMOC)

### BIM

Board Iascaigh Mhara

### BOGA

Beyond Oil and Gas Alliance

### BOP

Blow out prevention

### CAL BP

CAL BP Calibrated years before present (1950); usually used when converting radiocarbon years to calendar years

### CAMP

Comprehensive Atmospheric Monitoring Programme

### CEA

Cumulative Effects Assessment

### CEFAS

Centre for Environment, Fisheries and Aquaculture

### CER

Commission of Energy Regulation

### CFC

Chlorofluorocarbons

### CH<sub>4</sub>

Methane

### CO

Carbon Monoxide

### CO<sub>2</sub>

Carbon Dioxide

### CPRS

Continuous Plankton Recorder Survey

### CTS

Cutting Transport System

### CSI

Cetacean Strandings Investigation

### CSO

Central Statistics Office

### DAERA

Department of Agriculture, Environment and Rural Affairs

### DAFM

Department of Agriculture, Food and the Marine

### DECC

Department of the Environment, Climate and Communications

### DHLGH

Department of Housing, Local Government and Heritage

### DP

Dynamic Positioning

### EC

European Commission

### EHS

Environmental Health and Safety

### EIA

Environmental Impact Assessment

### ELC

European Landscape Convention

### EM

Electromagnetic

### EMFF

European Maritime Fisheries Fund

### EMODNet

European Marine Observation and Data Network

### EPA

Environmental Protection Agency

### EQS

Environmental Quality Standards

### ER

Environmental Report

**EU**

European Union

**EUNIS**

European Nature Information Systems

**EUTS**

European Emissions Trading Scheme

**EWIC**

East West Interconnector

**FLO**

Fisheries Liaison Officer

**GACS**

Global Alliance of Continuous Plankton Recorder Surveys

**GBIF**

Global Biodiversity Information Facility

**GDP**

Gross Domestic Product

**GEBCO**

General Bathymetric Chart of the Oceans

**GES**

Good environmental status

**GHG's**

Greenhouse Gases

**GHG ETS**

Greenhouse Gas Emissions Trading Scheme

**GSI**

Geological Survey of Ireland

**GVA**

Gross Value Added

**HAS**

Health and Safety Authority

**HABMAP**

HABitat MAPping for conservation and management of the southern Irish Sea

**HABS**

Harmful Algal Bloom

**HAC**

High Ambition Coalition

**HSA**

Health and Safety Authority

**HSE**

Health Service Executive

**IBEG**

Irish Basking shark group

**ICES**

International Council for the Exploration of the Sea

**IEG**

Irish Elasmobranch Group

**IGFS**

Irish Groundfish Survey

**INNS**

Invasive Non-Native Species

**IOSEA1**

Irish Offshore Strategic Environmental Assessment 1

**IOSEA2**

Irish Offshore Strategic Environmental Assessment 2

**IOSEA3**

Irish Offshore Strategic Environmental Assessment 3

**IOSEA4**

Irish Offshore Strategic Environmental Assessment 4

**IOSEA5**

Irish Offshore Strategic Environmental Assessment 5

**IOSEA6**

Irish Offshore Strategic Environmental Assessment 6

**IPPC**

Integrated Pollution Prevention and Control

**ISPSG**

Irish Shelf Petroleum Studies Group

**ITOPF**

The International Tanker Owners Pollution Federation

**ISF**

Irish Shelf Front

**IWDG**

Irish Whale and Dolphin Group

**JAMP**

Joint Assessment and Monitoring Programme

**JNCC**

Joint Nature Conservation Committee

**LCPA**

List of Chemicals for Priority Action

**LSE**

Likely Significant Effect

**MCZ**

Marine Conservation Zone

**MESH**

Mapping European Seabed Habitats

**MI**

Marine Institute

**MIDA**

Marine Irish Digital Atlas

**MODU**

Mobile Offshore Drilling Units

**MMO**

Marine Mammal Observer

**MMMU**

Marine Mammal Management Unit

**MODU**

Mobile Offshore Drilling Units

**MPA**

Marine Protected Area

**MU**

Management Units

**MSFD**

Marine Strategy Framework Directive

**NADC**

North Atlantic Drift Current

**NAO**

North Atlantic Oscillation

**NDCA**

National Dialogue on Climate Action

**NIEA**

Northern Ireland Environment Agency

**NIS**

Natura Impact Statement

**NMPF**

National Marine Planning Framework

**NMS**

National Monuments Service

**NRW**

Natural Resources Wales

**NO<sub>x</sub>**

Nitrogen Oxide

**N<sub>2</sub>O**

Nitrous Oxide

**NP**

National Park

**OBC**

Ocean-bottom cable

**OBM**

Oil-Base Muds

**OBN**

Ocean-bottom node

**ODS**

Ozone Depleting Substances

**OSCP**

Offshore Contingency Plan

**OSPAR Commission**

Oslo and Paris Commission

**OPEP**

Oil Spill Emergency Plan

**OSCP**

Oil Spill Contingency Plan

**PAH**

Poly Aromatic hydrocarbon

**PBT**

Persistence, Bioaccumulation and Toxicity

**PIP**

Petroleum Infrastructure Programme

**PM**

Particulate Matter

**PP**

Plans and Programmes

**P/P**

Project or Plan

**pWHS**

Potential World Heritage Site

**RBMP**

River Basin Management Plan

**RMS**

Riserless Mud Recovery

**RoRO**

Roll on Roll off

**ROV**

Remotely Operated Vehicle

**RSBP**

Royal Society for the Protection of Birds

**SAC**

Special Area of Conservation

**SAHFOS**

Sir Alister Hardy Foundation for Ocean Science

**SBM**

Synthetic Base Muds

**SCA**

Seascape Character Area

**SCI**

Special Conservation Interests

**SCT**

Seascape Character Type

**SEA**

Strategic Environmental Assessment

**SEO**

Strategic Environmental Objectives

**SEPA**

Scottish Environment Protection Agency

**SI**

Statutory Instrument

**SO<sub>x</sub>**

Sulphur Dioxide

**SOLAS**

Safety Of Life At Sea

**SOPEP**

Shipboard Oil Pollution Emergency Plans

**SPA**

Special Protection Area

**SPLASHCOS**

Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf

**SST**

Sea surface temperature

**SWD**

Shellfish Water Directive

**TCE**

The Crown Estate

**TIG**

Turtle Implementation Group

**UAU**

Underwater Archaeology Unit

**UCC**

University College Cork

**UKHO**

UK Hydrographic Office

**UNCLOS**

United Nations Convention on Law of the Sea

**UWTV**

Underwater TV

**VSM**

Vertical Seismic Profile

**VSP**

Vertical Seismic Profile

**VOC's**

Volatile Organic Compounds

**WBM**

Water-Base Muds

**WDC**

Whale and Dolphin Conservation

**WFD**

Water Framework Directive

**WHOAGG**

World Health Organisation Air Quality Guideline

**WIID**

Wrecks Inventory of Ireland Database

**WHS**

World Heritage Site

# 1. INTRODUCTION AND BACKGROUND

This document has been prepared for the Department of the Environment, Climate and Communications (DECC) by Intertek Energy and Water Consultancy Services (Intertek). It is the Environmental Report (ER) resulting from the Strategic Environmental Assessment (SEA) of the 'Plan for assessment of applications for Petroleum (oil and gas) Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030 (hereafter referred to as 'the Plan').

## 1.1 Introduction

This Strategic Environmental Assessment (SEA) Environmental Report (ER) has been prepared in accordance with the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, (Statutory Instrument (SI) No. 435 of 2004) as amended in 2011, Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011, (S.I. No. 201 of 2011), amending the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. No. 436 of 2004), the Strategic Environmental Assessment Guidelines for Regional Assemblies and Planning Authorities (DHLGH, 2022), the SEA of Local Authority Land-Use Plans - EPA Recommendations and Resources (EPA, 2022a) and SEA Guidance Pack (EPA, 2021a).

## 1.2 Scope and Purpose of IOSEA6

DECC is preparing a 'Plan for assessment of applications for Petroleum (oil and gas) Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030' ('the Plan'). The Plan is being considered in the context of both SEA and Appropriate Assessment (AA), with the entire project referred to as Irish Offshore Strategic Environmental Assessment 6 ('IOSEA6'). This Plan will replace the existing Plan (which was the subject of IOSEA5) and will incorporate recent policy and legislative developments. It will set out the approach to the granting of petroleum authorisations in Irish waters in the period to 2030, and the consenting of the possible offshore activities (seismic surveys and the drilling of wells) that could take place under an authorisation, subject to Ministerial consent.

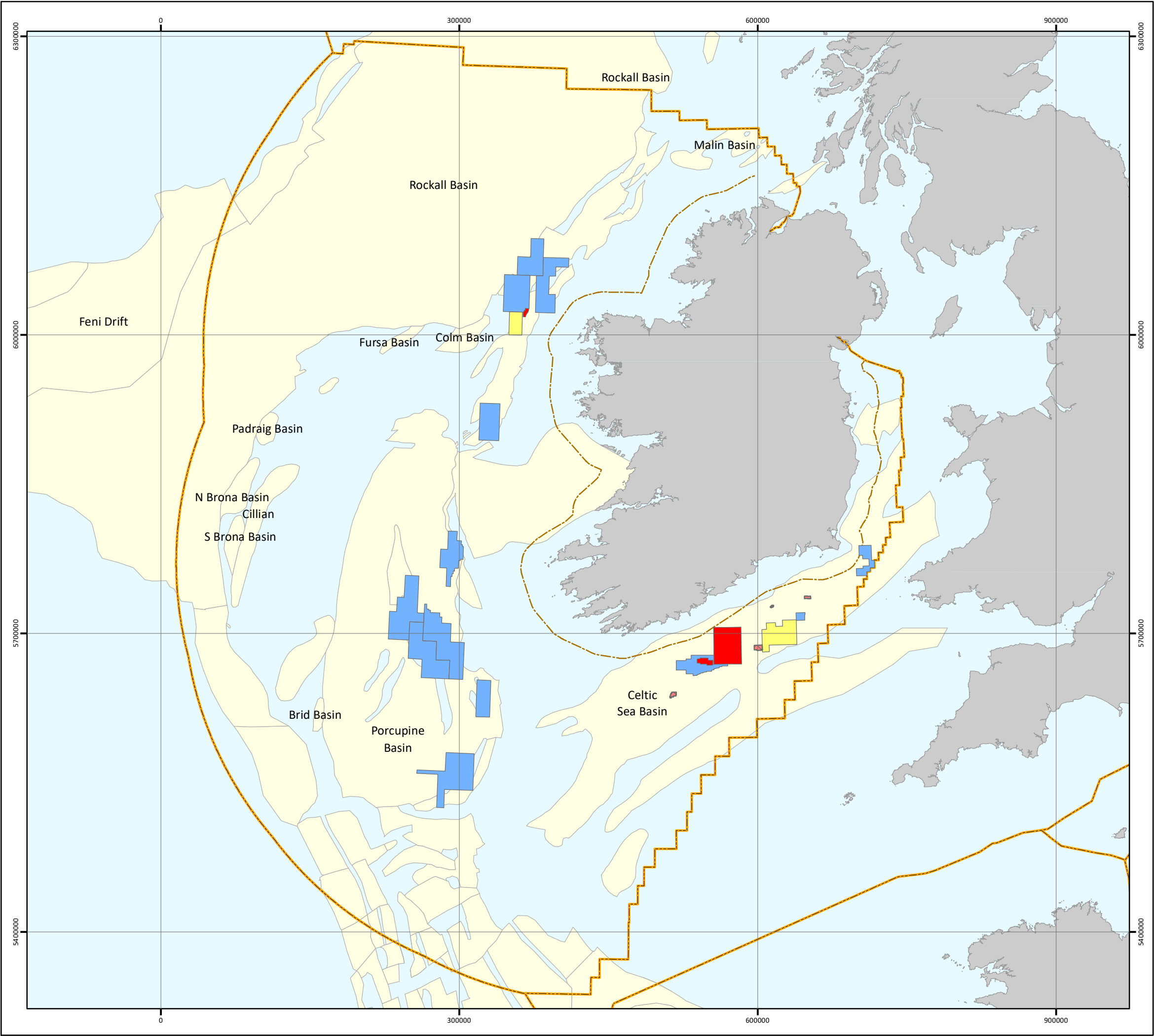
A key driver of the Plan is that the Climate Action and Low Carbon Development (Amendment) Act 2021 sets out a detailed plan to take decisive action to achieve a 51% reduction in overall greenhouse gas emission by 2030 and sets a path to reach net zero emissions no later 2050.

The purpose of the Plan is to provide a framework for the issuing of Petroleum Authorisations in Irish Offshore Waters. Key activities that could be undertaken under an authorisation include seismic surveys and the drilling of exploration, appraisal and production wells.

The Plan to be assessed under IOSEA6 will only grant petroleum (oil and gas) authorisations in areas currently under existing authorisations for petroleum activities to the west, south and south-east of Ireland. Offshore areas which are not currently subject to an authorisation will not be able to be licensed in the future. The IOSEA6 Study Area is shown in Figure 1-1 (Drawing Number: P2510-LOC-006).

The following objectives have been defined for IOSEA6:

- To inform DECC of specific environmental considerations in petroleum activities taking place under both existing petroleum authorisations and any follow-on authorisations that may be granted during the lifetime of the "Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the Period to 2030", in line with current policy and legislation.
- To provide petroleum authorisation holders an operational baseline against which they can conduct activities whilst ensuring the protection of the marine environment, in line with current best practice and lessons learned from previous IOSEAs.



# IOSEA6 - ENVIRONMENTAL REPORT

## LOCATION OVERVIEW

### IOSEA6 Study Area

Drawing No: P2510-LOC-006

B

#### Legend

**Current Authorisations (IOSEA6 Study Area)**

- Petroleum Lease
- Lease Undertaking
- Exploration Licence
- Licensing Option
- 12 NM Limit
- EEZ Boundary
- Offshore Geological Basins

Note: IOSEA6 Study Area is based on DECC Offshore Ireland Petroleum Exploration & Development Concession Map published on 31st December 2021.

NOTE: Not to be used for Navigation

Date	27 October 2022
Coordinate System	ED 1950 UTM Zone 29N
Projection	Transverse Mercator
Datum	European 1950
Data Source	DECC, GEBCO, MarineRegions
File Reference	J:\P2510\Mxd\01_LOC\ P2510-LOC-006.mxd
Created By	Emma Langley
Reviewed By	Chris Carroll
Approved By	Jillian Hobbs

© Metoc Ltd, 2022  
All rights reserved.

## 1.3 Purpose of this Report

As part of the preparation of the Plan, DECC (the Responsible Authority) is carrying out a SEA. The SEA has been undertaken in parallel with the revision of the Plan. The SEA fulfils the requirement of European Union (EU) Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive). SEA is a systematic method for considering the likely environmental effects of a Plan or Project (P/P). SEA aims to:

- integrate environmental factors into P/P preparation and decision-making;
- improve P/P and enhance environmental protection;
- increase public participation in decision making; and
- facilitate openness and transparency of decision-making.

Intertek carried out SEA Screening for the Plan in February 2022. The screening determined that the Plan falls within the remit of the SEA Directive and that a Mandatory SEA is required (Intertek, 2022a). The SEA Screening was then followed by a SEA Scoping Report, which detailed the proposed structure of the SEA ER (Intertek, 2022b). The Scoping Report was issued to key stakeholders and statutory authorities (see Section 1.4 for further information). This SEA ER presents the findings of the Environmental Assessment (see Appendix D for full assessment results).

The key steps of the SEA process are listed in Table 1-1 with the current stage of the process highlighted.

**Table 1-1 Key Stages in the SEA Process**

Stage	Description
Screening	Determines whether SEA is required for the Plan, in consultation with the designated statutory consultees.
Scoping	Determines the scope and level of detail of the assessment for the SEA, in consultation with the designated statutory consultees, being the Environmental Protection Agency (EPA), Department of Housing, Local Government and Heritage (DHLGH), Department of Agriculture, Food and the Marine (DAFM), Department of the Environment, Climate and Communications (DECC), and the Development Applications Unit of the DHLGH
Environmental Assessment	Formal and transparent assessment of the likely significant impacts on the environment as a result of implementing the Plan. The output from this is an ER which must go on public display along with the Draft Plan.
SEA Statement	Summarises the process undertaken and identifies how environmental considerations and consultations have been integrated into the final Plan.

## 1.4 Scoping Report Consultation

Under Article 6 of the SEA Directive (and Article 11 of SI 435 of 2004), the competent authority for SEA in this case is DHLGH. DECC are preparing the draft Plan and are the competent authority for the Plan. Under the SEA Regulations the competent authority is required to consult with specific 'environmental authorities' (statutory consultees) throughout the SEA process. The SEA Scoping Report was issued to the following.

#### **1.4.1 Statutory Consultees**

- Environmental Protection Agency (EPA);
- Department of Agriculture, Food and the Marine (DAFM);
- Department of the Environment, Climate and Communications (DECC);
- Department of Housing, Local Government and Heritage (DHLGH); and
- Development Applications Unit of the DHLGH;

Additionally, relevant adjoining local authorities should be consulted. These authorities fall under the Department of Rural and Community Development and includes county councils, city councils, city and county councils and regional assemblies.

#### **1.4.2 Transboundary Statutory Regulators**

- Isle of Man: Department of Environment, Food, and Agriculture
- Northern Ireland:
  - Northern Ireland Environment Agency (NIEA)
  - Department of Agriculture, Environment and Rural Affairs (DAERA)
- Scotland:
  - The Scottish Environment Protection Agency (SEPA)
  - NatureScot
  - Historic Environment Scotland
- Wales:
  - Natural Resources Wales (NRW)
  - Cadw (Welsh Environmental Service)
- England:
  - Natural England
  - Environment Agency
  - Historic England

#### **1.4.3 Irish non-statutory consultees relevant to and included in the IOSEA6 consultation**

- An Taisce
- Bird Watch Ireland
- Irish Sailing Association
- Bord Iascaigh Mhara (BIM)
- Commissioners of Irish Lights
- Central Fisheries Board
- Failte Ireland
- Health and Safety Authority
- Irish Basking Shark Group
- Irish Offshore Operators' Association

- Irish Whale and Dolphin Group (IWDG)
- Irish Wildlife Trust
- Marine Institute (MI)
- NPWS
- Sea Fisheries Protection Authority
- The Heritage Council
- Irish Aviation Authority
- Commission for Regulation of Utilities
- Irish Environmental Network
- Various Fisheries Producer Organisations
- Wind Energy Ireland

#### 1.4.4 UK non-statutory consultees relevant to and included in the IOSEA6 consultation

- Marine Management Organisation (MMO)
- Joint Nature Conservation Committee (JNCC)
- The Crown Estate (UK)
- Whale and Dolphin Conservation (WDC)
- ORCA Whale and Dolphin Group
- Department for Energy and Climate Change (UK)
- Centre for Environment, Fisheries and Aquaculture (CEFAS)
- Royal Society for the Protection of Birds (RSPB)

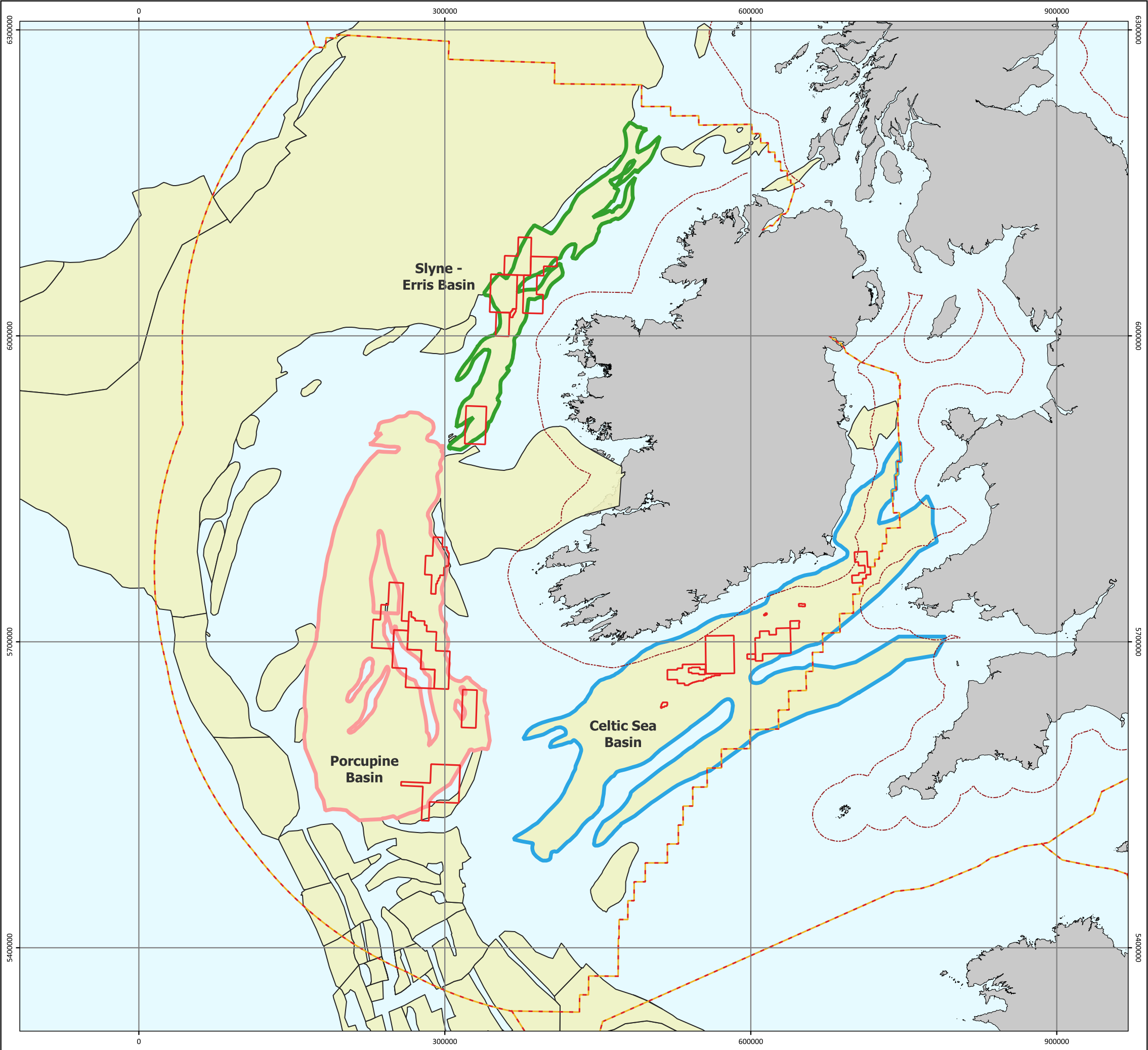
The Scoping comments received from the consultation authorities are summarised in Appendix B, along with how the comments were taken into account in the preparation of this SEA ER.

## 1.5 Scope of the SEA

### 1.5.1 Geographical Scope

The geographic scope of IOSEA6 has been based on the blocks from the Offshore Ireland Petroleum Exploration & Development Concession Map (issued on 31st December 2021). This map was selected as the Study Area at the time of commencing the IOSEA6 assessments and used in the geographic mapping of Baseline information and summary of the Baseline environment. However, it should be acknowledged that since the commencement of the IOSEA6 assessment, a number of licences have been relinquished and the areas covered by the Plan will likely be smaller in scale.

The IOSEA6 Study Area comprises existing authorisation areas for offshore petroleum activities to the west, south and south-east of Ireland. Existing authorisations within the Study Area are principally located in the Irish and Celtic Seas within the Slyne Basin in the eastern section of Rockall Basin, Porcupine Basin, North Celtic Sea Basin and Central Irish Sea Basin. The IOSEA6 Study Area and associated basins is shown in Figure 1-2 (Drawing Number: P2510-LOC-005).



IOSEA6 - ENVIRONMENTAL REPORT

LOCATION OVERVIEW

Study Area and Sedimentary Basins

Drawing No: P2510-LOC-005

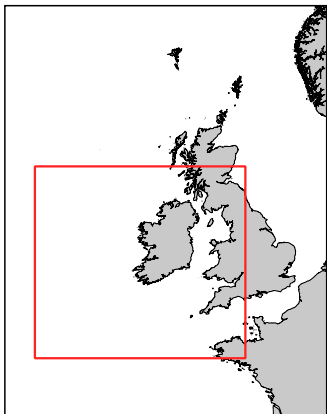
A

Legend

- IOSEA6 Study Area
- 12 NM Limit
- EEZ Boundary

Offshore Geological Basins copy

- Celtic Sea Basin
- Porcupine Basin
- Slyne - Erris Basin
- Offshore Geological Basins



NOT TO BE USED FOR NAVIGATION

Date	2022-10-27 09:11:37
Coordinate System	ED50 / UTM zone 29N
WKID	EPSG:23029
Scale @A3	1:3,750,000
Data Sources	DECC, MarineRegions, GEBCO, UKHO
File Reference	J:\P2510\Mxd\01_LOC \P2510-LOC-002-003.qgz
Created By	Lewis Castle
Reviewed By	Emma Langley
Approved By	Jill Hobbs



An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications

intertek

0 40 80 120 160 km

© Metoc Ltd, 2022  
All rights reserved

### 1.5.2 Temporal Scope

The Plan will encompass the period from approval to 2030. In line with the SEA Directive, short, medium and long-term impacts (including secondary, cumulative, synergistic, permanent and temporary, positive and negative effects) will be considered during the assessment. For the purpose of this SEA, the short-term will consider the period up to 2030, the medium to long-term will consider the period up to 2050 to coincide with Ireland's net zero emissions target.

## 1.6 Scoping in and out of the SEA Topics

In accordance with Article 5 of the Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive), consideration has been made on whether the environmental effects (both positive and negative) of the Plan are likely to be significant for the individual SEA topics also listed in Article 5 of the SEA Directive. The SEA Scoping Report screened in the following SEA topics to be assessed in this ER (Intertek, 2022b):

- Air Quality;
- Biodiversity, Flora and Fauna;
- Climatic Factors;
- Cultural, Architectural & Archaeological Heritage;
- Economy and Material Assets;
- Geology, substrates and coastal sediments;
- Landscape and Seascapes;
- Population and Human Health; and
- Water.

The focus of the SEA is the marine environment and the SEA topics are, therefore, tailored towards this.

## 1.7 Structure of this Report

The remaining sections of this report are structured as follows:

- Section 2: describes the Plan and the alternatives that will be assessed;
- Section 3: describes the context to IOSEA6;
- Section 4: provides the assessment of environmental effects; and
- Section 5: provides details of mitigation measures and monitoring.

## 2. OUTLINE OF THE PLAN

**Article 5, Annex I (a) of the SEA Directive requires that the ER includes an outline of the contents and main objectives of the plan or programme (PP). The purpose of this section is to explain the nature, activities and objectives of the Plan.**

### 2.1 Background and Plan Overview

The Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the Period to 2030 will replace the existing Plan (which was the subject of IOSEA5) and will incorporate recent policy and legislative developments. It will set out the approach to the granting of petroleum authorisations in Irish waters in the period to 2030, and the consenting of the possible offshore activities (seismic surveys and the drilling of wells) that could take place under an authorisation, subject to Ministerial consent. The purpose of the Plan is to provide a framework for the Issuing of Petroleum Authorisations in Irish Offshore Waters that incorporates recent policy and legislative developments.

Since the publication of the existing Plan, there have been several developments. The “Programme for Government - Our Shared Future” - adopted in June 2020, sets a clear pathway towards less reliance on fossil fuels across every sector of society and specifically contains a commitment to end the issuing of new licences for the exploration and extraction of gas on the same basis as the decision taken in 2019 by the previous Government in relation to oil exploration and extraction.

This commitment was made effective immediately upon the current Government taking office. Holders of existing authorisations are not affected by these changes and may apply to progress their authorisations through the licensing stages towards a natural conclusion. This commitment was then placed on a statutory footing through the Climate Action and Low Carbon Development (Amendment) Act 2021 (commenced on 7 September 2021), which resulted in several amendments to the Petroleum and Other Minerals Development Act 1960. A policy statement was published by the Department in August 2022 in relation to petroleum exploration and extraction, which reflects the current policy in light of the Programme for Government commitment, as well as providing clarity to stakeholders in relation to future authorisations which may be granted under legislation.

The Plan to be assessed under IOSEA6 will only grant petroleum (oil and gas) authorisations in areas currently under existing authorisations for petroleum activities to the west, south and south-east of Ireland. Offshore areas which are not currently subject to an authorisation will not be able to be licensed in the future. More information about existing authorisations is presented in Section 3.3.2.

### 2.2 Objectives of the Plan

The main objectives of the Plan are:

- To set out the proposed approach to the issuing of petroleum authorisations in Ireland, and the consideration of the possible offshore exploration activities that could take place under such authorisations, to reflect the 2020 Programme for Government commitment to end the issuing of new Petroleum Authorisations for the exploration and extraction of gas in line with the 2019 Government Decision on oil exploration and extraction and which was given statutory underpinning in the Climate Action and Low Carbon Development (Amendment) Act 2021, and commenced 7 September 2021
- To provide petroleum authorisation holders with an operational baseline against which they can conduct activities whilst ensuring the protection of the marine environment, in line with current best practice and lessons learned from previous IOSEAs

## 2.3 Content of the Draft Plan

The format and content of the draft Plan issued for consultation is summarised in Table 2-1.

**Table 2-1 Summary of the contents of the draft Plan**

Section	Summary of Content
Section 1: Introduction	The “Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the Period to 2030” sets out the proposed approach to the issuing of petroleum authorisations in Ireland, and the consideration of the possible offshore exploration activities that could take place under such authorisations.
Section 2: Policy and Legislative Background	A policy context including the relevant national, EU and international policy context for oil and gas exploration and the potential impacts and drivers for the sector.
Section 3: Current Status of Petroleum exploration in Ireland	A brief introduction into the current status of petroleum exploration in Ireland, including the geographic scope of the 6th Irish Offshore Strategic Environmental Assessment (IOSEA6) based on the blocks from the Offshore Ireland Petroleum Exploration & Development Concession Map issued on 31st December 2021.
Section 4: Plan for assessment of applications for Petroleum Exploration and Production Authorisations	<ul style="list-style-type: none"> <li>▪ Government Policy for issuing of Petroleum Authorisations</li> <li>▪ Types of Petroleum Authorisation listed under the Petroleum and Other Minerals Development Act 1960 <ul style="list-style-type: none"> <li>▪ Petroleum Prospecting Licence</li> <li>▪ Licensing Option</li> <li>▪ Exploration Licence</li> <li>▪ Lease Undertaking</li> <li>▪ Petroleum Lease</li> </ul> </li> <li>▪ Reserved Area Licence</li> </ul>
Section 5: Offshore Activities	Offshore exploration and production activities under petroleum authorisations will continue to be considered under the relevant legislation (i.e., the 1960 Act for plans for working of petroleum under a lease). Activities under an exploration licence or petroleum prospecting licence are subject to Environmental Impact Assessment (EIA) Screening and assessment procedures provided under Regulations 3 and 4 of the European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (S.I. 134 of 2013), as amended by the European Union (Environmental Impact Assessment) (Petroleum Exploration) (Amendment) Regulations 2019 (S.I. 124 of 2019).
Section 6: Activities Subject to EIA/AA screening [& full assessment if required]	<p>Summary of legislation that requires and EIA/AA screening and full assessment under European and Irish Law:</p> <ul style="list-style-type: none"> <li>▪ European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (as amended) S.I. 134 of 2013 and European Union (Gas Act 1976);</li> <li>▪ Petroleum and Other Minerals Development Act 1960 contain Environmental Impact Assessment (EIA);</li> <li>▪ All applications for offshore activities under a Petroleum Authorisation will continue to be subject to EIA/AA screening [and full assessment if required in accordance with the requirements set out in Directive 2011/92/EU;</li> <li>▪ Regulations 3 and 4 of the European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (S.I. 134 of 2013);</li> </ul>

Section	Summary of Content
	<ul style="list-style-type: none"> <li>European Union (Gas Act 1976) (Environmental Impact Assessment) Regulations 2021 (the 2021 EIA Regulations);</li> <li>Section 13 of the Petroleum and Other Minerals Development Act 1960 (the 1960 Act) for approval of the 'working of petroleum; and</li> <li>The European Communities (Birds and Natural Habitats) Regulations 2011-15, as amended (Birds and Natural Habitats Regulations).</li> </ul>
Section 7: Scenarios and Assumptions for the Plan	<p>Levels of activity for:</p> <ul style="list-style-type: none"> <li>Seismic Survey; and</li> <li>Wells (Exploration, Appraisal and Production).</li> </ul>

## 2.4 Description of Exploration Activities

This section describes the exploration activities which may be undertaken during seismic survey and well drilling. The activities to be assessed in this SEA are restricted to seismic surveys and exploration well drilling within the IOSEA6 Study Area and do not include appraisal, production or injection wells, construction of infrastructure such as pipelines connecting wells and platforms and do not include vessels transiting to a survey or drilling location.

### 2.4.1 Seismic Survey

A 2D seismic survey is the simplest form of seismic survey and consists of a single acoustic source and a single towed streamer. These streamers are normally between 3 and 8km long but can be up to 12km long. The resulting image of the seabed represents a two-dimensional profile in time beneath the survey line. It is normally the first type of seismic survey undertaken during exploration, with the results analysed and used to inform where a follow-up 3D survey should take place or where a potential drilling target may exist.

A 3D seismic survey is a more complex survey method involving more sophisticated equipment. At a basic level, a 3D seismic survey is a dense grid of 2D seismic lines. These surveys typically use multiple towed streamers enabling the acquisition of many closely spaced 2D lines over a single sail line. The acquired data can then be used to create a 3D image or data volume of the subsurface rock. This provides a much more detailed view of the underlying geology, and it is generally used to cover a specific geological target, as informed by the 2D survey.

Both 2D and 3D seismic surveys are typically conducted by a vessel towing acoustic sound sources (air guns) 5 - 10m below the sea surface along pre-determined survey lines. The air guns emit high intensity and low frequency noise (under 200Hz frequency band with a broad peak around 20-120Hz and incidental sounds up to 22kHz) into the surrounding water by the release of bubbles of compressed air, which produces a primary energy pulse and an oscillating bubble. The air guns contain different chamber volumes designed to generate an optimal tuned energy output of specific frequencies.

Seismic surveys would also generate noise from the operations of the primary seismic vessel and guard vessel (e.g., machinery, propellers and hull flow noise) and by helicopters (e.g., for crew transport) during survey operations.

Sea node and sea bottom cable surveys are non-conventional seismic acquisition techniques with Ocean Bottom Cables (OBC) or Ocean-Bottom Nodes (OBN) – essentially a seismic source detached from the receivers. Nodes are attached to the seabed, to receive the seismic energy transmitted by

vessels. OBC acquisition is deployed on the seafloor and connected by electrical wires. An assembly of geophones and hydrophones are connected by electrical wires deployed on the seafloor to record and relay data to a seismic recording vessel or recording buoy.

OBN is also deployed on the seafloor; however, this comprises a set of autonomous seismic receivers/recorders deployed on the sea floor. These are self-contained with a rechargeable battery and generally not connected to other receivers by cable. In addition, it is possible that electromagnetic (EM) survey may be undertaken. This can either be undertaken using a towed streamer, or can use an array of receivers deployed on the seafloor with a towed electric dipole source. The survey system measures subsurface resistivity to assist in identifying hydrocarbon accumulations.

MARPOL Annex V seeks to eliminate and reduce the amount of garbage being discharged into the sea from ships and generally prohibits the discharge of all garbage into the sea, except as provided otherwise in regulations 4, 5, and 6 of the Annex. These are related to food waste, cargo residues, cleaning agents and additives and animal carcasses. Routine vessel discharges are limited to galley waste, which comprises food waste that emanates from the vessel kitchen. Legal requirements to control wastes from ships are enforced under the Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 2012.

## 2.4.2 Drilling

Typically, the first step in the sequence of drilling activities is to drill an exploration well, to see if hydrocarbons are present. The location of exploration wells will be guided by the results of the analysis of the seismic surveys, and the design, depth and dimension of the exploration well will be determined by the environmental characteristics of the locations and the location of the target geological horizon(s). This will also determine the type of drilling rig used (e.g. jackup, semi-submersible, drillship).

The types of drilling rig that are employed under licenses issued in accordance with the Plan would be Mobile Offshore Drilling Units (MODUs) as follows:

- Moored / anchored (e.g. semi-submersible rigs);
- Dynamically Positioned (DP) rigs, including drill ships; and
- Jack-Up rigs (used in shallower waters).

The associated subsea equipment is likely to comprise the following:

- anchors, chains and wire (for a moored drilling unit only);
- wellhead and blowout preventer stack;
- marine riser;
- any Cuttings Transport System (CTS) or Riserless Mud Recovery (RMR) system, pumps, hoses, dispersion frames and hose skids; and
- Remotely Operated Vehicle (ROV).

As drill rigs are being brought on-line in preparation for drilling, some discharge of ballast water could occur.

Typically, the first step in the sequence of drilling activities is to drill a top-hole section into the seabed into which the conductor pipe is cemented, following which the well is drilled in successively smaller diameter sections until the hydrocarbon-bearing formation is reached. Once each well section is drilled, steel casing of appropriate diameter is inserted and cemented into place, to provide stability and a barrier between the wellbore and surrounding formations. In addition, the casing provides a firm anchorage for the blow out preventer (BOP) stack and structural integrity for subsequent drilling,

testing and possible future production operations. Once the BOP is in place the marine riser, a large diameter pipe that connects the BOP stack to the drilling rig, is installed.

The use of drilling fluid, also known as drilling mud, is intrinsic to all drilling operations. Drilling mud assists in a number of functions such as lubrication and cooling of the drilling bit, suspension and transport of rock cuttings to the surface and, most importantly, the provision of hydrostatic pressure to counterbalance formation pressure. Drilling mud consists of a liquid mixture of clay, water or oil, and other chemical additives. The most commonly used drilling fluids contain water as the fluid continuous phase, and are known as water-base muds (WBMs). However, certain borehole conditions might require a mud formulation where the continuous phase is oil or a synthetic fluid and these are known as oil-base muds (OBMs) or synthetic base muds (SBMs).

The top-hole section of the well has to be drilled without the conductor and BOP in place, and thus with no riser from the seabed to the drilling platform. This means that all drilling fluids, rock cuttings, and cement returns from the top section are discharged directly from the top of the well onto the seabed. Once the marine riser is in place, the drill fluids and cuttings can be circulated from the well back up to the drilling rig where they will be treated so that the drilling mud can be re-used and the cuttings disposed of appropriately.

Although some of the WBM is discharged with cuttings it readily disperses and tends not to form cuttings piles. There is, however, the potential for these cuttings to contain oil from the reservoir section of an oil well.

If OBMs or SBMs are used it would be only when a marine riser is in place, with recovery to the drill rig through the marine riser for either skip-and-ship to shore, or part or full processing on the rig. Ireland does not permit the offshore discharge of OBM or SBM; instead, the cuttings must be skipped and shipped for onshore treatment, re-use or disposal.

If hydrocarbons are found well testing may be required in order to test the productivity of the well and determine parameters such as pressure, flow rates and other reservoir and fluid characteristics and this can involve short duration flaring. Borehole seismic surveys, such as a checkshot survey or Vertical Seismic Profile (VSP) may be undertaken, which measure the seismic travel time (i.e. the elapsed time for a seismic wave to travel from its source to a given reflector and return to a receiver at the Earth's surface) from the surface to a known depth in the borehole, thereby allowing the well data to be correlated with the seismic data.

## 3. CONTEXT

The purpose of this section is to set out the context of the Plan. This section provides a summary of the relationship between the Plan and other relevant Plans and Programmes (PP); a list of the environmental baseline for the area the plan covers; an assessment of the limitations of the data; a list of current environmental problems within the area; the likely evolution of the environment without implementation of the Plan; and the SEA objectives to be assessed in this ER.

### 3.1 Policy and Legislative Background

The purpose of the Plan is to set out the proposed approach to issuing of petroleum authorisations, following the Government decision in 2020 to end the issuing of new licences for the exploration and extraction of gas on the same basis as the decision taken in 2019 by the previous Government in relation to oil exploration and extraction. This approach to reducing the reliance on fossil fuels is driven by several Government commitments. A number of key policies and items of legislation on energy are key drivers to the Plan:

- a. The Climate Action and Low Carbon Development (Amendment) Act commits Ireland to a 51% reduction in overall greenhouse gas emissions by 2030 at the latest, and to achieving net zero emissions no later than 2050. Section 21 of the Climate Action and Low Carbon Development (Amendment) Act 2021 amends the Petroleum and Other Minerals Development Act 1960 to restrict the Minister's power to grant new petroleum authorisations by repealing certain sections of the Act. Saving provisions, however, provide that the Minister may grant successor authorisations to holders of existing authorisations (and further successor authorisations in the future, depending on the stage of the authorisation);
- b. "Policy Statement on Petroleum Exploration and Production in Ireland" (DECC, 2022a) is the latest policy statement on petroleum exploration and extraction. Statement reflects the current policy in light of the Programme for Government commitment to end the issuing of new licences for the exploration and extraction of gas on the same basis as the decision taken in 2019.
- c. The Climate Action Plan 2021 is a detailed plan to put Ireland on a more sustainable path, cutting emissions, and creating a cleaner, greener economy and society. The Plan provided indicative ranges of emissions reductions for each sector of the economy by 2030;
- d. The Petroleum and Other Minerals Development Act 1960 (as amended) sets out the statutory basis for the issuing of authorisations and for environmental impact assessment of plans for the working of petroleum;
- e. The National Marine Planning Framework brings together all marine-based human activities and outlines the Government's vision, objectives and planning policies for each marine activity;
- f. European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (as amended) SI 134 of 2013 and European Union (Gas Act 1976) Environmental Impact Assessment Regulations 2021 SI 174 of 2021 contain the statutory basis for consenting offshore activities (including seismic surveys and drilling of wells) under a petroleum licence and the Environmental Impact Assessment (EIA) of those activities.
- g. European Union (Gas Act 1976) (Environmental Impact Assessment) Regulations 2021 (the 2021 EIA Regulations)

## 3.2 Plan Overview

### 3.2.1 New Authorisations

New authorisations are restricted to progression of existing authorisations only for the exploration and production of petroleum (oil and gas). Under the Plan any areas of the offshore not currently subject to an authorisation (as of December 2021) will not be able to be licensed in the future.

The types of authorisations that may be granted under the Plan are as follows:

- Exploration licence;
- Lease undertaking;
- Petroleum lease;
- Petroleum prospecting licence; and
- Reserved area licence.

### 3.2.2 Existing Authorisations

Holders of existing authorisations are not affected by the changes and may apply to progress their authorisations through the licensing stages towards a natural conclusion. Any such applications, or applications to undertake offshore activities under an authorisation, remain subject to Ministerial consent, and will continue to be required to meet environmental, technical and financial standards as appropriate.

Existing authorisations are divided into the following categories:

- h. Exploration licences;
- i. Licencing Option;
- j. Petroleum Leases; and
- k. Lease Undertaking.

### 3.2.3 Current Acreage

Offshore activities within current acreage will be considered by the Minister with focus on seismic acquisition and drilling of exploration, appraisal and production wells. Under the Plan these activities will require application for consent under the European Union (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 (as amended) SI 134 of 2013 and in accordance with Petroleum and Other Minerals Development Act 1960. These applications must also be submitted in accordance with DECC documentations such as the Department's Rules and Procedures Manuals. The activities will also require EIA/AA screening (and full assessment if required).

## 3.3 Relationship with other Plans and Programmes

Article 5, Annex 1 (e) of the SEA Directive requires that the ER includes an outline of the Plans relationships with other relevant PP, and how environmental protection objectives have been taken into account in the Plans preparation. Appendix A lists all the PP which have been reviewed alongside the Plan, identifies their environmental objectives and summarises how they affect or are affected by the Plan. Table 3-1 presents a summary of the main plans, programmes and legislation adopted at International, European, National and Transboundary level which would be expected to influence or be influenced by the Plan. No regional or local Plans and Programmes were identified. While it is recognised that there are many plans, programmes and legislation that will relate to the Plan it is

considered appropriate to only deal with those significant texts, to keep the assessment at a strategic level. A detailed review of these determining the implications on the Plan is presented in Appendix A.

**Table 3-1 Summary of key plans, programmes and legislation relevant to the Plan**

Level	Name of Plan, Programme or Legislation
International	<p>The Convention on the Conservation of European Wildlife and Natural Habitats, (The Bern Convention, 1979)</p> <p>Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention 1979), which entered into force in 1983.</p> <p>Convention on wetlands of international importance especially as waterfowl habitat (the Ramsar Convention 1971), came into force in 1975.</p> <p>ESPOO Convention and Kyiv (SEA) Protocol</p> <p>IMO International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78).</p> <p>IMO International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as updated by the Protocol of 1996 (London Convention/Protocol)</p> <p>International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO 2003), adopted February 2004 (entry into force September 2017).</p> <p>International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990, entered into force 1995. Ireland became a Party to OPRC in 2001 following the enactment of the Sea Pollution (Amendment) Act 1999; many of the functions set out in OPRC for the national competent authority had been carried out by the Coast Guard since 1991.</p> <p>International Finance Corporation (2015) Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development</p> <p>Montreal Protocol (UN September 1987)</p> <p>State of Global Climate – Provisional Report 2021</p> <p>The Convention for the Protection of the Marine Environment of the North-East Atlantic (1992 OSPAR Convention) *</p> <p>The Paris Agreement on Climate Change</p> <p>The UNECE Convention on Long-range Transboundary Air Pollution (LRTAP Convention) (1979)</p> <p>The World Heritage Convention, 1972</p> <p>UN Framework agreement on climate change (UNFCCC)</p> <p>UN Kyoto Protocol. The United Nations Framework. Convention on Climate Change (UNFCCC). Kyoto Protocol 1997</p> <p>UNESCO Convention on the Protection of the Underwater Cultural Heritage, adopted in 2001</p> <p>United Nations 2030 Agenda for Sustainable Development</p> <p>United Nations Convention on Biological Diversity (CBD) (Rio Convention), which entered into force in 1993.</p> <p>United Nations Convention on the Law of the Sea (UNCLOS). Concluded in 1982, UNCLOS came into force in 1994.</p> <p>World Health Organisation (WHO) Air Quality Guidelines (1999) and Guidelines for Europe (1987)</p>
EU Directives and Programmes	<p>A Blueprint to Safeguard Europe's Water Resources</p> <p>A new Industrial Strategy for Europe</p> <p>Bathing Waters Directive, (2006/7/EC)</p> <p>Climate and Energy Governance Regulation (2018/1999)</p> <p>Council Directive 2003/87/EC of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.</p> <p>Council Directive 79/409/EEC of 2 April 1979, codified by Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds (Birds Directive)</p> <p>Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.</p>

Level	Name of Plan, Programme or Legislation
	<p>Directive 2002/84/EC of the European Parliament and of the Council of 5 November 2002 amending the Directives on maritime safety and the prevention of pollution from ships.</p> <p>Directive 2009/31/EC on the Geological Storage of Carbon Dioxide</p> <p>Directive 2011/92/EU, as amended by Directive 2014/52/EU (EIA Directive)</p> <p>Directive 2013/30/EU on the safety of offshore oil and gas operations</p> <p>Directive on national Emission Ceilings for Certain Atmospheric Pollutants (2001/81/EC)</p> <p>Environmental Liability Directive (2004/35/EC)</p> <p>EU 2020 Climate and Energy Package</p> <p>EU 2030 Climate and Energy Framework</p> <p>EU Biodiversity Strategy to 2030</p> <p>EU Climate Adaptation Strategy 2021</p> <p>European Climate Law, Regulation 2021/1119</p> <p>European Commission (EC) Directive 2008/105/EC Directive on Environmental Quality Standards</p> <p>European Commission (EC) Industrial Emissions Directive 2010/75/EU (under review)</p> <p>European Commission (EC): The eighth Environment action programme to 2030 (proposed 2020)</p> <p>European Green Deal (2019)</p> <p>European Landscape Convention</p> <p>Habitats Directive (92/43/EEC)</p> <p>Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland</p> <p>Impact assessment for the European Climate law - Stepping up Europe's 2030 climate ambition</p> <p>Integrated Pollution Prevention and Control Directive (IPPC) (96/61/EC)</p> <p>Marine Strategy Framework Directive (2008/56/EC)</p> <p>Maritime Spatial Planning Directive (2014/89/EU) establishing a Framework for Maritime Spatial Planning</p> <p>National Strategic Aquaculture Plan</p> <p>Regulation (EU) No 1143/2014; on the Prevention and Management of the Introduction and Spread of Invasive Alien Species</p> <p>Shellfish Waters Directive (06/12/EC)</p> <p>The Air Framework Directive. Directive on Air Quality Assessment and Management (Framework Directive) (1996/62/EC)</p> <p>The European Convention on the Protection of the Archaeological Heritage (revised) 1992</p> <p>Water Framework Directive (2000/60/EC).</p>
National	<p>Air Quality Limit Value Regulations (NI) 2003 (SR No. 2121 of 2003) and amendments</p> <p>Climate Action and Low Carbon Development (Amendment) Act 2021</p> <p>Climate Action Plan 2021</p> <p>DECC Statement of Strategy 2021-2023</p> <p>Developing and Assessing Alternatives in Strategic Environmental Assessment (SEA)</p> <p>Development Plans (via Planning and Development Act 2000, as amended)</p> <p>Draft Seafood Development Programme 2021-2027 (DAFM, in prep)</p> <p>Foreshore Acts 1933 - 2014</p> <p>Foreshore and Dumping at Sea (Amendment) Act 2009</p> <p>Good practice note on SEA for the Energy Sector</p> <p>Grid25 Study</p> <p>Guidance on SEA Statements and Monitoring</p> <p>Guide to Best Practice in Seascape Assessment Hill et al., 2001</p> <p>Harmonised Offshore Chemical Notification Format (HOCNF) Scheme</p> <p>Integrating Climatic Factors into Strategic Environmental Assessment in Ireland - A Guidance Note</p>

Level	Name of Plan, Programme or Legislation
	<p>Management plans for relevant Natura 2000 sites (NPWS / JNCC)</p> <p>Maritime Jurisdiction Act 2021</p> <p>Merchant Shipping (Salvage and Wreck) Act, 1993</p> <p>Monuments and Archaeological Heritage Bill</p> <p>National Biodiversity Action Plan 2017-2021</p> <p>National Biodiversity Plan</p> <p>National Climate Policy Position</p> <p>National Development Plan 2021-2030</p> <p>National Energy and Climate Plan (NECP) 2021-2030</p> <p>National Landscape Strategy for Ireland 2015 - 2025</p> <p>National Marine Planning Framework (NMPF) Project Ireland 2040</p> <p>National Monuments Acts, 1930-2004.</p> <p>National Planning Framework</p> <p>Offshore Grid Study</p> <p>Offshore Renewable Energy Development Plan (OREDPA) (2014 &amp; 2019)</p> <p>Petroleum and Other Minerals Development Act 1960 - 2021 (as amended)</p> <p>Petroleum Exploration and Production Activities as part of Ireland's Transition to a Low Carbon Economy Policy Statement (DECC, 2019)</p> <p>Pollution Reduction Programmes (PRPs) for Shellfish Waters. Specifically (but not limited to): Adrigole Harbour; Baltimore Harbour/Sherkin Island; Ballymacoda; Cork Great Island North Channel; Kinsale; Oyster Haven; Roaringwater Bay; Rostellan (North, South and West)</p> <p>Policy Statement on Petroleum Exploration and Production in Ireland (2022)</p> <p>Prioritised Action Framework 2021-2027 (NPWS)</p> <p>Programme for Government - Our Shared Future</p> <p>Protection of the Environment Act 2003</p> <p>Regional Planning Guidelines for the Greater Dublin Area (2010-2022) (Dublin Regional Authority)</p> <p>Regional Planning Guidelines for the South-East Region (2010- 2022) (South-East Regional Authority)</p> <p>Regional Planning Guidelines for the South-West Region (2010 – 2022) (South-West Regional Authority)</p> <p>Sea-Fisheries and Maritime Jurisdiction Act 2006</p> <p>The Bathing Water Quality (Amendment) Regulations 2016. (S.I. No. 163 of 2016)</p> <p>The Planning and Development (Strategic Infrastructure) Act 2006</p> <p>The Sea Pollution Act (1999)</p> <p>Various Draft River Basin Management Plans (RBMP) 2022 2027</p> <p>Wildlife Act 1976 and Amendment 2000</p>
Plans and programmes in adjacent States with potential transboundary implications	<p>Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995</p> <p>Crown Estates Offshore Wind Round 1 – 4 (UK Waters)</p> <p>Geneva Convention on Long-Range Trans-boundary Air Pollution 1979</p> <p>Guidelines for Landscape and Visual Impact Assessment</p> <p>Integrated Coastal Zone Management Strategy for Northern Ireland 2006-2026</p> <p>Landscape Institute and the Institute of Environmental Management and Assessment (IEMA), 2013</p> <p>Marine Act (Northern Ireland) 2013</p> <p>Marine and Coastal Access Act 2009 (UK)</p> <p>Marine Plan, South-West Offshore, England (Updated 2021)</p> <p>Marine Strategy Framework Directive (08/06EEC) – UK waters</p> <p>Northern Ireland Marine Plan (draft) 2018</p>

Level	Name of Plan, Programme or Legislation
	Northern Ireland Offshore Renewable Energy Strategic Action Plan (ORESAP) UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland UK Marine Policy Statement UK Offshore Energy Strategic Environmental Assessment 4 (OESEA4), Department of Energy and Climate Change (DECC), UK Welsh National Marine Plan (2019) Wildlife (Northern Ireland) Order 1985

\*to include all relevant decisions, recommendations, agreements and amendments.

### 3.4 Environmental Baseline

Article 5, Annex 1 (b) of the SEA Directive requires that the ER details ‘Relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the P/P’, ‘Environmental characteristics of areas likely to be significantly affected’, and ‘Existing environmental problems that are relevant to the P/P including, in particular, those relating to any areas of particular environmental importance, such as areas designated under the Birds and Habitats Directives’. This section aims to describe the environmental context within which the Plan will operate and the constraints and targets that this context imposes on the Plan.

Article 5, Annex 1 (c) of the SEA Directive requires that the ER details “the environmental characteristics of the areas likely to be significantly affected. A detailed review of the baseline environment can be found in Appendix C, along with tables and figures detailing the main findings of the review. The following sections summarise Appendix C.

Table 3-2 summarises, for each identified SEA topic, the baseline data subject areas and lists the principal data sources for each subject.

**Table 3-2 Data sources to inform the baseline assessment**

SEA Topic	Environmental Baseline Data	Data Sources
Air Quality	Atmospheric Emissions	OSPAR - Comprehensive Atmospheric Monitoring programme, Environmental Protection Agency- 2018, 2019, 2020, 2021 and 2022, European Environment Agency, published journals.
	Greenhouse Gas Emissions	Central Statistics Office (CSO), EPA, National Climate Change Strategy, Eurostat, OSPAR - Intermediate Assessment 2017, and European Environment Agency, published journals.
Biodiversity, Flora and Fauna	Plankton	Global Alliance of Continuous Plankton Recorder Surveys (GACS), SAHFOS CPR Reports, International Council for the exploration of the Sea, National Oceanic and Atmospheric Administration, Marine Institute (MI), Copernicus Marine Service, Marine Biological Association, International Council for the Exploration of the Sea, DHLGH, published journals.
	Benthos	Marine Irish Digital Atlas (MIDA), EMODnet, Integrated mapping for the sustainable development of Ireland’s Marine Resource (INFOMAR), EUNIS marine habitat classification, Mapping European Seabed Habitats (MESH), the Irish Sea Pilot, UKSeaMap, HABMAP (HABitat MAPping for conservation and management of the southern Irish Sea, EMODnet, European Nature Information Systems (EUNIS), MSFD, MPAs Europe, underwater TV survey (UWTV), BIOMÔR 1, Geological Survey of Ireland (GSI), European Maritime and Fisheries Fund (EMFF), ICES, NPWS, published journals.
	Fish and Shellfish	NPWS, EPA, DECC, CEFAS, NIEA, National Biodiversity Data Centre (NBDC), Irish Whale and Dolphin Group (IWDG), Irish Basking shark group (IBSG), MI, Joint Nature Conservation Committee (JNCC), Irish

SEA Topic	Environmental Baseline Data	Data Sources
		Groundfish surveys, DAREA, natural England, Natural Resources Wales (NRW) ICES, NPWS, Inland Fisheries Ireland, Fisheries Ecosystem Assessment Services, Centre for Environment, Fisheries and Aquaculture Science, Marine Management Organisation, STECF fisheries, Irish Elasmobranch Group (IEG), ObSERVE, published journals.
	Marine Mammals	NPWS, MIDA, EPA, DECC, NIEA, NBDC, IWDG, IBSG, MI, JNCC, Irish Groundfish surveys, ICES, ObSERVE, SCANS I and SCANS II, published journals.
	Birds	NPWS, EPA, MIDA, DECC, NIEA, BirdWatch Ireland, University College Cork (UCC), NBDC, IWDG, IBSG, MI, JNCC, ObSERVE, published journals.
	Designated habitats &	NPWS, EPA, MIDA, DECC, DAREA, NIEA, RAMSAR, BirdWatch Ireland, UCC, NBDC, IWDG, IBSG, MI, JNCC, Natural England, NRW, Isle of Man Gov, NatureScot, UNESCO Biospheres, OSPAR, published journals.
	Marine reptiles	NBDC, MIDA, Global Biodiversity Information Facility (GBIF), TURTLE Database; 1950-2005, Biodiversity Ireland, Cetacean Strandings Investigation Programme (CSIP), Turtle Implementation Group (TIG), INNS, Invasive Species Northern Ireland, DAERA, Invasive Species Ireland, published journals.
	Invasive species	Invasive species Ireland, NBDC, NPWS, INNS, Invasive Species Northern Ireland, DAERA, published journals.
Climatic Factors	Winds	Met Éireann information on local and Irish-wide climate, Fugro GEOS, 2001, OSPAR, Irish Coast Pilot, DAFM, IALA.
	Precipitation	IPCC, EPA, Met Éireann information on local and Irish-wide climate, Irish Coast Pilot, 2003, OSPAR Joint Assessment and Monitoring Programme (JAMP), Boelens et al (2005).
	Climate Change	DECC, National Climate Change Strategy, EPA, GSI, Climate Change Advisory Council, MI.
Cultural, Architectural & Archaeological Heritage	Historic maritime and aviation wrecks	National Inventory of Architectural Heritage, Heritage of Ireland, Wreck Inventory of Ireland Database (WIID), Underwater Unit National Monuments Service, INFOMAR, DCHG, NMS, NPWS, ASI National Inventory of Archaeological Heritage data, UNESCO World Heritage Sites, World Heritage Ireland, published journals.
	Submerged prehistoric landscapes and archaeological sites	National Inventory of Architectural Heritage, Heritage of Ireland, Wreck Inventory of Ireland Database (WIID), Underwater Unit National Monuments Service, INFOMAR, SPLASHCOS-viewer.

SEA Topic	Environmental Baseline Data	Data Sources
Economy and Material Assets	Commercial fisheries	DAFM, OPW data, MIDA, Bord Iascaigh Mhara (BIM), MI, Marine atlas, Irish Groundfish Survey (IGFS), Atlas of Commercial Fisheries around Ireland, third edition (2019), The Stock Book (2020), SEMRU, IMDO.
	Commercial shipping	MI, MIDA, Irish Maritime Development Office, IMDO.
	Offshore energy	MI, MIDA, DHLGH: Foreshore unit, Wind Energy Ireland, Sustainable Energy Authority Ireland, ReNews.Biz
	Port development	IMDO, Dept of Transport, Wind Energy Ireland, Dublin Port Company.
	Other users	MI, MIDA, DHLGH: Foreshore unit, Dept of Defence, Submarine cable mapper, Commissioner of Irish Lights, Dept of Transport, EPA, TCE, DECC.
Geology, substrates and coastal sediments	Geology	AA GeoTool, Geological Survey Ireland (GSI), OPW and EPA data, Merlin Energy Consortium, DCMNR/PAD, EMODnet, published journals.
	Bathymetry and Seabed features	MI Marine Atlas, Joint Irish Bathymetric Survey (JIBS) data, General Bathymetric Chart of the Oceans (GEBCO) digital data set, UK Hydrographic Office (UKHO) digital data, EMODnet, published journals.
Landscape and Seascape	Seascape Character Types	Regional Seascape Character Assessment for Ireland 2020 Final Report, MI, Green Infrastructure, DECC UK, National Landscape Strategy and European Landscape Convention, published journals
	World Heritage Sites	Landscape Policy Development, UNESCO, Heritage Council, DHLGH, World Heritage Ireland.
	Transboundary Seascape Character Type	Northern Ireland Regional Seascape Assessment.
	National parks	Landscape Policy Development, Heritage Council, NPWS, OPW, Irish Trails (2014). National Waymarked Trails, National Parks of Ireland.
Population and Human Health	Commercial Fisheries and consumers of fish	DAFM, OPW data, MIDA, Bord Iascaigh Mhara (BIM), MI, Marine atlas, Irish Groundfish Survey (IGFS), Atlas of Commercial Fisheries around Ireland, third edition (2019), The Stock Book (2020), Hall-Spencer et al., 2010, Irish Naval Service, ICES, SFPA.
	Mariculture	DAFM, MI, MIDA, BIM, Kraan & Guiry (1999)
	Recreation and Tourism	Dept. of Tourism, EPA: Bathing Water, An Taisce: Blue Flag Data, Go Outdoor Ireland, Fáilte Ireland and MIDA recreation datasets, Central Statistics Office, (CSO) OPW, Wild Atlantic Way, National Monuments Service (NMS), Our Ocean Wealth Publications, Irish Sailing Association, Tourism Northern Ireland, NUI, SEMRU, Ireland Marine Atlas.
	Consumers of fish/shellfish	MI, BIM, EPA Geoportal, EPA radon map, OSPAR.

SEA Topic	Environmental Baseline Data	Data Sources
	Hazardous Materials Health and safety	DECC, EPA
	Well blowouts	International Finance Corporation (2007) Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development, UNEP (1997). Environmental Management in Oil and Gas Exploration and Production. An Overview of Issues and Management Approaches. Joint E&P Forum/UNEP Technical Publication.
	Fire and Explosions	UNEP (1997). Environmental Management in Oil and Gas Exploration and Production. An Overview of Issues and Management Approaches. Joint E&P Forum/UNEP Technical Publication.
	Personnel Transfer and Vessels	International Maritime Organization (IMO)
	Ship sinkage and collision	OSPAR, Anatec (2010)
	Health and safety	CSO, HSE, EPA Geoportal, EPA radon map, Health and Safety Authority (HAS) Ireland, UN Environment Programme.
Water	Contaminants of interest	WFD, MI, EPA, Boelens et al (1999), OSPAR, Published Journals.
	Coastal Water Quality	WFD, Irish Water, DHLGH: Water quality, EPA: Water Quality in Ireland reports, MI, GSI: Groundwater.
	Surface Waters	EPA, DHLGH, MI, Published Journals, European Parliament, OSPAR, Radiological Protection Institute of Ireland.
	Crude oil fate and behaviour during spills	DECC, OSPAR, Prince, R. C., and Lessard, R. R. 2004. Crude oil releases to the environment: natural fate and remediation options, Petroleum Affairs Division reports, International Tanker Owners Pollution Federation Ltd.
	Ocean circulation	MI, MIDA, INFOMAR, OSPAR, published journals.

### 3.5 Limitations of the Data

The key gaps and/or limitations of the SEA baseline data, and how the SEA addressed these shortcomings is summarised below. More information is available in Appendix C under each topic chapter.

- **Biodiversity, Flora and Fauna:** Various data gaps were identified for the topic. The main limitation of the data available is that the resources may only cover the IOSEA6 Study Area partially or not at all, depending on the survey coverage. The COVID 19 pandemic caused surveying and sampling to be disrupted from 2020 to 2021. As a result of the reduced activity in the offshore area, there is a data gap between these years, and the baseline may have changed. In addition there has not been any surveys of offshore benthic ecosystems, the environmental status of 41% of non-commercial fish species assessed in the MSFD is currently unknown, the offshore breeding habitats for certain

marine mammal species are unknown, the environmental status of Leatherback turtles in Irish waters was assessed as currently unknown, data is lacking on important offshore areas for seabirds in the breeding season and there are significant gaps in understanding of marine invasive species. Where it was not possible to use surveyed data of the IOSEA6 Study Areas, modelled data was used where applicable. Modelled data from EMODNet was used to classify benthic habitats and while the ObSERVE study was used to categorise the baseline for marine mammals and birds supplementary modelled, e.g. Waggit *et. al.*, (2020) was also used to further inform the baseline. Multiple sources containing a variety of datasets, modelled data or literature reviews were used and are considered reliable for the assessment of the state of the environment.

- **Climatic Factors:** There is currently data gaps as a result of data sets still being processed and verified by outside organisations. For example, Met Eireann is currently in the process of quality assuring their average weather data set from 1990 – 2020, which will provide updated data from 2010 to 2020, regarding wind and precipitation data. This is not determined to be essential to the assessment.
- **Cultural, Architectural & Archaeological Heritage:** There is no database and a lack of information for any known locations of marine aviation wrecks. It is unclear whether this is because there are no known locations or if it is due to an overall lack of knowledge. The minimal number of sites of Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf is likely attributable to a lack of research. Most of the sites located so far are coastal in nature where it assumed search effort is easier therefore a lack of offshore sites is noted. This is not determined to be essential to the assessment as cultural heritage is unlikely to be significantly affected by adoption of the draft Plan.
- **Economy and Material Assets:** there is no data on the volume of marine aggregates disposed or removed from Irish waters. This is not determined to be essential to the assessment.
- **Geology, Substrates and Coastal Sediments:** INFOMAR and EMODnet data do not cover all the blocks within the IOSEA6 Study Area. There is also a lack of comprehensive sediment analysis within all the blocks of the Study Area. This is not determined to be essential to the assessment at Plan level. At Project level additional seabed information will be collated prior to drilling to characterise the project area.
- **Landscape and Seascape:** Offshore wind turbine visibility to the coast has been assessed, however, there is no visual assessment in relation to oil and gas infrastructure, however, due to the distance offshore it is determined that visual disturbance will be minimal.
- **Population and Human Health:** The issue of the lack of overview of commercial fish distributions which was identified in IOSEA5 still remains. The Atlas of Commercial Fisheries Around Ireland only includes data from 2014 to 2018. Groundfish survey data is also only currently available to 2019. Ground fish survey and other MI fisheries surveys are conducted annually (Nephrops UWTV and acoustic survey). The main data gap is the lack of species distributions models and up to date synthesis of knowledge on essential fish habitats. Due to the impact of COVID 19, data from 2020 and 2021 was not deemed to be an accurate representation of regular recreation and tourism. There was also subsequently limited published data available for recreation and tourism during these years. Therefore, data from pre-COVID has been used.
- **Water Quality:** Since most discharges are terrestrial and marine discharges are generally more concentrated in coastal waters, the MI's national monitoring for hazardous substances is risk-based and predominantly focused on coastal seas (e.g. shipping converging around ports). Monitoring is not routinely extended outside Irish coastal waters if problems are not discovered in inshore waters unless there is a specific risk, such as specific offshore sources.

### 3.6 Environmental Problems

Article 5, Annex I (d) of the SEA Directive requires that information regarding ‘any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC (The Birds and Habitats Directives respectively)’ included in the ER. The purpose of this section is to explain how existing environmental problems will affect or be affected by the Plan, and whether the Plan is likely to aggravate, reduce or otherwise affect existing environmental problems. Existing environmental problems that have been deemed relevant IOSEA6 and the surrounding areas are summarised in Table 3-3.

**Table 3-3 Environmental problems relevant to the Plan**

SEA Topic	Environmental Problem	Implications for the Plan
Air Quality	<ul style="list-style-type: none"> <li>Greenhouse Gas emissions</li> <li>Atmospheric emissions (PM<sub>2.5</sub>)</li> <li>Air quality not meeting WHO standards</li> </ul>	Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland has committed to become net zero by 2050. The Plan must seek to reduce atmospheric emissions in order to help Ireland meet its commitment.
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Maintenance of condition of designated sites, under the requirements of the EC Habitat and Bird Directives.</li> </ul>	<p>The seismic surveys and exploration wells authorised under the Plan must adhere to appropriate legislation and seek not to adversely impact the integrity of designated sites.</p> <p>A Natura Impact Statement (NIS) has been carried out for the IOSEA6 Plan and Appropriate Assessment, , will be carried out at project level by the competent authority if required under Articles 6(3) and 6(4) of the Habitats Directive (92/43/EEC).</p>
	<ul style="list-style-type: none"> <li>Anthropogenic disturbance in the marine environment e.g. vessel presence and noise, fishing activities) and the pressures (e.g. displacement, disturbance, avoidance or mortality) resulting on marine life.</li> </ul>	The Plan must ensure protected species and their habitats are not adversely impacted. Potential impacts to marine mammals, fish, birds and marine reptiles arising from the Plan have been assessed in this ER and in the NIS. Mitigation to be followed at Project level has been suggested to reduce impact from activities arising from the Plan on marine life and their habitats.
	<ul style="list-style-type: none"> <li>Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms.</li> </ul>	Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland has committed to become net zero by 2050. Although the exploration for Oil and Gas contributes to climate change. The Plan must seek to minimise the effects of climate by reducing the number and extent of permitted activities.
	<ul style="list-style-type: none"> <li>Loss and damage (e.g. by fishing activities, anchorage) on non-designated but important habitats and</li> </ul>	The Plan must ensure that seabed disturbance is kept to a minimum. Potential impacts to marine mammals, fish, birds and marine reptiles arising from the Plan have been assessed in this ER and in the NIS.

SEA Topic	Environmental Problem	Implications for the Plan
	species and Annex I Habitats (including potential habitats).	Mitigation to be followed at Project level has been suggested to reduce impact from activities arising from the Plan on marine life and their habitats.
	▪ Introduction of Invasive Non-Native Species (INNS).	The Plan must seek to minimise INNS introduction risks. Oil and gas activity is unlikely to change the risk of the INNS as the vessels typically operate in a geographically localised area, and the risk from hull fouling is low, given the geographical working region. However, the Ballast Water Management (BWM) Convention is a treaty adopted by the IMO in order to help prevent the spread of potentially harmful aquatic organisms and pathogens in ships' ballast water as Ireland is a member of the IMO it must meet with the legislation enacted.
	▪ Marine litter	The Plan must seek to minimise marine litter introduction risks. All vessels operating under the Plan must adhere to MARPOL standards with respect to black and grey wastewater and food and other waste discharges.
Climatic Factors	▪ Sea level rise	Although the exploration for Oil and Gas contributes to climate change. The Plan must seek to minimise the effects of climate change which impact, sea level rise, pH level decrease and Sea Surface Temperature by reducing the number and extent of permitted activities.
	▪ pH level decreasing	
	▪ SST	
Cultural, Architectural & Archaeological Heritage	▪ Climate change leading to damage to cultural heritage	Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland has committed to become net zero by 2050. The Plan must seek to minimise the effects of climate by reducing the number and extent of permitted activities.
	▪ Commercial industry (e.g. aggregate extraction)	The seismic surveys and exploration wells authorised under the Plan must adhere to appropriate legislation and seek not to adversely impact the integrity of Cultural, Architectural & Archaeological Heritage.
	▪ Natural processes damaging cultural heritage	None noted.
Economy and Material Assets	▪ Overfishing	The Plan must seek to not impede the fishing, shipping and offshore wind industries.
	▪ Commercial shipping	
	▪ Offshore energy projects	
Geology, substrates and coastal sediments	▪ Sediment contamination	The Plan must seek to minimise the risk of sediment contamination from well leaks and hydrocarbon release which has the potential to result in contamination of plankton and fish, which can

SEA Topic	Environmental Problem	Implications for the Plan
		contaminate local fish stocks or mariculture sites, and bioaccumulate in the food chain.
Landscape and Seascapes	Impacts on Seascapes Character Type due to growth in renewables	The Plan is unlikely to impact upon Seascapes Character Type due to the distance from the shore of the IOSES6 Study Area and subsequent well development.
Population and Human Health	Overfishing and mariculture	None noted.
Water	<ul style="list-style-type: none"> <li>Agriculture impacting water quality</li> <li>Hydromorphology</li> <li>Urban runoff pressures</li> <li>Nutrient input</li> <li>Wastewater and fouling</li> <li>Aquaculture</li> </ul>	None noted.

### 3.7 Likely Evolution of the Environment without implementation of Revised Plan

Article 5, Annex I (b) requires that information regarding ‘the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme’ is included in the ER. The likely future changes to the IOSEA6 Study Area and the surrounding area in relation to the relevant SEA topics are described in Table 3-4 below.

**Table 3-4 Summary of future baseline for each topic**

SEA Topic	Summary of Future Baseline
Air Quality	Levels of NO <sub>2</sub> should continue to be monitored onshore as in urban areas in Ireland it is close to the EU limit, and this is expected to rise. PM <sub>2.5</sub> is another pollutant which should be monitored, as this pollutant can be linked to the use of solid fuels. Ireland is in the process of transitioning away from solid fuels such as peat and turf. Future baseline studies could look at the levels of PM <sub>2.5</sub> in Ireland’s atmosphere, however, studies by the EPA have found this difficult to model, with EPA research report 270 reporting that, “Particulate Matter is one of the most difficult pollutants to model because of its wide range of anthropogenic and natural sources” (EPA, 2020a).
Biodiversity, Flora and Fauna	<p>There are strong legislative drivers to improve water quality, notably in coastal waters. These include the MSFD, Bathing Water Directive and Water Framework Directive. Monitoring programmes are carried out in Irish coastal waters to ensure the management and improvement of water quality. As improvements are made this should confer benefits for natural plankton communities, although some reduction in events such as anthropogenically influenced algal blooms would be expected.</p> <p>Cold water coral changes in the Belgica mound. The proportion of live coral facies show little change while coral rubble facies show most change. This highlights an inconsistency</p>

SEA Topic	Summary of Future Baseline
	<p>between temporally-separated data sets and implies that in 20 years, the mound surface may almost entirely change.</p> <p>Fish and shellfish will be subject to natural influences and anthropogenic pressures. Whilst certain responses may be predicted, such as northerly distribution shifts for species currently at the southern limit of their range under the influence of climate change for example, many will be subject to complex interactions of factors.</p> <p>Marine mammals that occur within the IOSEA6 Study Area will be subject to global and regional natural influences and anthropogenic pressures, including:</p> <ul style="list-style-type: none"> <li>▪ Direct and indirect impacts of climate change;</li> <li>▪ Anthropogenic underwater noise;</li> <li>▪ By-catch; and</li> <li>▪ Marine pollution.</li> </ul> <p>Seabirds that occur within the IOSEA6 Study Area will be subject to global and regional natural influences and anthropogenic pressures, including:</p> <ul style="list-style-type: none"> <li>▪ Direct and indirect impacts of climate change;</li> <li>▪ Coastal squeeze;</li> <li>▪ Offshore developments;</li> <li>▪ Fishing activities;</li> <li>▪ Marine pollution;</li> <li>▪ Predator pressure; and</li> <li>▪ Competition pressure with expanding populations of non-native species.</li> </ul>
Climatic Factors	<p>Climate change will continue to accelerate.</p> <p>In 2021 the COP26 conference took place in Glasgow, Scotland. As part of this conference, Ireland committed to the phasing out of the production of Oil and Gas in Ireland, by joining the Beyond Oil and Gas Alliance (BOGA), 'this alliance focuses on limiting carbon emissions from fossil fuels, rather than turning of the tap' (O'Sullivan, 2021). Ireland also signed up to a number of other agreements including:</p> <ul style="list-style-type: none"> <li>▪ Ireland became a signatory to the High Ambition Coalition (HAC), to support global efforts to limit the temperature rise to 1.5°C;</li> <li>▪ €10m was committed (through the Adaptation Fund Contributor Dialogue), between now and the end of 2022 for the Adaption Fund;</li> <li>▪ Participating in the Climate and Clean Air Coalition Ministerial, to accelerate action to reduce short-lived climate pollutants; and</li> <li>▪ Empowering citizens to be involved in a transition that is fair, equal and just, Minister Eamon Ryan launched a new National Dialogue on Climate Action (NDCA) – from COP26. This event saw the announcement of €60 million from the Climate Action Fund, to be invested in community climate action projects and initiatives over the next three years (DECC, 2022b).</li> </ul>
Cultural, Architectural & Archaeological Heritage	<p>Factors that are likely to impact on the future archaeological baseline are not merely restricted to impacts from marine developments, but also include environmental factors such as sea level changes, erosion and climate change. In areas where the seabed is mobile, or erodible, wreck sites or archaeological artefacts may become exposed and put at risk as a result of natural seabed deterioration. Climate change can have the potential to expose underwater cultural heritage and also has the potential to raise sea levels to the point where 136 UNESCO-designated cultural and historical monuments will be flooded by 2100 (as discussed above (Marzeion and Levermann, 2014)). These types of changes will alter the baseline of the cultural heritage in Ireland.</p>

SEA Topic	Summary of Future Baseline
Economy and Material Assets	The potential exists for an increased focus and use of Ireland's marine environment. Future fishing activity will depend on the interaction of multiple factors such as fish and shellfish stock resources, fisheries management and the commercial viability of specific fisheries. The government is committed to developing these resources as outlined in National Marine Planning Framework'.
Geology, Substrates and Coastal sediments	No changes anticipated within the Plan timeframe.
Landscape and Seascape	Applications for foreshore licences in Ireland has increased in the last number of years, as the foreshore licensing is transitioning to a new regime of known as the Maritime Area Consent (MAC). Currently, there are seven qualified projects with MAC applications these are: Oriel Wind Park; RWE's Bray and Kish Banks; Codling Wind Park, made up of Codling 1 and Codling 2; Fuinneamh Sceirde Teoranta's Skerd Rocks; and the North Irish Sea Array. It is anticipated that there would be a gradual increase in overall shipping / boating activity and lead to changes in landscape and seascape.
Population and Human Health	<ul style="list-style-type: none"> <li>Commercial fisheries - Future fishing activity will depend on the interaction of multiple factors such as fish and shellfish stock resources, fisheries management and the commercial viability of specific fisheries.</li> <li>Mariculture - The National Strategic Plan for Sustainable Aquaculture Development, outlined in the National Marine Planning Framework (NMPF) aims to achieve sustainable growth of the industry towards 2040 (Department of Housing, Local Government and Heritage, 2021). However, this will depend on the economic condition and the balance between production costs and market prices.</li> <li>Whilst tourism declined during the COVID 19 pandemic, it is expected that tourism will quickly recover and continue to grow into the future, especially with promotion of schemes such as the "Wild Atlantic Way" and SeaFest.</li> <li>Risks to human health are likely to remain low due to the regulatory systems in place in order to preclude significant impacts to the health of employees. The Commission for the Regulation of Utilities (CRU) is the independent safety regulator for upstream petroleum exploration and extraction activities in Ireland. The CRU regulates the industry in accordance with the Petroleum Safety Framework a collection of regulations, written regulatory documents and procedures. The Health and Safety Authority (HSA) have responsibility for occupational health and safety in relation to petroleum exploration and extraction activities in Ireland.</li> </ul>
Water	<ul style="list-style-type: none"> <li>The MSFD and WFD monitoring programmes will be ongoing as compliance is required under the Directives. Updates to these assessments will provide more comprehensive assessment of the baseline water quality in the future to determine potential impacts of oil and gas operations.</li> <li>GES of sites will continue to be aimed for and as such, site classifications can change under the monitoring scheme. To continue with improvements, the RBMP, will continue to be updated and adhered to and Irish Water has plans in place to improve infrastructure which will affect the future baseline of water quality.</li> <li>The potential wastes and discharges produced by the oil and gas industry offshore are regulated by a suite of regulations and plans, seeking to limit the impact of those activities and operations, which seek to limit the impact. Reductions in discharges have been seen in recent years and may continue in the future, however, this will need</li> </ul>

SEA Topic	Summary of Future Baseline
	<p>to validated through assessment and monitoring. 'The volume of dispersed oil discharged in 2019 has decreased by 16% on 2009 figures in the north-east Atlantic. While there was not a year on year decrease the total quantity of dispersed oil (aliphatic oil) discharged to the sea from Produced Water and displacement water decreased from 4 890 tonnes in 2009 to 4,096 tonnes in 2019' (OSPAR 2022). Reinjection of produced water has increased by 49% from 2009 to 2019, but the effect of this is counteracted by aging fields with decreasing hydrocarbon production and increasing water production.</p> <ul style="list-style-type: none"> <li>▪ Cumulative impacts from other industries in the area will in the future affect the water quality of the area. These impacts on water quality must be incorporated when assessing the future baseline.</li> </ul>

### 3.8 Environmental Topic Inter-Relationships

Table 3-5 highlights the potential inter-relationships between SEA topics at a strategic plan-level. These potential interactions will be taken into account in the assessment. There is the potential for all topics to interact with each other with the exception of:

- Air Quality and Cultural, Architectural & Archaeological Heritage
- Air Quality and Geology, substrates & coastal sediments
- Air Quality and Landscape & Seascape

Air Quality has no inter-relationship with Cultural, Architectural & Archaeological Heritage, Geology, substrates & coastal sediments and Landscape & Seascape this is because air quality plays no part in damaging any component of the mentioned topics.

**Table 3-5 Potential inter-relationships between SEA topics**

<b>Biodiversity, Flora and Fauna</b>	✓							
<b>Climatic Factors</b>	✓	✓						
<b>Cultural, Architectural &amp; Archaeological Heritage</b>	X	✓	✓					
<b>Economy and Material Assets</b>	✓	✓	✓	✓				
<b>Geology, substrates &amp; coastal sediments</b>	X	✓	✓	✓	✓			
<b>Landscape and Seascape</b>	X	✓	✓	✓	✓	✓		
<b>Population and Human Health</b>	✓	✓	✓	✓	✓	✓	✓	
<b>Water</b>	✓	✓	✓	✓	✓	✓	✓	✓
<b>Environmental Topic</b>	<b>Air</b>	<b>Biodiversity, Flora and Fauna</b>	<b>Climatic Factors</b>	<b>Cultural, Architectural &amp; Archaeological Heritage</b>	<b>Economy and Material Assets</b>	<b>Geology, substrates &amp; coastal sediments</b>	<b>Landscape and Seascape</b>	<b>Population and Human Health</b>

### 3.9 SEA Objectives

The assessment will be undertaken for a set of environmental objectives. These have been derived from the review of (a) relevant PP, (b) the environmental baseline, (c) associated environmental issues and (d) consultation.

To streamline the assessment approach environmental topics are grouped and one or more objectives relevant to the Plan are assigned to each topic. The Plan and its alternative will be assessed against the Strategic Environmental Objectives (SEO) to examine the likely significant environmental impacts. The SEOs specify the desired direction of change (e.g., reduce impacts on water quality, promote green economy) and have been kept broad to allow for a wide range of environmental topics to be considered.

The SEA objectives used in this assessment of alternatives are listed in Table 3-6. These objectives take into account the inter-relationships identified above.

**Table 3-6 Draft SEA Objectives for the assessment of the Plan**

SEA Topic	SEA Objective
Air Quality	1. Minimise emissions to the air.
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna of Ireland, its seas and transboundary waters, particularly EU designated sites and protected species.
Climatic Factors	3. Contribute to the delivery of the climate action plan and green economy, including the objectives set out in the climate action plan.
Cultural, Architectural & Archaeological Heritage	4. Prevent damage to or loss of heritage features including maritime heritage.
Economy and Material Assets	5. Protect and enhance the existing oil and gas infrastructure and ports servicing the sector. 6. Avoids disruption, disturbance and nuisance to communities and their sources of income (e.g. commercial fishing, aquaculture, tourism and recreation etc).
Geology, substrates and coastal sediments	7. Protect the quality of the seabed, coastline and its sediments.
Landscape and Seascape	8. Protect the landscape/seascape character and visual amenity.
Population and Human Health	9. Ensure no adverse impact on human health and wellbeing.
Water	10. Minimise impacts on water quality and support the achievement of the objectives of the Marine Strategy Framework Directive.

## 4. ASSESSMENT OF ENVIRONMENTAL EFFECTS

Article 5, Annex I (h) of the SEA Directive requires that the ER includes “an outline of the reasons for selecting the alternatives and a description of how the assessment was undertaken including any difficulties encountered in compiling the required information”. This section presents the alternatives assessed and the assessment methods, as well as the results of the assessment.

### 4.1 Identification of Alternatives

The SEA Directive requires that the assessment identifies and evaluates reasonable ‘alternatives’ to what is proposed within the Plan. EPA guidance (EPA, 2015) on ‘Developing and Assessing Alternatives in Strategic Environmental Assessment (SEA)’ was used in the development of the assessment alternatives.

DECC consider that renewable energy will be the main source of energy in the near future, however, there is still a short term need to examine Ireland’s offshore hydrocarbon resources, hence there is a requirement for a revised plan for issuing authorisations. The available alternative options have been considered in the context of Irish energy policy.

DECC has considered the inclusion of alternative options relating to the differences in the level of activity during the earlier years of the Plan period; however, this is not consistent with DECC’s policy approach and legislation, therefore, is not a realistic alternative. The ceasing of issuing authorisations is not a viable option. The following alternative options for assessment have been identified.

#### 4.1.1 Option A

To proceed with issuing authorisations, as well as permitting petroleum (oil and gas) activities up to the maximum levels of activity presented in Table 4-1, subject to modifications to the regulatory regime which may derive from the SEA/AA process. These modifications represent the proposed mitigation measures resulting from the SEA assessment, e.g. restriction of timing of activities.

**Table 4-1 Option A maximum levels of activity**

Activity	Maximum over duration of plan	Maximum in any one year
Wells drilled	15	3
2D seismic survey acquired	8,000km	2,000km
3D seismic survey acquired	4,000km <sup>2</sup>	1,000km <sup>2</sup>

#### 4.1.2 Option B

To proceed with issuing authorisations, as well as permitting petroleum (oil and gas) activities up to the maximum levels of activity presented in Table 4-2, subject to modifications to the regulatory regime which may derive from the SEA/AA process. These modifications represent the proposed mitigation measures resulting from the SEA assessment, e.g. restriction of timing of activities.

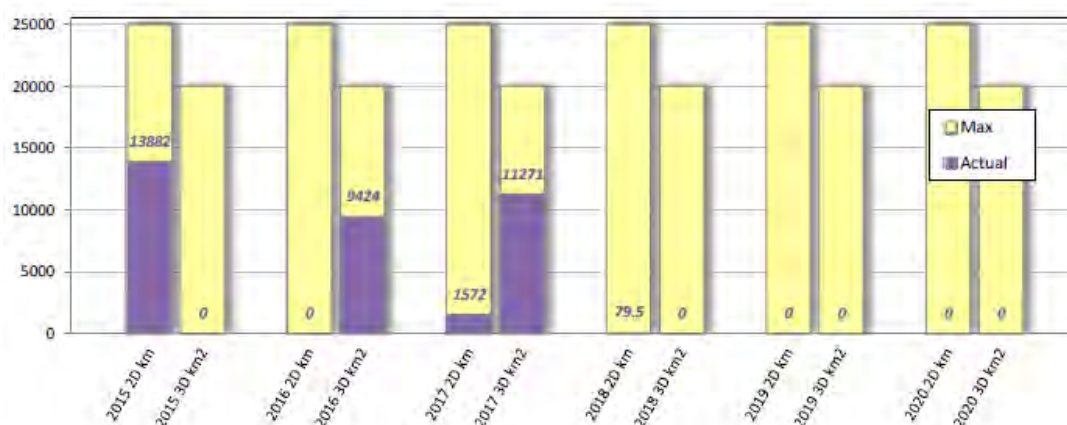
Represents a 50% increase in potential activities over the lifetime of the Plan and a 100% increase in activities in any one year.

**Table 4-2 Option B maximum levels of activity**

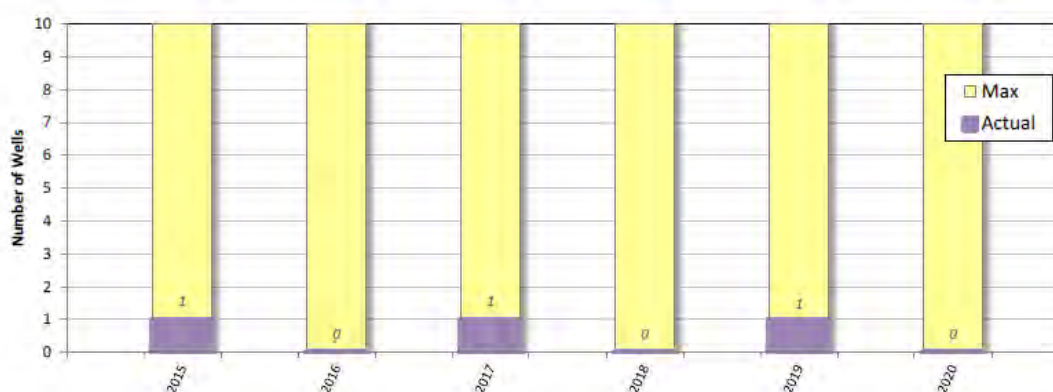
Activity	Maximum over duration of plan	Maximum in any one year
Wells drilled	23	6
2D seismic survey acquired	12,000km	4,000km
3D seismic survey acquired	6,000km <sup>2</sup>	2,000km <sup>2</sup>

These levels of activities identified in the Plan have been developed to inform the environmental assessment of the Plan for both options A and B. In reality, It is possible that actual levels of activity will be lower than these values. For comparison, whilst the Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters during the Period 2015 to 2020 (which was the subject of IOSEA5) was undertaken on the basis of assumptions of a maximum of 10 wells per annum, 25,000km of 2D seismic survey per annum and 20,000km<sup>2</sup> of 3D seismic survey per annum, the actual levels of activity were well below those values. Figures 4-1 and 4-2 provide the volume of seismic surveys and exploration wells drilled over IOSEA5. Over the entire duration of the IOSEA5 Plan (i.e. in the period 2015-2020), there was a sum total of three wells drilled, 15,533.5km 2D seismic acquisition and 20,695km<sup>2</sup> 3D seismic acquisition.

**Figure 4-1 Seismic surveys undertaken in IOSEA5 Area between 2015 and 2020**



**Figure 4-2 Exploration drilling undertaken in IOSEA5 Area between 2015 and 2020**



## 4.2 Assumptions of the Plan

In order to undertake the environmental assessment a number of assumptions have been made to characterise typical operations for both seismic survey and drilling activities. These are summarised below.

- **Seismic survey:**
  - The maximum number of vessels predicted to be operational during a typical seismic survey is expected to be two, an acquisition vessel and guard vessel.
  - The typical time period for a seismic survey is expected to be four weeks.
  - The number of helicopter trips on average during the seismic survey activities is expected to be one per week.
- **Drilling activities:**
  - The maximum of drilling vessels, support vessels and transport vessels predicted to be operational at any one time during drilling is five. This will be 1 x drilling unit, 1 x standby vessel, 3 x supply vessels. For semi-sub rigs additional anchor tugs would be on location for anchor lay and anchor retrieval operations.
  - The typical time period for a drilling operation is dependent on the rig type (DP/anchored), water depth and drilling depth. The 11 wells drilled between 2008 and 2019 had an average duration of 66 days from SPUD date to drilling rig leaves (this duration does not include time taken for vessels to transit to the drill location).
  - The number of helicopter trips on average during the drilling activities is expected to be five per week.
  - Diesel is expected to be the typical fuel used by the drill rig and associated vessels.
  - The likelihood of a well test being required is considered to be unlikely for exploration wells. This is considered more likely in the case of an appraisal well. Only one of last 11 wells drilled between 2008 and 2019 was tested.

## 4.3 Assessment Methods

SEA is a strategic level assessment; therefore, it is not possible for the environmental assessment to be undertaken in as much detail as at project-level. SEA sets out a series of objectives to rationalise information for the purposes of assessment. The environmental assessment is focused on the level of details contained within the policy, plan or programme.

Each alternative option will be assessed against the SEOs. The baseline for the assessment is determined to be the Previous Plan (i.e. the plan assessed under IOSEA5), therefore, as the two Options being assessed permit a smaller extent of seismic activity and exploration well drilling they have a lesser effect overall environmentally.

The environmental assessment includes a combination of qualitative assessment and expert judgment. GIS has been used for mapping the baseline and the assessment considers the location of these receptors in relation to the IOSEA6 Study Area. The assessment uses oil spill modelling undertaken on behalf of the Petroleum Infrastructure Programme (PIP) to inform where an accidental oil spill may spread to. This is explained more in the following section.

### 4.3.1 Oil Spill Modelling

The Irish Shelf Petroleum Studies Group (ISPSG) of the PIP commissioned a modelling study to understand the effects of oil spill from currently authorised blocks in Irish Waters, as part of the West

& South Coast Oil Spill Response Environmental Sensitivity Mapping Study (ERM, 2019). The modelling study identifies high risk areas in the context of offshore drilling activities from accidental oil spill events. The oil spill modelling was conducted from the following basins and from each basin a centralised location was used. The locations are shown on Figure 4-1 (Drawing Number: P2510-OIL-003-A) and summarised below:

1. Porcupine Basin (North);
2. Porcupine Basin (South);
3. North Celtic Sea Basin (West);
4. North Celtic Sea Basin (Central);
5. North Celtic Sea Basin (East); and
6. Central Irish Sea Basin.

The Slyne basin, relevant to this IOSEA6 Study Area was not modelled as the basin is known to contain gas/condensate and poses very little risk to the shoreline. For this investigation, stochastic modelling methods were employed. A historical record of ocean currents and winds spanning several years is used in stochastic modelling. Throughout the dataset, identical spill scenarios are released at regular intervals, subjecting each release to various ocean currents and winds. This method illustrates the variety of events that could result from that spill scenario. Releases were modelled under stochastic conditions for a 30 day release duration of Group 2 crude oil. 30 days is considered to be the typical time to install a capping stack (ERM, 2019).

The findings of stochastic modelling are frequently used to determine the "worst" case scenario, such as the lowest arrival time or the highest amount of oil on the shoreline. This is helpful for planning, but it could give the impression that a spill situation is much worse than it actually is. Therefore, care should be taken while interpreting the findings. Findings of the modelling were as follows (ERM, 2019):

1. Porcupine Basin (North): Impact to the west coast of Ireland, from County Mayo to Cork. The probability of impact to shoreline locations is less than 10 %, apart from County Kerry where 21% of the simulations impacted.
2. Porcupine Basin (South): There was no impact above the threshold value of the threshold value of 0.1l/m<sup>2</sup>.
3. North Celtic Sea Basin (West): Impact to the counties of Clare, Kerry and Cork in the south-west of Ireland. The majority of the impact is across Kerry and the western side of Cork where up to 47% of the simulations impacted County Cork. The IOSEA6 Study Area does not permit authorisations from this area, therefore results from this scenario are not considered further.
4. North Celtic Sea Basin (Central): impact to the west and southern coast from County Mayo to County Wexford. The highest probability of impact occurs within County Cork where 93% of simulations resulted in shoreline impact to the county.
5. North Celtic Sea Basin (East): Impact to the southern coast from County Kerry to County Wexford. The highest probability of impact occurs within County Cork where 71% of simulations resulted in shoreline impact to the county. This scenario also impacts the coast of Cornwall, England and Pembrokeshire, Wales, with less than 25% of simulations impacting these shorelines.
6. Central Irish Sea Basin: Impact to the south and east coast from County Cork to County Dublin. The highest probability of impact occurs within County Wexford where 81% of simulations resulted in shoreline impact. This scenario also impacts the west coastline of Wales, with shoreline impacts from up to 95% of simulations. Lower probability of impact to shoreline locations is also identified along the coastline of County Down, Northern Ireland; Isle of Man;

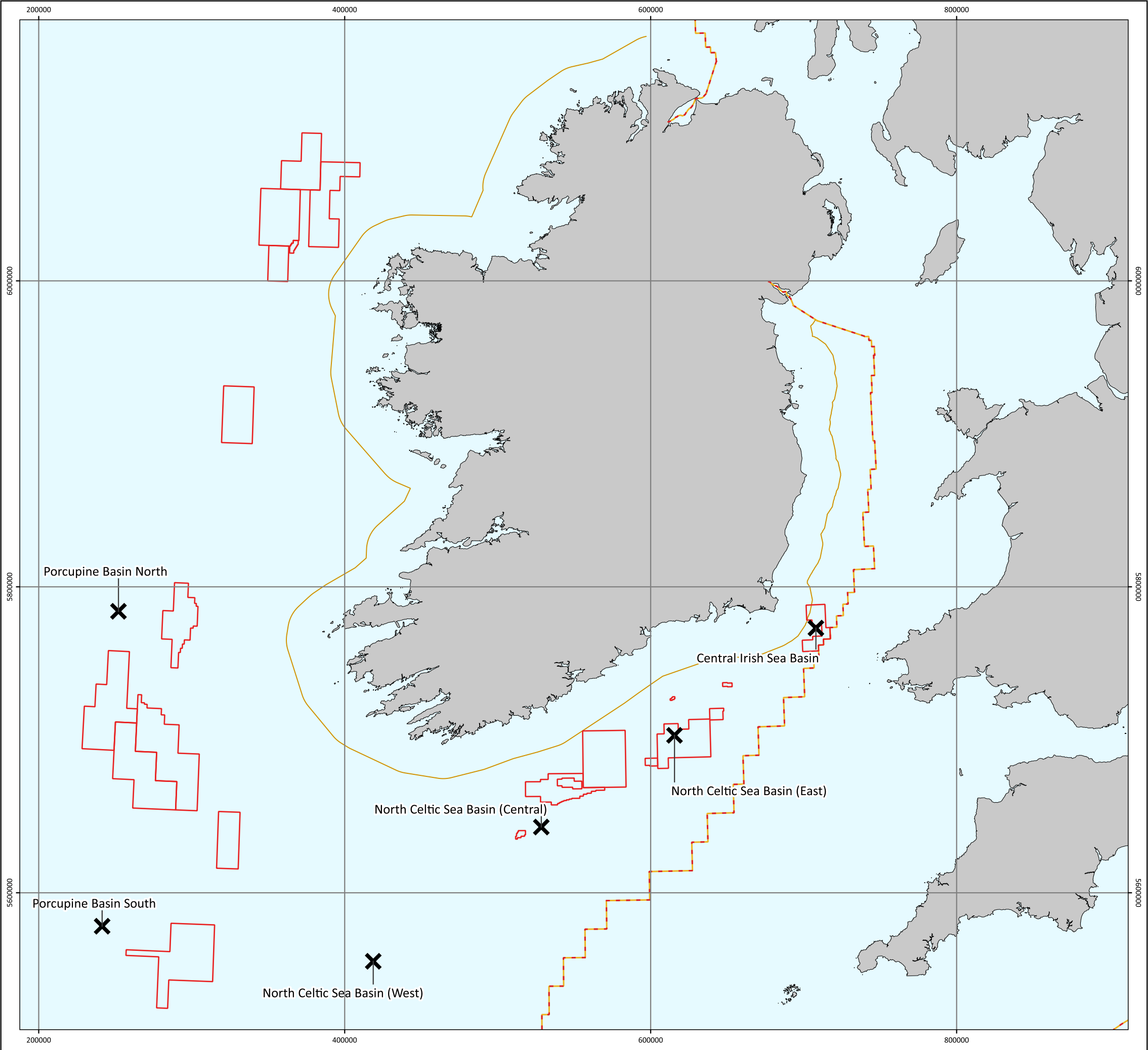
Lancashire and Cumbria, England and County of Wigtownshire, Dumfries and Galloway; Scotland.

The probability of potential oil spill shoreline impacts on Irish and UK coastlines from the relevant Scenarios (1, 4, 5 and 6) is shown in Figure 4-2 (Drawing Number: P2510-OIL-004-A). Probability helps to estimate how likely an area is to being impacted from a realistic case simulation.

The probability of a visible surface sheen (above a thickness of 0.3  $\mu\text{m}$ ) across Irish and UK Waters is shown in Figure 4-3 (Drawing Number: P2510-OIL-005-A). Below 0.3  $\mu\text{m}$  the spill will rapidly break up with minimal additional impact.

This shows that depending on the location of the spill and prevailing wind conditions there is the potential for the oil to spread across the Celtic Sea and into the Irish Sea (when spill occurs from the Celtic Sea Basin).

The modelling results were used to inform the environmental assessment.



# IOSEA6 - ENVIRONMENTAL REPORT

## OIL SPILL MODELLING

### Oil Spill Modelled Locations

Drawing No: P2510-OIL-003

A

**Legend**

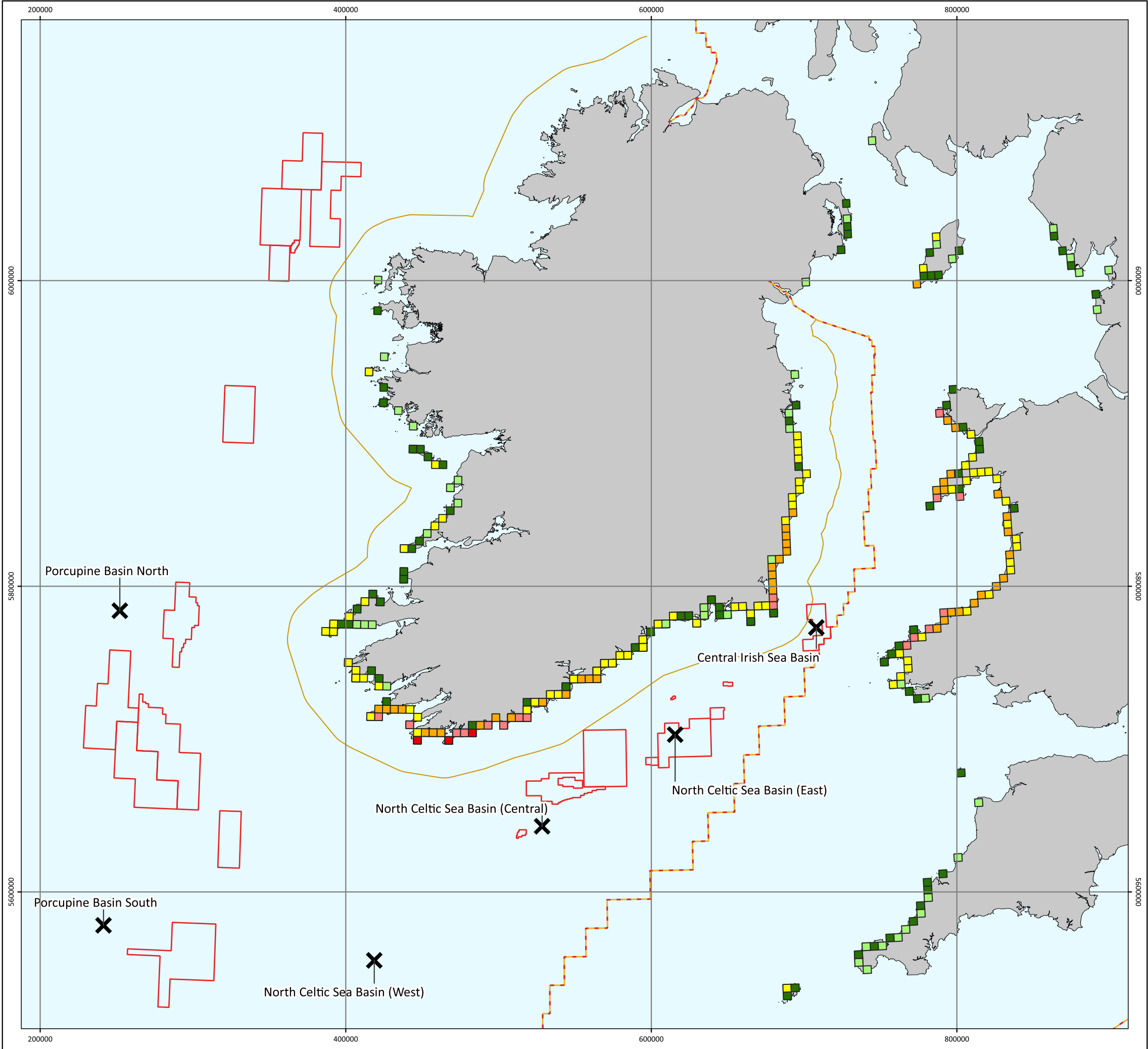
- IOSEA6 Study Area
- Modelled Spill Location
- 12 NM Limit
- EEZ Boundary

NOT TO BE USED FOR NAVIGATION

Date	2022-10-27 10:10:28
Coordinate System	ED50 / UTM zone 29N
WKID	EPSG:23029
Scale @A3	1:2,500,000
Data Sources	MarineRegions; DCCA, ESRI, GEBCO, PIP
File Reference	J:\P2510\Mxd\15_OIL \P2510-OIL-001.qgz
Created By	Lewis Castle
Reviewed By	Emma Kilbane
Approved By	Emma Langley

An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications

© Metoc Ltd, 2022  
All rights reserved



IOSEA6 - ENVIRONMENTAL REPORT

OIL SPILL MODELLING

Potential Oil Spill Impact on UK and Irish Shores

Drawing No: P2510-OIL-004

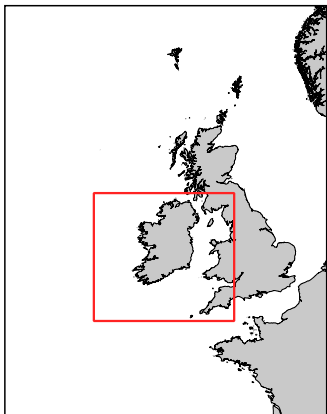
A

Legend

- IOSEA6 Study Area
- Modelled Spill Location
- 12 NM Limit
- EEZ Boundary

Probability

- < 1 %
- 1 - 5 %
- 5 - 25 %
- 25 - 50 %
- 50 - 75 %
- 75 - 95 %
- > 95 %

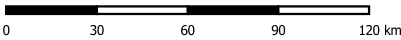


NOT TO BE USED FOR NAVIGATION

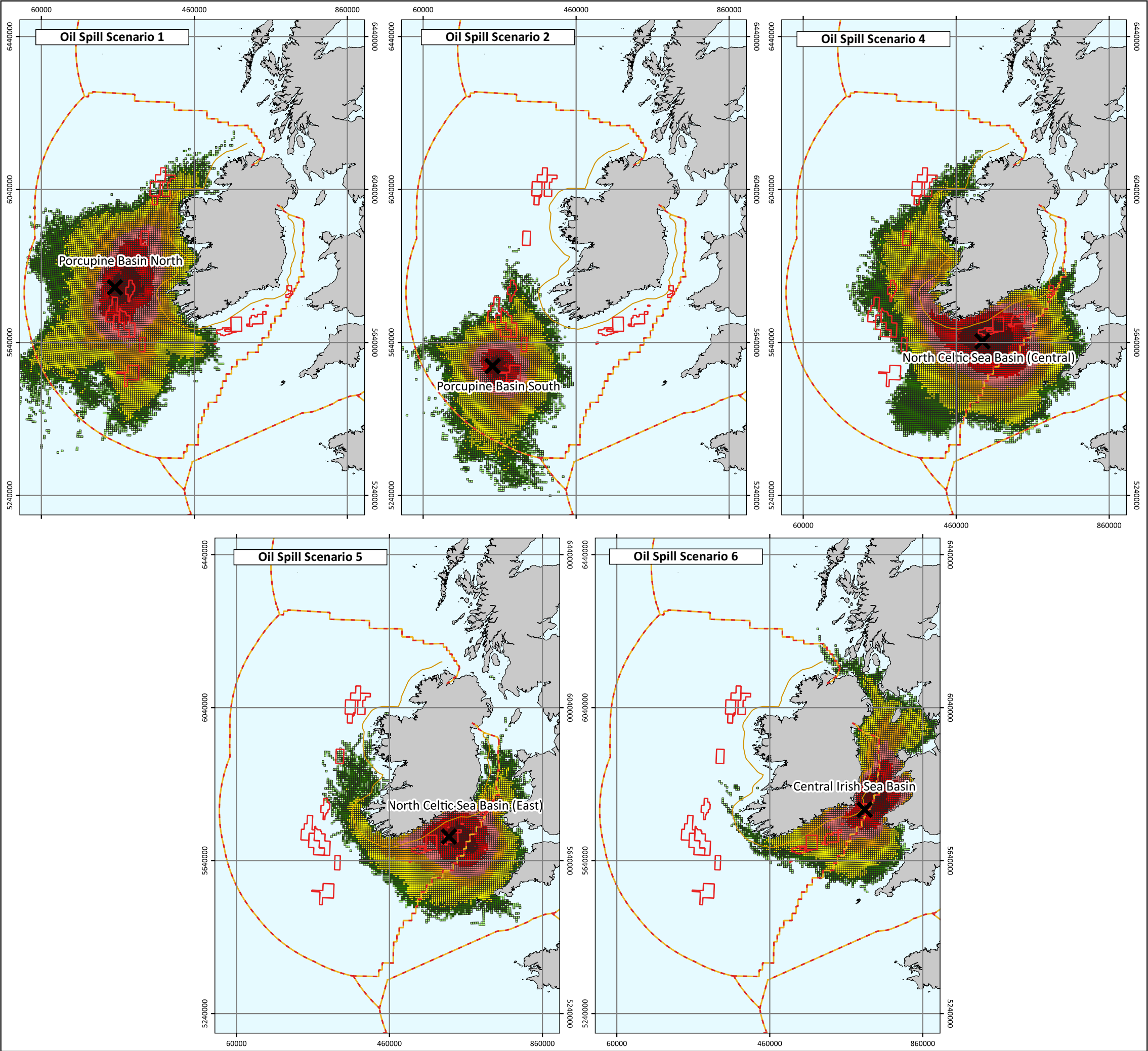
Date	2022-10-27 10:08:34
Coordinate System	ED50 / UTM zone 29N
WKID	EPSG:23029
Scale @A3	1:2,500,000
Data Sources	ESRI; MarineRegions; DCCAE, GEBCO, PIP
File Reference	J:\P2510\Mxd\15_OIL \P2510-OIL-001.qgz
Created By	Lewis Castle
Reviewed By	Emma Kilbane
Approved By	Emma Langley



An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications



© Metoc Ltd, 2022  
All rights reserved



# IOSEA6 - ENVIRONMENTAL REPORT

## OIL SPILL MODELLING Probability of Surface Sheen Across Irish and UK Waters

Drawing No: P2510-OIL-005

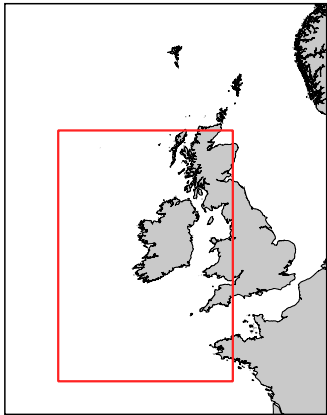
A

### Legend

- IOSEA6 Study Area
- Modelled Spill Location
- 12 NM Limit
- EEZ Boundary

### Probability of Sheen Thickness ( > 0.3 µm )

- < 1 %
- 1 - 5 %
- 5 - 25 %
- 25 - 50 %
- 50 - 75 %
- 75 - 95 %
- > 95 %



NOT TO BE USED FOR NAVIGATION

Date	2022-10-31 17:35:17
Coordinate System	ED50 / UTM zone 29N
WKID	EPSG:23029
Scale @A3	1:9,999,996
Data Sources	ESRI; MarineRegions; DCCAE, GEBCO, PIP
File Reference	J:\P2510\Mxd\15_OIL \P2510-OIL-001.qgz
Created By	Lewis Castle
Reviewed By	Emma Langley
Approved By	Emma Langley



An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications

intertek

0 100 200 300 400 km

© Metoc Ltd, 2022  
All rights reserved

### 4.3.2 Assessment of Significance

Impacts from the Plan relating to the issues addressed by the SEA objectives above will be considered and a high-level appraisal of the alternatives against the SEO using the significance criteria detailed in Table 4-3.

**Table 4-3 Significance criteria for assessment**

Significance of effect	Description of effect significance
<b>Substantially supports SEO</b>	Is considered significant, e.g. beneficial impacts are substantial, substantially accelerate an improving trend, substantially decelerate a declining trend, substantially support delivery of a declared objective.
<b>Support SEO</b>	Supports SEO but not to a significant extent, e.g. beneficial impacts are not substantial, do not substantially accelerate an improving trend, do not substantially decelerate a declining trend, do not substantially support from delivery of a declared objective.
<b>Neutral contribution to SEO</b>	Either no impacts or on balance (taking account of positive and negative impacts) a neutral contribution.
<b>Detracts from SEO</b>	Detracts from SEO but not to a significant extent, e.g. adverse impacts are not substantial, do not substantially decelerate an improving trend, do not substantially accelerate a declining trend, do not substantially detract from delivery of a declared objective.
<b>Substantially detracts from SEO</b>	Is considered significant, e.g. adverse impacts are substantial, substantially decelerate an improving trend, substantially accelerate a declining trend, substantially detract from delivery of a declared objective.

Effects will each impact on the environment in a different manner. Effects considered will include secondary, cumulative, synergistic, permanent and temporary, positive and negative effects. It will also be identified if effects are likely to be permanent or temporary and, where relevant, the likely geographical and temporal scale of the effect. A justification of the assessment will be given in the for each SEO.

The definitions of such impacts (negative or positive) are detailed below:

- **Direct effects:** Direct impacts represent for example loss of habitat, disturbance of bird species, changes in biodiversity abundances or loss of resources.
- **Indirect/Secondary effects:** effects on the environment, which are not a direct result of the activities of the Plan, often produced away from or as a result of a complex pathway.
- **Irreversible:** an effect which is likely to be permanent, effects that cannot be undone even through remediation and the resource cannot turn to its original state.
- **Reversible:** an effect which is temporary and effects that can be undone, for example through remediation or restoration.
- **Cumulative:** an effect which results from the combined impact of past, present and future activities.
- **Synergistic:** effects that, when totalled, result in a greater or lesser effect than the sum of the individual effects.

## 4.4 Assessment of Alternatives

A high-level assessment was undertaken of the two different alternatives (Option A and B) for the Plan was undertaken. The full assessment record is presented in Appendix D. Table 4-4 presents a summary of the results for each option against the SEO's. Implementation of mitigation measures will minimise the impact of each potential environmental impact.

**Table 4-4 Summary of the results of the assessment of Plan Options**

SEA Topic	SEA Objective	Activity	Option A	Option B
Air Quality	1. Minimise emissions to the air.	Seismic	Support SEO	Support SEO
		Drilling	Support SEO	Neutral contribution to SEO
Biodiversity, Flora and Fauna	2. Avoid damage to the biodiversity, flora and fauna of Ireland, its seas and transboundary waters, particularly EU designated sites and protected species.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Detracts from SEO	Detracts from SEO
Climatic Factors	3. Contribute to the delivery of the climate action plan and green economy, including the objectives set out in the climate action plan.	Seismic	Support SEO	Support SEO
		Drilling	Support SEO	Neutral contribution to SEO
Cultural, Architectural & Archaeological Heritage	4. Prevent damage to or loss of heritage features including maritime heritage.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Economy and Material Assets	5. Protect and enhance the existing oil and gas infrastructure and ports servicing the sector.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
	6. Avoids disruption, disturbance and nuisance to communities and their sources of income (e.g. commercial fishing, aquaculture, tourism and recreation etc).	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Geology, substrates and coastal sediments	7. Protect the quality of the seabed, coastline and its sediments.	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Detracts from SEO
Landscape and Seascape	8. Protect the landscape/seascape character and visual amenity.	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO
Population and Human Health	9. Ensure no adverse impact on human health and wellbeing.	Seismic	Support SEO	Support SEO
		Drilling	Neutral contribution to SEO	Neutral contribution to SEO

SEA Topic	SEA Objective	Activity	Option A	Option B
Water	10. Minimise impacts on water quality and support the achievement of the objectives of the Marine Strategy Framework Directive.	Seismic	Neutral contribution to SEO	Neutral contribution to SEO
		Drilling	Detracts from SEO	Detracts from SEO

## 4.5 Summary of Effects

Article 5, Annex 1 (f) of the SEA Directive requires that the likely significant effects on the environment are identified. There is the potential for negative effects on Air Quality, biodiversity, Flora and Fauna, Climatic Factors, Economy and Material Assets, Landscape and Seascape, Population and Human Health and Water from implementation of the Plan. Good planning and selection of mitigation measures and implementation of them will mitigate many of these potential negative effects.

Potential effects on the SEA topics are summarised below:

- **Air Quality:** Negative effects on air quality due to emissions from vessel and helicopter combustion and flaring, however, less emissions than under the Previous Plan due to reduction in the extent of permitted seismic survey and drilling activity.
- **Biodiversity, Flora and Fauna:** Negative effects on biodiversity, flora and fauna may include underwater noise during seismic survey, contaminated cuttings discharge and chemical/mud/cement/cuttings discharge, disturbance of marine mammals and birds due to presence of vessels and helicopters, habitat disturbance and impact to benthos through anchoring or placement of equipment on the seabed and drilling and disturbance of birds due to flaring. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on biodiversity, flora and fauna in local and transboundary waters.
- **Climatic Factors:** Negative effects on climatic factors due to emissions of greenhouse gases, however, less emissions than under the Previous Plan due to reduction in the extent of permitted seismic survey and drilling activity.
- **Cultural, Architectural & Archaeological Heritage:** Minimal effects predicted on submerged cultural heritage due to physical damage from drilling operations and seismic surveys.
- **Economy and Material Assets:** Negative effects on fishing industry due to exclusions around survey vessels and drilling rigs. Conflict of space during operations for other marine users. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on the economy.
- **Geology, substrates and coastal sediments:** Minimal effects predicted to seabed due to physical damage from drilling operations. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on coastal sediments.
- **Landscape and Seascape:** Seismic surveys and drilling will not impact the landscape/seascape character. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on coastal landscape and seascape.
- **Population and Human Health:** An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on population.
- **Water:** Negative effects on water quality due to accidental release of fuel from vessels and chemical discharges from drilling operations. Negative effects due to release of mud/cement/cuttings to the water column. An accidental oil spill event (e.g. well blowout) could lead to the potential for negative effects on water quality in local and transboundary waters.

## 4.6 The Preferred Alternative

The preferred Plan alternative (Option) is Option A. This option provides a significant reduction in the extent of permitted seismic survey activity, with a 92% reduction in 2D and 95% reduction in 3D seismic survey activity per year, compared to the Previous Plan. Option A also permits significantly less exploration wells to be drilled than under the Previous Plan with a 70% reduction per year. This reduction in the level of activities minimised the likely significant effects on the environment and supports the most SEO.

## 4.7 Cumulative Assessment

This section of the ER provides an outline of the potential cumulative effects on the environment as a result of implementation of the Plan.

Cumulative effects are defined in the EPA SEA Process Checklist as “*effects on the environment that result from incremental changes caused by the strategic action together with other past, present and reasonably foreseeable future actions. These effects can result from individually minor but collectively significant actions taking place over time or space*” (EPA, 2022). These effects can be insignificant individually but cumulatively over time and from a number of sources can result in the degradation of sensitive environmental resources. Assessment of cumulative effects is required by the SEA Directive (2001/42/EC).

Cumulative impacts occur as a result of a number of activities, discharges and emissions combining or overlapping, potentially leading to a significant impact. Potential cumulative impacts could arise as a result of impacts from seismic and exploration activities interacting or combining with those from other activities taking place in the IOSEA6 Study Area.

The activities resulting from the adoption of the Plan may interact incrementally with those of other offshore renewable energy sources and existing or new oil and gas (including gas storage) activities, or they may interact cumulatively with those of other human activities (e.g. fishing and shipping). While synergistic effects are thought to be potential effects of hydrocarbon or renewable industry activities where the joint result of two or more effects is greater than the sum of individual effects, secondary effects are indirect effects that do not occur as a direct result of the proposed activities.

These effects are defined below (EPA, 2020b):

- **Cumulative / in-combination effects:** Effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. These occur when two or more environmental effects combine to have a greater effect.
- **Synergistic effects:** When individual effects interact with each other to produce a total effect greater than the sum of the individual effects, so that the nature of the final effect is different to the nature of the individual effects.
- **Neutralising:** When one project or plan balances the impact of another.

For there to be potential cumulative effects between the activities authorised by the Plan and another project, plan or licensed activity there must be a common pressure-receptor pathway which overlaps spatially and to a certain degree temporally. A screening exercise was undertaken, presented in the sub-sections below, to determine if any of the projects, plans and activities identified have:

- A common-pressure receptor pathway with the project;
- Activities, the effects of which overlap spatially with the IOSEA6 Study Area; and
- Activities, the effects of which overlap spatially and temporally with the project.

The main pressures resulting from the Plan that have the potential for cumulative effects are:

- Underwater sound changes and the subsequent effects on birds, fish and marine mammals;

- The temporary displacement of other marine users (including fishing vessels);
- Disturbance to the sea bed;
- Atmospheric emissions;
- Physical presence; and
- Accidental events.

#### 4.7.1 Assessment Methodology

The proposed method for the assessment of potential cumulative impacts is based on 'Good Practice Guidance on Cumulative Effects Assessment (CEA) in Strategic Environmental Assessment' (EPA, 2020b). The guidance sets out the CEA approach to identifying cumulative effects as summarised below:

1. Identify receptors. 'Scope in' Plan impacts that, alone, might be insignificant but cumulatively would be significant (for instance, climate change).
2. Identify limits/thresholds/standards. These will be used during impact assessment (task 4) to determine the significance of the cumulative impacts.
3. Describe the 'current state of the environment and likely evolution thereof without implementation of the Plan' (SEA Directive Annex I (b)), including changes due to other plans, programmes, projects and general trends.
4. Assess the impacts of the Plan plus those of other actions (from task 3). Compare these against the limits/thresholds (from task 2) to determine significance.
5. Mitigate significant cumulative impacts. This is likely to require additional discussion with other stakeholders.
6. Monitor for significant cumulative impacts. In the future, review monitoring findings to inform identification of key cumulative effects issues at next cycle of plan making and SEA/CEA.

#### 4.7.2 Assumptions

It should be noted that as the Plan covers a large area around the Irish Coast, individual plans and projects have not been listed. Categories have been used to describe different industries projects/plans which have similar activities. These categories have been screened to identify if there are pressure-receptor pathways for any potential significant cumulative impacts. As the IOSEA6 Plan will be in place until 2030 this CEA considers categories of projects/plans which are currently in development or are developments in the planning system.

Activities to be assessed under the Draft Plan are restricted to seismic surveys and exploration well drilling within the IOSEA6 Study Area and do not include construction of infrastructure such as pipelines connecting wells and platforms and do not include vessels transiting to a survey or drilling location. The cumulative effects of other O&G activity is considered in the assessment.

#### 4.7.3 Task 1 - Identification of activities, receptors, and pressures

To first identify which P/P are likely to interact with the IOSEA6 Study Areas, it was established whether a common pressure-receptor pathway exists with the IOSEA6 activities and other types of projects and plans. For there to be potential cumulative impacts, the IOSEA6 activities and another project or plan must share a common pressure-receptor pathway which overlaps spatially and to a certain degree temporally. Based on professional judgement, projects and plans were grouped into categories, using characteristics of projects (where they are known), and then each category was assessed to determine whether it would have a pathway, either spatially and/or temporally, and likely to induce similar pressures as the IOSEA6 activities.

Potential overlapping activities/impacts with the IOSEA6 Plan have been listed in Table 4-5.

**Table 4-5 Task 1 Identification of receptors for potential cumulative effects**

Project Category	Key Activities (but not limited to) associated with category	Are there potential pressure receptor pathway with IOSEA6?	Potential Cumulative Effects						Category to be included in assessment?
			Underwater sound changes and subsequent effects on birds, fish and marine mammals	Temporary displacement of other marine users (inc. fishing vessels)	Disturbance to the sea bed	Atmospheric emissions	Physical presence	Accidental events	
Offshore Renewable Energy (ORE) Project Site Investigations- existing developments and developments in the planning system	<p>Geophysical surveys (including seismic, sub-bottom profiling and multibeam echo sounders)</p> <p>Geotechnical surveys (information including cone penetration test (CPT), vibrocore, boreholes, grab sampling and box coring)</p> <p>Environmental surveys (including grab sampling and drop-down cameras)</p> <p>Metocean surveys (lidar buoys and acoustic doppler current profilers)</p> <p>Marine mammal and bird aerial surveys</p> <p>Vessel presence</p>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORE Project Site construction, operation and maintenance & Decommissioning - existing developments and developments in the planning system	<p>Pre-construction: surveys and activities including, but not limited to:</p> <ul style="list-style-type: none"> <li>- Geophysical surveys;</li> <li>- Geotechnical surveys; and</li> <li>- UXO clearance;</li> </ul> <p>Construction:</p> <ul style="list-style-type: none"> <li>- Fixed bottom foundation installation along with scour protection installation. (The foundation installation methodology will depend on the type of foundation to be used.)</li> <li>- Offshore cable installation (UXO intervention if required, boulder clearance if required, sand wave pre-sweeping if required, pre-lay grapnel runs, construction of infrastructure crossings, pre and post lay /burial route survey, landfall construction, cable lay/burial)</li> </ul> <p>Operation and Maintenance:</p>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Project Category	Key Activities (but not limited to) associated with category	Are there potential pressure receptor pathway with IOSEA6?	Potential Cumulative Effects						Category to be included in assessment?
			Underwater sound changes and subsequent effects on birds, fish and marine mammals	Temporary displacement of other marine users (inc. fishing vessels)	Disturbance to the sea bed	Atmospheric emissions	Physical presence	Accidental events	
	<ul style="list-style-type: none"> <li>- Turbine Maintenance and Servicing</li> <li>- Foundation and anchor inspection and repair via Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles</li> <li>- Scour monitoring and management</li> <li>- Cable inspection and repair</li> <li>- Large component repair (via repair vessel);</li> </ul> Decommissioning: <ul style="list-style-type: none"> <li>- Cutting the ends of cables, removing the wind turbine, met mast, switchgear, and ancillaries (perhaps leaving underground inter-array wires in place);</li> <li>- The mobilisation of tugboats as well as the service vessel with pumping equipment and a ROV.</li> <li>- Removing ballast from a foundation, adding buoyancy aids as specified by the design, or cutting a foundation at seabed level</li> <li>- The transportation of the foundation to the port and dry dock for eventual deconstruction, reuse, and recycling.</li> </ul>								
Fisheries	Different Fishing methods (inshore and offshore) <ul style="list-style-type: none"> <li>- Dredge fishing</li> <li>- Bottom trawl</li> <li>- Pots and seines</li> <li>- Net fishing</li> </ul>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aquaculture – Currently licenced sites and in the planning system	Shellfish farming: <ul style="list-style-type: none"> <li>- Bag and trestle culture method, mesh bags;</li> <li>- Maintenance activities on-site include shaking and turning of bags</li> </ul>	Yes	No – Sound changes related to this activity are localised and due to the distance of the	Yes	No – Seabed disturbance will only occur for new installation	Yes	Yes	Yes	Yes

Project Category	Key Activities (but not limited to) associated with category	Are there potential pressure receptor pathway with IOSEA6?	Potential Cumulative Effects						Category to be included in assessment?
			Underwater sound changes and subsequent effects on birds, fish and marine mammals	Temporary displacement of other marine users (inc. fishing vessels)	Disturbance to the sea bed	Atmospheric emissions	Physical presence	Accidental events	
	Finfish farming (SEPA, 2018; Reef Resilience, 2022): <ul style="list-style-type: none"> <li>- Broodstock for aquatic animals and seaweed are usually collected from the wild</li> <li>- Transport of juveniles to sea pens for rearing</li> <li>- Feed and medicinal additions to ensure health of stock</li> </ul>		IOSEA6 Study areas there will not be a pressure receptor pathway		of aquaculture pens, this is likely to be very localised and due to the distance of the IOSEA6 Study areas there will not be a pressure receptor pathway.				
Marine Aggregates & Mining	Aggregates and mineral extractions (Environment Guide, 2018; Drzen et al., 2020; BMAPA, 2022). <ul style="list-style-type: none"> <li>- Surveying includes; geological, geochemical and geophysical surveys (e.g. seismic surveying), aerial surveys</li> </ul> Seafloor suction dredging, seafloor slurry pipes, use of tracked vessels on the seafloor and seafloor cutting/fragmentation.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ports, Harbours & Shipping	Maintenance dredging Shipping activity including cargo and ferries Construction activities involved with expansion of ports e.g. mono-piling, dredging, demolition	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Seaweed Harvesting	Seaweed harvesting can be completed either manually or mechanically (IWT, 2017): Manual method include: <ul style="list-style-type: none"> <li>- foraging</li> <li>- hand harvesting (using tools, like a sickle)</li> </ul>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Project Category	Key Activities (but not limited to) associated with category	Are there potential pressure receptor pathway with IOSEA6?	Potential Cumulative Effects						Category to be included in assessment?
			Underwater sound changes and subsequent effects on birds, fish and marine mammals	Temporary displacement of other marine users (inc. fishing vessels)	Disturbance to the sea bed	Atmospheric emissions	Physical presence	Accidental events	
	<p>Mechanical methods include:</p> <ul style="list-style-type: none"> <li>- Use of a curved iron hook called a scoubidou which is turned on a hydraulic arm. The kelp is uprooted and hauled aboard a dredger during this procedure.</li> <li>- A trawler intended for seaweed harvesting pulls a 3 m long iron sledge along the seabed with its forks facing in the drag direction.</li> </ul> <p>Kelp plants are suctioned into a cutter. After cutting the seaweed, further suction moves the seaweed into the harvesting boat. Sonar is used to establish and control the cutter's depth, and some models have underwater cameras.</p>								
Tourism and Recreation	<p>Sector includes many activities such as, angling, diving, sailing, surfing, windsurfing, kite surfing, sea kayaking as well as visiting coastal tourist attractions, nature viewing either on land or at sea, and offshore islands (Hynes et. al 2020).</p> <p>Additionally, development of infrastructure to support the tourism and industry sector, e.g. walkways, tourism centres</p>	Yes	Yes	Yes	No - No pressure receptor pathway identified	Yes	Yes	Yes	Yes
Telecommunications and power cables (pre-installation, installation, operation and maintenance, decommissioning)	<p>Pre-construction: surveys and activities including, but not limited to:</p> <ul style="list-style-type: none"> <li>- Geophysical surveys;</li> <li>- Geotechnical surveys; and</li> <li>- UXO clearance;</li> </ul> <p>Construction:</p> <ul style="list-style-type: none"> <li>- Offshore cable installation (UXO intervention if required, boulder clearance if required, sand wave pre-sweeping if required, pre-lay grapnel runs, construction of infrastructure crossings, pre and</li> </ul>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Project Category	Key Activities (but not limited to) associated with category	Are there potential pressure receptor pathway with IOSEA6?	Potential Cumulative Effects						Category to be included in assessment?
			Underwater sound changes and subsequent effects on birds, fish and marine mammals	Temporary displacement of other marine users (inc. fishing vessels)	Disturbance to the sea bed	Atmospheric emissions	Physical presence	Accidental events	
	<p>post lay /burial route survey, landfall construction, cable lay/burial)</p> <p>Operation and Maintenance:</p> <ul style="list-style-type: none"> <li>- Scour monitoring and management</li> <li>- Cable inspection and repair</li> <li>- Large component repair (via repair vessel);</li> </ul> <p>Decommissioning:</p> <ul style="list-style-type: none"> <li>- Buried decommissioned cables are usually left in place</li> <li>- Removal of additional protection and non-buried cables</li> </ul>								
Wastewater Treatment & Disposal	<p>Wastewater disposal by marine outfalls</p> <p>Ocean dumping sites (for dredged material)</p>	Yes	No - No pressure receptor pathway identified	No – No pressure receptor pathway identified	Yes	Yes	No - No pressure receptor pathway identified	Yes	Yes
In-combination effect of IOSEA6 activities occurring at the same time and other O&G activities such as production.	<p>As there are three basins within the IOSEA6 Study Areas and multiple blocks within these basins, there is the potential that survey work on multiple wells could occur at the same time.</p> <p>In addition other O&amp;G activities could occur at the same time as activities permitted under the Draft Plan, such as geo-technical/geo-physical survey, drilling of other wells (e.g. appraisal or production), venting, flaring etc</p>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

#### **4.7.4 Task 2 and 3 Identification of thresholds and baseline environment**

##### **4.7.4.1 Task 2: Identification of limits/thresholds**

The guidance compiled by the EPA in 2020 states that as part of the CEA process thresholds and limits need to be stated to determine the significance of the cumulative impacts. The limits are legal or other nationally agreed standards. In contrast to a "real" ecological limit, some of these (such as the Paris Agreement and air quality standards) indicate a balance between the financial costs and social and environmental advantages of meeting the limit. It should be noted that many limits have not been defined, therefore, a precautionary approach is adopted to all limits. As the Plan is within the marine area only the relevant marine SEA Topics listed in the guidance were included.

Ireland complies with the EU's Marine Strategy Framework Directive (MSFD) 2008/56/EC which requires member states to reach Good Environmental Status (GES) in a number of areas classed as descriptors. The assessment process considers 11 qualitative descriptors for determining GES which are under Article 9 of the Directive (DHLGH, 2020). Additionally, a Commission Decision (2017/848) sets out 'Primary and Secondary Criteria' across each of the descriptors which provide for a clearer framework (DHLGH, 2020). Where descriptors are applicable, they have been used here to provide a threshold/limit for the SEA topics.

##### **4.7.4.2 Task 3: Current state of the environment and likely evolution thereof without implementation of the plan**

The following activities are included in this task, which is a component of the early SEA evidence-gathering stages: describing the current state of the environment and historical trends; identifying additional actions that may interact with the plan in a positive or negative way; and describing the likely environmental impacts of those additional actions.

The current state of the environment for each SEA Topic has been described in detail in Appendix C. Data sources used to Table 4-6 includes summary of the current and future baselines.

**Table 4-6 Threshold/Limit of each SEA Topic and current state of environments and likely evolution without the plan**

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
Air Quality	Standards in the EU Air Quality Directive and 'daughter' directives.  Monitoring of local air quality shows no adverse impact.	Levels of NO <sub>2</sub> should continue to be monitored as in urban areas in Ireland it is close to the EU limit, and this is expected to rise. PM2.5 is another pollutant which should be monitored, as this pollutant can be linked to the use of solid fuels. Ireland is in the process of transitioning away from solid fuels such as peat and turf. Future baseline studies could look at the levels of PM2.5 in Ireland's atmosphere, however, studies by the EPA have found this difficult to model, with EPA research report 270 reporting that, "Particulate Matter is one of the most difficult pollutants to model because of its wide range of anthropogenic and natural sources" (EPA, 2020b).	Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland has committed to become net zero by 2050.

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
Biodiversity, Flora and Fauna	<p>The 'integrity' of Special Protection Areas and Special Areas of Conservation, based on their conservation objectives (the overall target for the species/habitat for which the site has been designated).</p> <p>No adverse impact on the ability to achieve the objectives for GES under the MSFD.</p> <p>No significant loss of diversity or decline in a population attributable to plan related activities.</p>	<p>Descriptor 1 relates to biodiversity (birds, mammals, reptiles, fish, cephalopods, pelagic habitats. Monitoring is required of each of the MSFD descriptors and the status determined in both Ireland's 'Marine Strategy Part 1' in 2020 and 'Marine Strategy Part 2' in 2021 is that GES for biodiversity has only been partially achieved (DHLGH, 2021). While much of Ireland's marine ecosystem is in generally good condition concerns such as overexploitation, pollution and climate change are leading to biodiversity and habitat loss and ecosystem degradation.</p>	<p>There are strong legislative drivers to improve water quality, notably in coastal waters. These include the MSFD, Bathing Water Directive and Water Framework Directive. Monitoring programmes are carried out in Irish coastal waters to ensure the management and improvement of water quality. As improvements are made this should confer benefits for natural plankton communities, although some reduction in events such as anthropogenically influenced algal blooms would be expected.</p> <p>Cold water coral changes in the Belgica mound [province]. The proportion of live coral facies show little change while coral rubble facies show most change. This highlights an inconsistency between temporally-separated data sets and implies that in 20 years, the mound surface may almost entirely change.</p> <p>Fish and shellfish will be subject to natural influences and anthropogenic pressures. Whilst certain responses may be predicted, such as northerly distribution shifts for species currently at the southern limit of their range under the influence of climate change for example, many will be subject to complex interactions of factors.</p> <p>Marine mammals that occur within the IOSEA6 Study Area will be subject to global and regional natural influences and anthropogenic pressures, including:</p> <ul style="list-style-type: none"> <li>- Direct and indirect impacts of climate change;</li> <li>- Anthropogenic underwater noise;</li> <li>- By-catch; and</li> <li>- Marine pollution.</li> </ul> <p>Seabirds that occur within the IOSEA6 Study Area will be subject to global and regional natural influences and anthropogenic pressures, including:</p> <ul style="list-style-type: none"> <li>- Direct and indirect impacts of climate change;</li> <li>- Coastal squeeze;</li> <li>- Offshore developments;</li> <li>- Fishing activities;</li> <li>- Marine pollution;</li> <li>- Predator pressure; and</li> </ul> <p>Competition pressure with expanding populations of non-native species.</p>

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
Climatic Factors	Paris Agreement targets.	The climate is highly variable due mainly to the North Atlantic Oscillation (NAO). The North Atlantic Drift Current (NADC) is another influencing factor in the region. The predominant winds over the open waters west of Ireland are from the west and south-west. Over the open ocean winds of greater than 8 m/s (Beaufort Force 5) are experienced for 70 to 75% of the winter and 30 to 35% of the summer. The offshore oil and gas industry requires substantial power in order to extract, process and export hydrocarbons. Consequently, the main source of emissions are from power generation. Flaring of hydrocarbons is also required during well testing and well clean-up operations and to ensure safety at the platform. These are the main sources of the majority of the carbon emissions during oil and gas industry activities (Oil and Gas UK). 'In Ireland the annual average surface air temperature has increased by approximately 0.9°C over the last 120 years with most of this increase being attributed to emissions of anthropogenic related greenhouse gases in the atmosphere' (EPA, 2021b)	Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland has committed to become net zero by 2050. The Plan must seek to reduce atmospheric emissions in order to help Ireland meet its commitment.  National Dialogue on Climate Action (NDCA) – from COP26. This event saw the announcement of €60 million from the Climate Action Fund, to be invested in community climate action projects and initiatives over the next three years (DECC, 2022b).
Cultural, Architectural and Archaeological Heritage	No significant change to the historic landscape, or to the setting of a heritage asset. listed in the Sites and Monuments Record or the National Inventory of Architectural Heritage	The National Monuments Service's (NMS) Underwater Archaeology Unit (UAU) has created an archive of approximately 18,000 wrecking occurrences, although it is thought that the true number could be as high as 30,000 wrecks (NMS, 2022a, 2022b)  Aviation wrecks may also survive in the marine environment, often the result of a crash, controlled ditching, or technical malfunction. Identification and discovery of coherent aviation archaeological sites in a marine context is challenging.  Prehistoric archaeological sites and features linked with times of lower sea level may survive in shallower portions of the IOSEA6 Area (i.e. shallower than c.120m depth). In the Irish and Celtic Seas, particularly the shallower and protected parts have the highest potential for surviving prehistoric archaeological items.	Important policies, plans and guidance are in place to ensure the future protection of this finite and non-renewable cultural resource before it is lost.
Economy and Material Assets	No significant negative economic and social impact on other sea users.	The waters around Ireland are critical to Ireland's economy for commerce and industry. They comprise some of the most productive fishing grounds in the world and primary activities of relevance include commercial fisheries, commercial shipping and offshore energy. Fisheries within the IOSEA6 area are important both nationally and internationally, with a wide range of fish and shellfish	Increased focus and use of Ireland's marine environment. Future fishing activity will depend on the interaction of multiple factors such as fish and shellfish stock resources, fisheries management and the commercial viability of specific fisheries. The government is committed to developing this resources as outlined in 'Our Ocean Wealth'.

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
		<p>species targeted by demersal and pelagic fishing fleets. The waters around Ireland also include some of the densest shipping channels. Other activities includes sand and gravel extraction, military uses, presence of undersea cables, etc.</p> <p>A total of 34 stocks (18 %) have achieved GES, while the environmental status of 99 stocks (60 %) is currently unknown. In the case of 44 other stocks (22 %), GES has not been achieved.</p> <p>Ireland has achieved GES for concentrations of contaminants within its maritime area, for the criteria assessed, which are contaminants in water and biota, acute pollution events and biological effects of contaminants. There are threshold values associated with the concentrations of contaminants and biological effects. There is no threshold value for acute pollution events.</p>	

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
Geology, Substrates and Coastal Sediments	MSFD Descriptor 6: Sea-floor integrity Assessment.	<p>The IOSEA6 Area predominantly lies within the Porcupine Basin, North Celtic Sea Basin and Slyne Basin.</p> <p>Porcupine basin contains thick layers of Cretaceous -Tertiary rocks, with volcanic seamounts of Cretaceous origin found throughout the southern portion of the basin. Hydrocarbons have been discovered in reservoirs from the Triassic, Middle and Upper Jurassic, Lower Cretaceous, and Palaeocene periods (DCMNR/PAD, 2006). Generally composed of fine sediments and consists of clayey sands and overlaying silty clays. The Gollum Channel System acts as the main pathway for focused sediment transport out of this area (Dorschel et al., 2010).</p> <p>The North Celtic Sea basin is the largest of the basins off the south-eastern Irish coast. Three gas fields are currently in pro Celtic Sea Basin and a number of undeveloped discoveries have also been made in the vicinity. The main reservoir is the Upper Cretaceous Greensand. Lower Cretaceous shallow marine sands provide additional reservoirs (Croker and Shannon, 1995). The basin, like the South Celtic Sea basin, is defined by a 9-kilometer-thick sequence of sediments accumulated during Mesozoic rifting and subsequent thermal subsidence. Coarse deposits ranging from gravelly sands to cobble pavements characterise sediments in the southern Irish Sea and Celtic Sea. Areas of outcropping bedrock also occur in nearshore areas along the south coast (Croker et al., 2005).</p> <p>The Slyne-Erris Basin is on the south-eastern edge of the Rockall Basin, which formed as a result of rifting of the continental crust between the Irish mainland and the Rockall Bank (O'Reilly et al., 1996). The Slyne-Erris Basin is composed of Triassic sandstone, which contributes significant sand supply around the basin area (Franklin et al., 2019). Present day sediments in the Slyne-Erris Basin are subject to redistribution by near bottom currents and gravity driven processes.</p> <p>Continental shelf substrata are predominantly sandy, with patches of gravel and intermittent rock outcrops., with silty clay at the northern</p>	No changes anticipated within the Plan timeframe.

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
		part of the continental slope where the gradient is shallow. In the southern section the sediment is more mixed, with gravel and boulders exposed by erosion.	
Landscape and Seascape	No significant impact on nationally-designated areas.	Seascape defined as “landscapes with views of the coast or seas, and coastal areas and the adjacent marine environment with cultural, historical and archaeological lines with each other” (DHLGH, 2021). An assessment carried out in 2019 classified Irelands seascapes in Seascape Character Types (SCT) of which 13 were identified along the coast adjacent to the IOSEA6 Areas. The Porcupine and Slyne-Erris Basin IOSEA6 Areas were identified to be within an offshore SCT classified as “13. Offshore waters with high energy wave climate”. Additionally, the Celtic Sea-Basin IOSEA6 Area is within SCT 12 “Shallow offshore waters”. Landscape baseline includes six national parks located in close proximity to the coast and would, represent key sensitive landscape receptors. There is currently two UNESCO sites located in Ireland, one of which is located offshore “Sceilg Mhichíl”. The closet distance to any IOSEA6 Area is approximately 100km east of the Porcupine Basin.	Applications for foreshore licences in Ireland has increased in the last number of years, as the foreshore licensing is transitioning to a new regime of known as the Maritime Area Consent (MAC). Currently, there are seven qualified projects with MAC applications these are: Oriel Wind Park; RWE's Bray and Kish Banks; Codling Wind Park, made up of Codling 1 and Codling 2; Fuinneamh Sceirde Teoranta's Skerd Rocks; and the North Irish Sea Array. It is anticipated that there would be a gradual increase overall shipping / boating activity and lead to changes in landscape and seascape.
Population and Human Health	No adverse impact on the ability to achieve the objectives for GES under the MSFD.  Progress in achieving measures set out by OSPAR, for the continued reduction in the harmfulness of offshore discharges.	Commercial Fisheries - Fisheries within the IOSEA6 Area are important both nationally and internationally, with a wide range of fish and shellfish species targeted by demersal and pelagic fishing fleets;  Mariculture - operations include fin and shellfish cultivation together with seaweed cultivation and harvesting;  Recreation and tourism - The coast, both offshore and foreshore, around Ireland supports a wide range of significant recreation and tourism-related activities. The nature and extent of these activities is wide ranging, varied, increasing in demand and important to often rural deprived communities. The area of the east and south coast extending to circa 24km offshore (seascape unit) is likely to be most sensitive to potential impacts.  Risks to human health from hazardous substances, well blow out, fire and explosions, personnel transfer, ship sinkage and collision are all low, due to the regulatory systems in place in order to preclude significant impacts to the health of employees and other users of the sea. Indirect impacts on human health could occur from impacts on	Commercial fisheries - Future fishing activity will depend on the interaction of multiple factors such as fish and shellfish stock resources, fisheries management and the commercial viability of specific fisheries.  Mariculture - The National Strategic Plan for Sustainable Aquaculture Development, outlined in the National Marine Planning Framework (NMPF) aims to achieve sustainable growth of the industry towards 2040 (DHLGH, 2021). However, this will depend on the economic condition and the balance between production costs and market prices.  Whilst tourism declined during the COVID 19 pandemic, it is expected that tourism will quickly recover and continue to grow into the future, especially with promotion of schemes such as the "Wild Atlantic Way" and SeaFest.  Risks to human health are likely to remain low due to the regulatory systems in place in order to preclude significant impacts to the health of employees. OSPAR sets targets for the reduction of accidents and improvements to occupational health and safety of oil and gas workers within the North-East Atlantic.

SEA Topic	Threshold/Limit (EPA, 2020b) or others	Current state of the environment	Likely evolution without the plan (to 2030)
		<p>water quality, businesses and recreation, such as in relation to a hydrocarbon spill.</p> <p>Ireland has achieved GES for concentrations of contaminants in fish and seafood for human consumption within its maritime area.</p>	
Water Quality	<p>No adverse change in quality of WFD waterbody status in relation to attainment of good ecological status or potential, or good chemical status.</p> <p>MSFD Descriptor 5: Eutrophication Good Environmental Status Assessment</p>	<p>Significant data on water quality is available for the inshore areas (coastal and transitional), generally corresponding to greater levels of activity and a greater complexity of regulatory drivers in place.</p> <p>Inshore and transitional water quality summary:</p> <ul style="list-style-type: none"> <li>- The majority of Bathing Waters were classified as Good;</li> <li>- Nearly 200 (potentially substantially greater) licenced aquaculture sites are located in the waters of Ireland. These are indicative of current high water quality standards in these areas;</li> <li>- An overall decreasing concentration of heavy metal sediment contamination; however still unacceptably high in many coastal industrialised areas. Concentrations of metals in seafood rarely exceed the Seafood Maximum Limit;</li> <li>- Decreasing levels of Polychlorinated Biphenyls (PCBs) contamination in shellfish. Some tissue samples (shellfish and dolphins) contain high PCB levels;</li> <li>- Concentrations of PAHs were found to be above acceptable levels at more sites tested in OSPAR Region III (includes all the waters around Ireland). than any other OSPAR Region, particularly in coastal areas of the Irish Sea (OSPAR, 2009); and</li> <li>- Acceptable and low concentrations of radionuclides.</li> </ul> <p>Far less data is available for water quality in offshore areas of the study area, which limits any detailed assessment of baseline water quality. The small amount of available information suggests concentrations of metals, hydrocarbons, radionuclides, persistent organic pollutants are likely low and often comparable to background levels.</p> <p>Ireland has achieved GES for eutrophication within its maritime area, for the three primary criteria assessed; nutrients, chlorophyll a and dissolved oxygen.</p>	<p>The MSFD and WFD monitoring programmes will be ongoing as compliance is required under the Directives. Updates to these assessments will provide more comprehensive assessment of the baseline water quality in the future to determine potential impacts of oil and gas operations.</p> <p>GES of sites will continue to be aimed for and as such, site classifications can change under the monitoring scheme. To continue with improvements, the RBMP, will continue to be updated and adhered to and Irish Water has plans in place to improve infrastructure which will affect the future baseline of water quality.</p> <p>The potential wastes and discharges produced by the oil and gas industry offshore are regulated by a suite of regulations and plans, seeking to limit the impact of those activities and operations, which seek to limit the impact. Reductions in emissions have been seen in recent years and may continue in the future, however, this will need to be validated through assessment and monitoring.</p>

#### 4.7.12 Task 4: Cumulative Impact Assessment

The total (intra-plan or combined) effects of the Plan are those of all the plans and projects policies or sub-components together. Cumulative impacts can have a negative (-), positive (+) or neutral (0) effect. Table 4-7 describes the total effects of the cumulative impacts on the SEA topics of the categories scoped in Section 4-5. Table 4-8 summarises the total cumulative effects of the Plan. The individual potential cumulative effects are discussed in the sub-sections below.

**Table 4-7 Total effects of a plan summarised**

SEA Topic	Potential Cumulative Effect <sup>1</sup>					
	Underwater sound changes and the subsequent effects on birds, fish and marine mammals	The temporary displacement of other marine users (including fishing vessels)	Disturbance to the seabed	Atmospheric emissions	Physical presence	Accidental events
Air Quality	N/A	N/A	N/A	-	N/A	N/A
Biodiversity, Flora and Fauna	-	N/A	-	-	-	-
Climatic Factors	N/A	N/A	N/A	-	N/A	-
Cultural, Architectural and Archaeological Heritage	N/A	N/A	-	N/A	-	-
Economy and Material Assets (Commercial Fisheries / Aquaculture / Marine-related activities and communities / Tourism and Recreation)	-	-	-	-	-	-
Geology, Substrates and Coastal Sediments	N/A	N/A	-	N/A	N/A	-
Landscape and Seascape	N/A	N/A	N/A	N/A	-	-
Population and Human Health	N/A	-	-	-	-	-
Water Quality	N/A	N/A	-	-	N/A	-

Key: (-) Negative effect, (+) Positive effect or (0) Neutral effect. N/A denotes that there is no pressure receptor pathway between the SEA topic and potential cumulative effect.

**Table 4-8 Total effects of a plan summarised**

SEA Topic	Description of total effects of the plan
Air Quality	<b>Atmospheric emissions:</b> Use of fuel for vessels for activities related to IOSEA6 activities, fishing, shipping, and ORE surveys causes release of SO <sub>2</sub> and NO <sub>x</sub> which can cause cumulative impacts on air quality.
Biodiversity, Flora and Fauna	<p><b>Underwater sound changes and the subsequent effects on birds, fish and marine mammals:</b> Noise generated from air guns during seismic surveys have the potential to impact marine mammals.</p> <p><b>Disturbance to the seabed:</b> Loss and damage on non-designated but important habitats and species</p> <p><b>Atmospheric emissions:</b> Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms.</p> <p><b>Physical presence:</b> There is the potential that seabirds and marine mammals may be physically disturbed by the presence of survey vessels and equipment. Both visual and noise disturbance may result from the presence of the vessels and equipment whilst noise disturbance is likely to be the most significant cause of disturbance during borehole operations</p> <p><b>Accidental events:</b> Loss and damage on non-designated but important habitats and species</p>
Climatic Factors	<b>Atmospheric emissions:</b> Increase in greenhouse gas emissions can result in sea level rise, pH level decreasing and rise of sea surface temperature.
Cultural, Architectural and Archaeological Heritage	<p><b>Disturbance to the seabed:</b> May result in minor impacts where releases occur in close proximity to historic wrecks both known and unknown. Currently unquantifiable due to lack of information on actual well locations and proximity to historic wrecks. Notable that historic wrecks may also act as a contaminant and release chemicals and dangerous substances into the marine environment.</p> <p><b>Physical Presence:</b> Physical damage can occur from associated vessel/rig anchoring. Additionally, loss of access to submerged cultural heritage can occur through loss of access.</p> <p><b>Accidental events:</b> Potential impacts from hydrocarbon spill on coastal archaeology and historic wrecks, which are primarily associated with smothering and damage from clean-up operations rather than from the spill itself.</p>
Economy and Material Assets (Commercial Fisheries / Aquaculture / Marine-related activities and communities / Tourism and Recreation)	<p><b>Underwater sound changes and the subsequent effects on birds, fish and marine mammals:</b> Potential for disturbance and displacement of mobile marine life. Therefore, affecting Economy and Material Assets.</p> <p><b>The temporary displacement of other marine users (including fishing vessels):</b> If multiple sectors are operating in the same area this can impact mobile species ability to move away from disturbance.</p> <p><b>Disturbance to the seabed:</b> Loss and damage on non-designated but important habitats and species</p> <p><b>Atmospheric emissions:</b> Impact of climate change, i.e. shifting baselines of certain species due to increase in temperature, e.g. phytoplankton are sensitive to temperature change which can increase harmful algal blooms.</p> <p><b>Physical presence:</b> There is potential for interactions between fishing vessels and seismic survey operations. No impacts predicted to aquaculture and tourism due to the offshore location of the IOSEA6 Study Areas.</p> <p><b>Accidental events:</b> Potential for impact on / death of marine life due to loss of equipment / collision. Potential impacts on receptors if hydrocarbon spill occurs.</p>
Geology, Substrates and Coastal Sediments	<p><b>Disturbance to the seabed:</b> Localised areas of the seabed will be disturbed by drilling which can take place with OWF activities and IOSEA6 drilling.</p> <p><b>Accidental events:</b> Oil may enter the marine environment during seismic and/or drilling operations as a result an accidental event.</p>

SEA Topic	Description of total effects of the plan
Landscape and Seascape	<p><b>Physical Presence:</b> Potential for negative visual effects which could also affect the Seascape/Landscape character, but likely to be negligible due to the distance from the coast.</p> <p><b>Accidental events:</b> Hydrocarbon contamination from a large event i.e. blowout or from vessel spills can have the potential to effect the quality of the receptors.</p>
Population and Human Health	<p><b>The temporary displacement of other marine users (including fishing vessels):</b> Multiple operations with buffer zones can exclude marine users from certain areas.</p> <p><b>Disturbance to the seabed:</b> Indirect effects of sea water contamination affecting fish/shellfish and then passing into the food chain.</p> <p><b>Atmospheric emissions:</b> Increase in atmospheric emissions contributing to climate change which will indirectly effect populations and human health.</p> <p><b>Physical presence:</b> Potential for death or injury of workers or other users of the sea due to vessel collision.</p> <p><b>Accidental events:</b> A severe hydrocarbon and PAH contamination could lead to direct (e.g. restrictions to activities in the local area) or indirect (e.g. reduced amenity value, impact to water quality or marine life) impacts on recreation and tourism.</p>
Water Quality	<p><b>Disturbance to the seabed:</b> Release of oil and chemicals etc to the water, with a direct effect on the water quality. Impacts on water quality would indirectly impact ecology, recreation value, and also have potential impacts for human health (via food uptake routes).</p> <p><b>Atmospheric emissions:</b> Increase in atmospheric emissions due to cumulative impact from all industries can cause sea surface temperature to rise, changes in salinity and changes in pH levels.</p> <p><b>Accidental events:</b> Release of diesel, chemicals etc. to the water from multiple industries e.g. waste treatment, with a direct effect on the water quality. Impacts on water quality would indirectly impact ecology, recreation value, and also have potential impacts for human health (via food uptake routes). If a large scale blowout occurred these effects may be major.</p>

#### 4.7.12.2 Underwater sound changes

##### Marine mammals

Cumulative effects are likely to result where localised disturbance from more than one activity either occurs simultaneously resulting in a wider zone of disturbance restricting foraging, migratory or breeding behaviour; or consecutively within a restricted area resulting in an extended period of disturbance or the production of a barrier restricting movements. At this time, it is not known when the seismic survey consents will be awarded or when other offshore wind site investigations will be conducted, therefore two scenarios were considered by the assessment. Firstly, that surveys are conducted at the same time (surveys for offshore wind and other industries e.g. oil and gas), and secondly that they occur consecutively. The first scenario is highly unlikely as data acquisition can be impaired if two or more surveys occur at the same time in proximity due to equipment interference. It is therefore more likely that survey would occur consecutively. This would result in an extension of the time period that marine mammals would be disturbed.

The potential cumulative effect has been assessed as Temporary and Not Significant. This is based on the results of a study in the UK Southern North Sea SAC on the potential cumulative effects from a number of nearby windfarms on harbour porpoise (BEIS 2020). The study found that harbour porpoise displacement was temporary and harbour porpoise relocated elsewhere. It was concluded that seismic surveys would not have an adverse effect upon the integrity of the Southern North Sea SAC. The same

behavioural response is likely in open coastal waters where marine mammals have the ability to avoid the temporary survey works.

### Fish

The potential cumulative effect has been assessed as Temporary and Not Significant. This is based on proposed surveys being primarily offshore and not within the estuaries of any of the important twaite shad rivers. Given that spawning occurs upstream in the relevant rivers, outside the zone of influence of the survey, the surveys themselves will not affect twaite shad spawning habitat or cause a deterioration in water quality. The potential zones of influences are transient and move slowly in a constant direction along a principal survey line orientation. It is predicted that fish will avoid the area once operations have started and are extremely unlikely to move towards the sound sources. The individual surveys alone or in combination will not lead to any long-term displacements as they are transient and brief. Individuals are expected to return once the operation has passed through.

### Birds

There is the potential for diving birds (e.g. cormorant) to be affected by underwater noise generated from cumulative impact of multiple surveys, construction or operation and maintenance activities. The likelihood of a noise sensitive diving bird being in the vicinity of a noise generating operation is very low due to the surface activity associated with such operations disturbing the birds prior to commencement of noise generation (Fliessbach et al. 2019; Garthe & Hüppop, 2004; Leopold & Camphuysen, 2009).

Given the very low likelihood of interaction between the sound sources and a diving bird due to the intervening distances, relatively short exposure time, the temporary and short-term nature of the survey work, the mobile nature of the surveys and the displacement of most diving species due to flushing disturbance, it can be determined that cumulative underwater noise would have no conceivable effect on diving seabirds in the vicinity including those which may forage in the area.

### Cumulative Impact

Other users of the IOSEA6 Study Area include merchant shipping, fishing, marine scientific research, naval vessels, the offshore wind and renewable energy sector and the oil and gas industry in adjacent offshore areas (e.g. the UKCS). In general, the sound levels emitted by these users are below levels expected to cause any injurious effects on marine mammals or other marine species. Although short-term behavioural reactions may be likely, the transitory and temporary nature of noise from seismic and drilling exploration activities, as well as that from other sea users (mainly fishing and shipping which will pass by and then away from drilling and seismic activity), the interaction of these with underwater noise from drilling and associated activities will be short-lived and consequently less likely to cause significant cumulative impacts. The following potential for cumulative effects should be noted, however:

- shipping density in the IOSEA6 Study Area is relatively low (<0.5 – 0.5 vessel hours per km) and the potential for cumulative impacts relating to underwater noise is thus elevated compared to less intensively traversed regions;
- There has been a significant rise in the number of OWF applications for site investigations in the last two years (2020-2022) (DHLGH, 2022)

In the event that there is a requirement for multiple surveys in the IOSEA6 Study Area at the same time it is advised that these are combined into consecutive surveys through appropriate planning and co-operation between Operators and Contractors. Where surveys must be carried out simultaneously, a minimum separation distance of 100 km should be observed between survey vessels in order to create a likely corridor of lower noise levels between the surveys through which marine mammals (and other species which may be affected) may travel. This should minimise impacts on larger scale

migration routes. Depending on the nature of the programme, it may also be necessary to model the cumulative impacts, whether those be within-project (e.g. seismic and vessel noise) or between-project (e.g. two seismic programmes in close proximity).

#### 4.7.12.3 Temporary displacement of vessels

There is the potential for cumulative effects on commercial fisheries and other marine users from displacement. The worst-case is that fishermen using static gear (pot fishing) are requested to move fishing gear or other marine users are requested to keep at a safe distance for more than one project, extending the period in which they cannot access their traditional grounds. However, the cumulative effect will be temporary as fishermen and other marine users will be able to return to the area once the proposed surveys have passed and therefore it is concluded that the significance of cumulative effects will be Minimal.

#### 4.7.12.4 Disturbance to the seabed

Small areas of habitat will be disturbed by the placement of drilling rigs on the seabed and the deposition of drill risings from the geotechnical boreholes; approximately 16m<sup>2</sup> per borehole. This pressure would only have the potential to result in adverse effects on localised areas within the IOSEA6 Study Area.

Other activities taking place within the IOSEA6 Study Area which lead to physical disturbance of the seabed include commercial fishing for demersal or benthic species, power/telecommunications cable installation, and latterly a developing offshore wind and renewable energy industry and associated electrical grid development.

Exploration drilling activity will be taking place in an environment that has long been used for a variety of economic activities, some of which disturb the seabed. As the potential impacts from drilling discharges and physical disturbance to the marine environment tend to be localised, of short duration and with generally good recovery potential, the risks of cumulative impacts are considered to be low for this level of exploration and appraisal activity. For these reasons, transboundary impacts from drilling are also likely to be negligible.

Depositions on the seabed will result in a physical change to the seabed characteristics. Routine discharges of OBMs from cuttings or centrifuges are not permitted in Irish waters. DECCs Rules and Procedures Manual for Offshore Petroleum Exploration and Appraisal Operations. Petroleum Affairs Division (DCENR, 2014) stated that such material must be circulated back up from the wellbore to the drilling deck and stored for shipment ashore to appropriate treatment and disposal facilities.

Marine water column organisms are at a low risk of harm from chemical discharges because of rapid dilution and dispersal of chemicals. Impacts of chemicals are a result of a combination of persistence, bioaccumulation and toxicity (PBT). While the majority of chemicals used during offshore oil and gas operations are relatively benign, there is the potential for localised contamination of sediments through chemical discharges.

Biological effects on seabed communities from the discharge of WBM and associated cuttings are usually subtle or undetectable. Monitoring studies around well sites drilled with WBMs have rarely shown any effects to benthic infauna (at a community level) detectable beyond 50 m. Subtle impacts to the benthos were identified at up to 750 m from a production site developed using WBMs, but these were associated with hydrocarbon contamination (Hartley & Bishop, 1986).

Best practice should be followed in order to limit dragging of anchors and chains. This could include detailed best-fit anchor planning around protected features, minimisation of anchor wire/chain touchdown using flotation or heavier chain or anchors and pre-laying anchors using ROV. Where possible, the use of a DP mobile offshore drilling unit is recommended. This means no anchoring required and physical interaction with the seabed limited to a small area around the wellhead.

#### 4.7.12.5 Atmospheric emissions

In 2021, Ireland ranked third in having the highest level of GHG emissions per capita in the EU and levels are still increasing, this is despite commitments from government to decrease these emissions. In 2021, Ireland's provisional GHG emissions are estimated to be 61.53 million tonnes carbon dioxide equivalent (Mt CO<sub>2</sub>eq), which is 4.7% higher (or 2.76 Mt CO<sub>2</sub> eq) than emissions in 2020 (58.77 Mt CO<sub>2</sub> eq). There was a decrease of 3.4% in emissions reported for 2020 compared to 2019 (EPA, 2022b).

Although Ireland is third behind Luxembourg and Denmark in the EU for GHG emissions released, Ireland's emissions have returned to pre-pandemic levels, representing a 19% increase in emissions levels year-on-year from Q1 2021 from 3.13 tons per capita, total emissions in Ireland increased by almost 5% in 2021 the EPA's Air Quality Ireland report 2021 has stated. The estimated combined emissions based on the worst case scenario (for Preferred Option A) of 15 wells drilled on an annual basis from both seismic survey (20,603 tonnes CO<sub>2</sub> equivalents) and drilling (213,330 tonnes CO<sub>2</sub> equivalents) activities in the IOSEA4 area amount to 233,933 tonnes CO<sub>2</sub> equivalent. This equates to 0.4% of the total annual Irish emissions for 2021 (EPA, 2022b).

Due to the low contribution to emissions from any activities arising from the IOSEA6 Plan the cumulative effect is expected to be negligible.

#### 4.7.12.6 Physical presence

In terms of physical exclusion to other sea users, the combination of seismic survey and drilling activity is unlikely to happen at the same time within the same basin; drilling at a location tends to follow on from a seismic survey. However, it may be useful to consider the total area affected by the proposed activities.

Within the IOSEA6 Study Area, the fishing industry, shipping and offshore wind developments are likely to be the main other sea users potentially affected by the Plan. Since, for the most part, the activities relating to oil and gas exploration, shipping and fishing are temporary and/or of short duration, the physical presence interactions between these will be minor and mitigated through existing control and notification measures in the regulatory framework. Therefore these should not change significantly when considered in combination. With regard to offshore wave and tidal energy, the SEA for the Offshore Renewable Energy Development Plan II considers that the potential for the development of these in the IOSEA6 Study Area is not likely to be significant in the near future. Also, whilst there is potential for tidal energy in the IOSEA6 Study Area, this is restricted to the southern Irish Sea close to the coast in the close vicinity of the Arklow and Codling Banks and the Tuskar Rock and Carnsore Point Channel. These areas have not been the subject of oil and gas interest to date.

With regard to offshore wind energy, a wind farm is already in operation at Arklow Bank, and further projects are under development or have received consent. However, the short duration of oil and gas exploration activities means that impacts on wind energy development will be negligible. Similar considerations also mean that the areas taken up by exploration seismic survey and drilling will not add significantly to those taken up, on a more permanent basis, by offshore wind farms.

The effects of oil and gas exploration activity on the seascape and visual amenity of the coastal zone adjacent to IOSEA6 Study Area are limited to drilling alone, as vessel activity (seismic or otherwise) is considered to be indistinguishable against a backdrop of other transient shipping activity taking place within sight of the coast. In addition, a number of protected sites, such as SAC's and SPA's, are present along the IOSEA6 coastline. These sites are designated such in order to protect the habitats and species within the area. Protection also extends to species normally based within the designated site but which travel further afield, e.g. for foraging. Since it is most likely that exploration activities under the Plan will be concentrated offshore and well away from, for example, coastal seabird or seal colonies, such interactions and impacts would be minimal. For any exploration activities envisaged close to shore the potential impacts on seascape/visual amenity and protected sites will be minimised by their short duration, but will need to be assessed and mitigated on a project- and site-specific basis.

The risk of collision with marine mammals is likely to be affected by vessel type, speed, and ambient noise levels. Laist et al. (2001) predicted the most severe injuries from collision with vessels when travelling at over 14 knots. Marine mammals may be more vulnerable to collision risk if they are not able to detect the approach of a vessel. For example, sound produced during piling operations may mask the presence of vessels, leading to reduced detection and avoidance by marine mammals which could lead to increased potential for vessel strikes to occur.

It is considered that there is a high likelihood of avoidance from both increased vessel noise and collision risk, with both a high potential for recovery (< 1 year) for increased noise, and medium potential for recovery for collision risk reflecting the low likelihood of collision and potential for non-lethal collision to occur.

#### 4.7.12.7 Accidental events

The likelihood of a large oil spill occurring from vessels is extremely low and the risk is no greater than that for any other vessel activity in the area. All drilling and support vessels will have control measures and shipboard oil pollution emergency plans (SOPEP) in place and will adhere to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I requirements.

During drilling activities, there is a risk of spillage of oil (fuel/crude), and spillage or leakage of chemicals. Additionally, there is the risk of shallow gas blowouts which could have major direct and indirect impacts on Natura 2000 site and associated features.

#### 4.7.13 Task 5: Mitigation

No significant negative cumulative effects were identified, additional avoidance or mitigation measures will not need to be considered further than the mitigation that has already been proposed for the IOSEA6 Plan and presented in Section 5.1.

## 4.8 Habitats Directive Appropriate Assessment

A key requirement of the Habitats Directive is that the effects of any plan or project, alone, or in combination with other plans or projects, on the Natura 2000 site network, should be assessed before any decision is made to allow that plan or project to proceed. This process is known as Appropriate Assessment (AA). Each plan or project considered for approval, must take into consideration the possible effects it may have in combination with other plans and projects when going through the AA process. The obligation to undertake AA derives from Article 6(3) and 6(4) of the Habitats Directive.

This section presents a summary of the AA process that has been undertaken for the Plan in parallel with the SEA process.

#### 4.8.1 AA process

The AA process consists of the following steps:

##### Screening for AA

1. Identification of relevant sites.
2. Identification of potential pressures.
3. Identification of sensitive receptors.
4. Identification of a pathway for effect.

##### Appropriate Assessment

1. Special Conservation Interest Assessment.
2. Examination of Plan Activities.

3. Link Between Pressure-Receptor Pathways with Plan Activities.
4. Assessment of Adverse effects on integrity of relevant sites (alone and in-combination).
5. Schedule of Mitigation.
6. Determination.

#### 4.8.2 Screening for AA

A Stage 1: Screening for AA of the Plan in April 2022 (Intertek, 2022c). The assessment identified pressure-receptor-pathways and concluded that the adoption of the Plan could result in a Likely Significant Effect (LSE) on 241 relevant Irish Natura 2000 sites (101 Special Protection Areas (SPAs) and 140 Special Areas of Conservation (SACs)) and 161 relevant Transboundary Natura 2000 sites (104 SACs, 56 SPAs and 1 pSPA) and as a result the Plan should be subject to Stage 2 AA.

The nine potential pressures identified were:

- Underwater noise changes.
- Visual and above water noise disturbance.
- Collision above and below water with static or moving objects not naturally found in the marine environment.
- Temporary habitat disturbance including penetration and abrasion.
- Smothering and siltation rate changes.
- Physical change (to another sediment type).
- Sediment contamination / potential for bioaccumulation in food chain.
- Deterioration of water quality / toxic effects on species.
- Hydrocarbon & PAH contamination.

The more detailed assessment of the potential LSEs conducted in Section 5 of the Natura Impact Statement (NIS) concluded that of the nine potential LSEs, underwater noise changes and hydrocarbon & PAH contamination would result in an LSE to the Conservation Objectives of Natura 2000 sites.

The report concluded that Stage 2: AA was required to assess whether it can be demonstrated, beyond reasonable scientific doubt, that the implementation of the Plan will not adversely affect the site integrity of relevant Natura 2000 sites.

#### 4.8.3 Appropriate Assessment

Following the Screening for AA, a NIS was conducted to determine the potential for any adverse effects on site integrity of relevant Natura 2000 sites. This was achieved by assessing the specific sensitivities of receptors the site has been designated for – the 'Special Conservation Interests (SCIs)' to the identified pressures.

The assessment of adverse effects on site integrity of relevant Natura 2000 sites involved:

- a. Assessment of adverse effects of the Plan implementation on site integrity – where a potential for an adverse effect for a SCI has been identified, an assessment in relation to the conservation objectives and site integrity has been undertaken.
- b. In-combination effects assessment – assessment of other plans and projects within the potential area of search between the relevant Natura 2000 sites and the Plan has been undertaken. For there to be a potential in-combination effect between the Plan and

another plan or project there must be a common pressure-receptor pathway which overlaps spatially and temporally.

#### **4.8.4 Conclusion**

Detailed assessment is required at the individual Project level, to ensure that the draft Plan and consented activities will not adversely affect the integrity of any relevant Natura 2000 sites in view of the conservation objectives of these sites. With the implementation of the proposed mitigation measures (if necessary at Project level) there is no residual effect; therefore, no in-combination effect is possible.

Continued assessment is required at individual project level to ensure that the Draft Plan will not adversely affect the integrity of any relevant Natura 2000 sites in view of the conservation objectives of these sites.

## 5. MITIGATION AND MONITORING

This section describes the measures proposed to mitigate the significant adverse environmental effects identified and presents the approach for monitoring the potential environmental effects of the Plan.

### 5.1 Measures Envisaged for the Prevention, Reduction and Offsetting of Any Significant Adverse Effects

Article 5, Annex 1 (g) of the SEA Directive requires an explanation of “the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme”. This section describes the measures proposed to manage, by preventing, reducing or offsetting, the significant adverse environmental effects identified for the Plan.

#### 5.1.1 Mitigation and Enhancement Measures

Mitigation measures will be selected at a Project level and through detailed planning and design, when the specifics can be optimised in order to limit the potential impacts on sensitive receptors. This section provides initial consideration of potential mitigation measures that could be implemented at Project level. At Project level the residual impacts remaining will be assessed following the implementation of mitigation measures. Residual impacts are not considered in this report. The potential mitigation measures for the significant effects associated with the Plan’s activities are presented in Table 5-1.

The timing of individual seismic survey and drilling works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects. All works and planning of works should be undertaken with respect to all relevant legislation, licencing and consent requirements and recommended best practice.

Operators are expected to use best available technology (BAT), best environmental practice and clean technology as laid out in Section 4.4.2 of the Rules and Procedures for Offshore Petroleum Exploration and Appraisal Operations (DCENR, 2014), which states that:

*“The Operator shall take all possible steps to prevent the introduction of substances or energy into the marine environment that are likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate users of the sea. To this end the Operator shall apply, where appropriate:*

- *best available technology;*
- *best environmental practice; and*
- *clean technology.*

*These objectives and principles apply to the Operator and equally to contractors and subcontractors working on their behalf. The operator is responsible for the entire operation. Notwithstanding this the operator is responsible for ensuring that contractors carry out their work in accordance with best industry practice. Operators shall also ensure that their operations are carried out in accordance with National Legislation and the provisions of the Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR Convention).”*

**Table 5-1 Measures envisaged for the prevention, reduction and offsetting of any significant adverse effects**

SEA Topic	Issue / Impact Predicted	Mitigation Measure
Air Quality	Impacts of atmospheric emission from combustion from survey vessels, rigs, helicopters and other vessels.	Under the MARPOL Convention and EU law, as applicable in national law, ships may not cause pollution either by discharge to water or emissions to air, when at sea or when at berth in port.  Annex VI of MARPOL covers the prevention of air pollution from ships.
	Impacts of flaring on air quality.	Flaring should only be undertaken when required. Best Available Techniques Guidance on upstream hydrocarbon exploration and production published by the European Commission should be followed.
Biodiversity, Flora and Fauna	Underwater noise impacts on marine mammals and fish from seismic survey and drilling.	Application of mitigation measures listed in Section 4.3.4 in relation to seismic survey and 4.3.2 in relation to Drilling of Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014).
		Under Annex IV of the EU Habitats Directive 92/43/EEC cetaceans are listed as requiring strict protection. Therefore seismic surveys should screen for potential impact to Annex IV species and where necessary Appropriate Assessment will be undertaken.
		DECC will act as a central coordinator of seismic activity which will also include surveys carried out under Marine Scientific Research (MSR) provisions on the Irish Continental Shelf. The 100 km separation distance is a standard condition of all survey approvals.
	Effects of accidental spills on flora and fauna (including birds, fish and marine mammals), habitats and designated sites.	Design / implementation of schemes should minimise disturbance to biodiversity as well as wildlife protection measures.
		Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.
	Visual disturbance of marine mammals and birds due to presence of vessels and helicopters.	Under Annex IV of the EU Habitats Directive 92/43/EEC cetaceans are listed as requiring strict protection. Therefore seismic surveys should screen for potential impact to Annex IV species and where necessary Appropriate Assessment will be undertaken.
		Surveys could be undertaken to determine European Protected Species (EPS) and basking sharks presence in areas where development is proposed.
		Lighting on-board the vessels will be kept to the minimum level required to ensure safe operations. This will minimise disturbance to seabird species without compromising marine navigation requirements and health and safety of offshore workers.
		Vessels will be travelling at a slow speed during works to minimise impacts of disturbance.

SEA Topic	Issue / Impact Predicted	Mitigation Measure
	Disturbance of birds due to flaring.	Flaring should be minimised as much as is practically possible in order to reduce the potential for adverse impacts on seabird populations
	Collision above and below water with static or moving objects on marine mammals	Vessels will be travelling at a slow speed during works to minimise the risk injury impacts to marine mammals.
	Habitats disturbance and impact on benthos due to anchoring or placement of equipment on the seabed and drilling.	Seabed habitat information should be obtained, using surveys if necessary, prior to any deployment in order to assess the potential for damage, and deployment on the most sensitive habitats should be avoided. The European Communities (Birds and Natural Habitats) Regulations provide for the management of Natura 2000 sites and the strict protection of animal species. Any activity carried out under a petroleum authorisation is, therefore, subject to AA Screening/AA as appropriate.
		Deployment of anchor chains will be kept to a minimum.
		The consideration of potential impact to the benthic community is a component requirement of the EIA Directive and in the Habitats Directive assessments, where there is existence of benthos.
		Appropriate site assessment and planning, to include determination of the location of any potentially sensitive benthic habitats, along with modelling and assessment of the potential for accumulation and dispersal of cuttings, should be carried out prior to selection of final drilling locations in order to reduce the potential for significant impacts.
	Control and management of alien species and invasive species.	Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention).
	Impact on species and habitats due to contaminated cuttings discharge and chemical/mud/cement/cuttings discharge.	Discharge of chemicals is controlled through DECC consenting processes for use and discharge of chemicals in connection with O&G activities, in accordance with relevant OSPAR Decisions, Agreements and Recommendations.
Climatic Factors	Atmospheric emissions of greenhouse gases from combustion from survey vessels, rigs, helicopters and other vessels.	All petroleum activities, under an exploration licence or petroleum prospecting licence, including seismic surveys are subject to the requirements of the European Communities (Environmental Impact Assessment) (Petroleum Exploration) Regulations 2013 as amended and European Union( Gas Act 1976) ( Environmental Impact Assessment ) regulations 2021 with respect of EIA.
Economy and Material Assets	Indirect effects on economy due to accidental spills.	Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.
		As per the MARPOL 73/78 requirement under Annex I, all ships with 400 GT and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization under MEPC (Marine Environmental Protection Committee) act.

SEA Topic	Issue / Impact Predicted	Mitigation Measure
		Production of this plan will help to ensure that the potential for release of pollutants from construction, operation and decommissioning is minimised.
		Notification to the Irish Coast Guard if the activity occurs within or near an International Maritime Organisation (IMO) designated Traffic Separation Scheme. Employ the safety measures detailed in 'traffic routing systems' (IMO) wherever possible to reduce the probability for collisions.
	Disturbance effects on fishing industry due to exclusion zones around survey and drilling operations.	A Fisheries Liaison Officer (FLO) will be employed to manage interactions between vessels, personnel, equipment and fishing activity. This will be managed through the Fisheries Liaison Mitigation Action Plan.
		Notification to fishing vessels and the Sea Fisheries Protection Authority and DECC of the location and timing of seismic surveys and drilling operations. The notices include the time and location of any work being carried out, and emergency event procedures.
	Effects on other marine users such as shipping industry, offshore renewable energy projects and military e.g. conflicts of space.	Notice to Mariners (including local), Kingfisher bulletins, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings will be promulgated in advance of any proposed works. The notices include the time and location of any work being carried out, and emergency event procedures.
Geology, substrates and coastal sediments	Effects on coastal sediments due to accidental spills.	Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.
Landscape and Seascape	Effects on coastal landscape due to accidental spills.	Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.
Population and human health	Effects on population due to accidental spills.	Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.

SEA Topic	Issue / Impact Predicted	Mitigation Measure
Water	Impacts on water quality due to routine vessel discharges.	Vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ship standards.
		Compliance with all OSPAR Agreements, Recommendations, Strategies, Decisions and Guidelines and MARPOL legislation relating to protection of the marine environment from the potential effects of discharges.
	Impacts on water quality due to release of chemicals/mud/cement and cuttings to the water column.	To use best practice technologies to reduce the concentrations of chemicals discharged,
		Use and discharge of least harmful chemicals to the marine environment, including those on the OSPAR list of Substances/Preparations Used and Discharged Offshore which are Considered to Pose Little or No Risk to the Environment (PLONOR) in all drilling operations wherever possible.
		Zero discharge of chemicals on the OSPAR List of Chemicals for Priority Action (LCPA).
		To reduce usage by the best means practicable of chemicals on the OSPAR List of Substance of Possible Concern.
		All drilling operations to ensure compliance with Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
		Utilisation of OBM or SBM to be kept to a minimum and all OBM or SBM to be collected through closed system and brought ashore for re-use, recycling or disposal.
		Ensure minimal use of chemicals where biodegradation is less than 20% during 28 days, and specify use of substances that meet the Persistent, Bioaccumulative and Toxic (PBT) criteria. Both of these measures are used by OSPAR as criteria to assess improvement in the industry over time.
		All chemicals used on drilling units must have prior approval according to a system in which chemical formulation is continually reviewed and revised to eliminate or minimise harm to the environment through factors such as toxicity and bioaccumulation.
	Impacts to marine waters and the foreshore from accidental spills.	An Emergency Spill Response Plan will help to ensure that the potential for release of pollutants from vessels and rigs is minimised. Production of this plan will help to ensure that the potential for release of pollutants from construction, operation and decommissioning is minimised.
		As per the MARPOL 73/78 requirement under Annex I, all ships with 400 GT and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization under MEPC (Marine Environmental Protection Committee) act.
		Implementation of an Oil Pollution Emergency Plan (OPEP) / Oil Spill Contingency Plan (OSCP). These are designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects.
		Any oil spill, however small, must be reported immediately to the Irish Coast Guard. The level and manner of the required oil spill response will be overseen by the Irish Coast Guard, and determined by the

SEA Topic	Issue / Impact Predicted	Mitigation Measure
		<p>volume and type of oil spilled, and the weather and sea conditions at the time.</p> <p>Any oil spill likely to have impacts in UK waters must be reported by the Irish Coast Guard to the relevant UK authorities. The Irish Coast Guard has a close working relationship with the UK Maritime and Coast Guard Agency (MCA) and the two have a draft Service Level Agreement for co-operation on search and rescue and oil spill response in place. The Irish Coast Guard and the UK MCA also regularly conduct joint search and rescue and oil spill response exercises.</p> <p>Potentially hazardous operations should be carried out under appropriate weather/tide conditions</p>
	Effects on water quality through release of diesel and chemicals.	<p>Implementation of an Oil Pollution Emergency Plan (OPEP). The OPEP is designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects. An OSCP is required under the Sea Pollution (Amendment) Act 1999, and this requirement is re-stated in the DCENR Rules and Procedures Manual (DCENR, 2014). The OSCP is designed to assist the decision-making process during an oil spill, indicate what resources are required to combat the spill, minimise any further discharges and mitigate its effects. The OSCP must be submitted to the Irish Coastguard for approval.</p> <p>Management of ship waste (mainly oil, hazardous and polluting substances, sewage, garbage and polluting emissions to air) and of all cargo residues must be ensured as required under international (IMO), EU and national law. Under existing provisions ships are obliged to discharge waste and cargo residues at port and ports are obliged to provide facilities for their reception from ships.</p> <p>The crew of the drilling rig/ship should undergo environmental awareness and safety training. All equipment used on the rig/ship should have safety measures built in to minimise the risks of any oil spillage. All operations where appropriate, shall apply best available technologies, best environmental practice and clean technology. This is the aim of the requirement of DECC (2011) for operators to have accredited and verified environmental management systems.</p> <p>Implementation of OSPAR Recommendation 2006/3 to phase out discharge of offshore chemicals that are, or which contain substances identified as candidates for substitution and phasing towards the cessation of these discharges from offshore installations.</p> <p>Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. In the event of an accidental fuel release occurring and appropriate standard practice management procedures will be implemented accordingly.</p>

## 5.2 Monitoring

Article 5, Annex 1 (i) of the SEA Directive requires a “description of the measures envisaged concerning monitoring in accordance with Article 10”. Article 10 of the SEA Directive requires that monitoring be carried out in order to identify, at an early stage, any unforeseen adverse effects due to

implementation of a plan/policy, and to be able to take remedial action. Monitoring is carried out by reporting on a set of targets and indicators, which enable positive and negative impacts on the environment to be measured.

As this is a high-level national Plan and no significant negative environmental effects are predicted monitoring will focus on Project level activities.

Applications for Approval to conduct activities should be submitted to the Geoscience Regulation Office accompanied by a screening for EIA and AA assessing the potential environmental effects of activities in a specific location.

As part of this process, the operator is also required to provide the Geoscience Regulation Office in DECC the most recent and relevant information of the potential environmental impacts of their proposed activities to ensure that the operations being proposed are not in conflict with the SEA objectives outlined under the draft Plan, while the Geoscience Regulation Office will be responsible for seeking observations from relevant bodies on the details of the application.

DECC is satisfied that under these conditions, alongside the requirement for all applications to comply with international and national conventions, directives and legislation and to apply the best available technologies, best environmental practice, and clean technology, that the monitoring of the activities is accurately captured at the project level of each individual application throughout the life of each such project.

When a project obtains ministerial consent, the operator is required to comply with a list of commitments to ensure environmental protection. DECC will in any event conduct compliance check following conclusion of the project operations. In 2030, should a new plan be initiated, any new SEA process will monitor the effectiveness of the previous SEA.

Following identification of any unforeseen significant adverse effects the IOSEA6 Plan will be modified to provide remedial actions or mitigation measure to prevent, reduce or offset these effects. This will be undertaken in consultation with other bodies and the public where appropriate.

## 6. CONCLUSION AND NEXT STEPS

In summary, Option A was determined to be the preferred option:

Activity	Maximum over duration of plan	Maximum in any one year
Wells drilled	15	3
2D seismic survey acquired	8,000km	2,000km
3D seismic survey acquired	4,000km <sup>2</sup>	1,000km <sup>2</sup>

It provides a significant reduction in the extent of permitted seismic survey activity, with a 92% reduction in 2D and 95% reduction in 3D seismic survey activity per year, compared to the Previous Plan. Option A also permits significantly less exploration wells to be drilled than under the Previous Plan with a 70% reduction per year. This reduction in the level of activities minimised the likely significant effects on the environment and supports the most SEO's.

Table 6-1 lists future milestones in the development of the Plan and its SEA, and the dates when these are expected to be completed.

The SEA ER and Draft Plan will undergo a 7 week period of consultation 28 November 2022 to 13 January 2023.

**You are hereby invited to express your views on this Environmental Report and the Draft 'Plan for assessment of applications for Petroleum Exploration and Production Authorisations in Irish Offshore Waters for the period to 2030. Please send your comments by email to [GSPD@decc.gov.ie](mailto:GSPD@decc.gov.ie) or by post to:**

**Geoscience Policy Division  
Department of the Environment, Climate and Communications  
29-31 Adelaide Road  
Dublin, D02 X285  
Ireland**

Once the final Plan has been finalised and adopted, the monitoring framework set out within the SEA ER will be used to assess the impacts of the implementation of the Plan.

**Table 6-1 Anticipated plan-making and SEA milestones**

Actions	Timeline
Consultation on the SEA ER and Draft Plan	28 November 2022 to 13 January 2023 (7 weeks)
Post Adoption SEA Statement and Plan	Q1 2023

## REFERENCES

- 1 BEIS. (2020). Review of Consented Offshore Wind Farms in the Southern North Sea Harbour Porpoise SAC. [Online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/921754/RoC\\_SNS\\_SAC\\_HRA\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921754/RoC_SNS_SAC_HRA_FINAL.pdf) [Accessed October 2022]
- 2 BMAPA. (2022). British Marine Aggregate Producers Association (BMAPA) part of the Mineral Products Association (MPA). [Online]. Available at: [https://bmapa.org/regulation\\_and\\_management/ten\\_dering\\_and\\_prospecting.php](https://bmapa.org/regulation_and_management/ten_dering_and_prospecting.php) (Accessed September 2022).
- 3 Croker P.F. & Shannon P.M. (1995). The petroleum geology of Ireland's offshore basins: introduction. In CROKER, P.F. & SHANNON, P.M. (eds) 1995, The Petroleum Geology of Ireland's Offshore Basins, Geological Society Special Publication No 93.
- 4 Croker P., Kozachenko M. & Wheeler A.J. (2005). Gas-related seabed structures in the Western Irish Sea (IRL-SEA6). Technical report produced for the Strategic Environmental Assessment – SEA6. DTI, January 2005.
- 5 DAHG. (2014). Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Available online: [https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance\\_Jan%202014.pdf](https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf) (Accessed September 2022).
- 6 DCENR. (2014). Rules and Procedures for Offshore Petroleum Exploration and Appraisal Operations. Petroleum Affairs Division. Department of Communications, Energy and Natural Resources, May 2014.
- 7 DCMNR/PAD (2006). Petroleum Systems Analysis of the Rockall and Porcupine Basins Offshore Ireland. Digital Atlas. Petroleum Affairs Division.
- 8 DECC, (2019). Policy Statement - Petroleum Exploration and Production Activities as part of Ireland's Transition to a Low Carbon Economy (Available at: <https://assets.gov.ie/75204/3e135d8d-01e5-4028-a983-bca17a569b35.pdf> [Accessed June 2022].
- 9 DECC, (2022a). Policy Statement on Petroleum Exploration and Production in Ireland, In accordance with the Climate Action and Low Carbon Development (Amendment) Act 2021. Available at: <https://assets.gov.ie/231818/e707df54-6a03-44b7-acb3-c036a426263e.pdf> (Accessed September 2022).
- 10 DECC, (2022). Minister Ryan welcomes COP26 agreement as a compromise to keep 1.5 alive. [online] Gov.ie. Available at: <https://www.gov.ie/en/press-release/8d0b5-minister-ryan-welcomes-cop26-agreement-as-a-compromise-to-keep-15-alive/> [Accessed 9 June 2022].
- 11 DHLGH. (2020). Energia - Application for Site Investigation Licence for Windfarm off Helvick Head. [Online]. Available at: <https://www.gov.ie/en/foreshore-notice/2efc8-energia-application-for-site-investigation-licence-for-windfarm-off-helvick-head/> [Accessed 25 August 2021].
- 12 DHLGH, (2021). National Marine Planning Framework. [Online]. Available at: <https://www.gov.ie/en/publication/60e57-national-marine-planning-framework/> [Accessed April 2022].
- 13 DHLGH, (2022). Strategic Environmental Assessment Guidelines for Regional Assemblies and Planning Authorities. March 2022.
- 14 Dorschel, B., Wheeler, A.J., Monteys, X. & Verbruggen, K. 2010. Porcupine Seabight. In: Dorschel, B., Wheeler, A.J., Monteys, X. & Verbruggen, K. (eds) (2010). Atlas of the Deep-Water Seabed: Ireland. Dordrecht Heidelberg London New York; Springer.
- 15 Drazen, J. C., Smith, C. R., Gjerde, K. M., Haddock, S. H. D., Carter, G. S., Choy, C. A., Clark, M. R., Dutrieux, P., Goetze, E., Hauton, C., et al. (2020). Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining. *Proceedings of the National Academy of Sciences*, 117 (30), pp.17455–17460. [Online]. Available at: doi:10.1073/pnas.2011914117 (Accessed September 2022).
- 16 Environment Guide. (2018). Mining Methods • Environment Guide. [Online]. Available at:

<https://www.environmentguide.org.nz/activities/minerals/mining-methods/> (Accessed September 2022).

**17** EPA. (2015). Developing and Assessing Alternatives in Strategic Environmental Assessment (SEA). EPA Research Report. Available online: [https://www.epa.ie/publications/research/biodiversity/EPA-157\\_web.pdf](https://www.epa.ie/publications/research/biodiversity/EPA-157_web.pdf) (Accessed September 2022).

**18** EPA, (2020a). Air Quality in Ireland 2019. Air Quality. [online] Wexford: EPA. Available at: <https://www.epa.ie/publications/monitoring--assessment/air/Air-Quality-In-Ireland-2019.pdf> [Accessed 10 June 2022].

**19** EPA. (2020b). *GOOD PRACTICE GUIDANCE on Cumulative Effects Assessment in Strategic Environmental Assessment*. [Online]. Available at: <https://www.epa.ie/publications/monitoring--assessment/assessment/strategic-environmental-assessment/EPA-Good-Practice-Guidelines-SEA.pdf> (Accessed September 2022).

**20** EPA, (2021a). SEA Pack. [Online]. Available at: <https://www.epa.ie/publications/monitoring--assessment/assessment/strategic-environmental-assessment/SEA-Pack-2022.pdf> [Accessed September 2022].

**21** EPA, (2021b). Climate Status Report for Ireland 2020. [online] Wexford: EPA. Available at: [https://www.epa.ie/publications/research/epa-research-2030-reports/Research\\_Report\\_386.pdf](https://www.epa.ie/publications/research/epa-research-2030-reports/Research_Report_386.pdf) [Accessed 7 June 2022].

**22** EPA, (2022a). SEA of Local Authority Land-Use Plans - EPA Recommendations and Resources. Available at: [https://www.epa.ie/publications/monitoring--assessment/assessment/strategic-environmental-assessment/EPA-SEA-LandUse-Recommendations-Guidance\\_2022.pdf](https://www.epa.ie/publications/monitoring--assessment/assessment/strategic-environmental-assessment/EPA-SEA-LandUse-Recommendations-Guidance_2022.pdf) [Accessed September 2022].

**23** EPA. (2022b). *Latest emissions data*. [Online]. Available at: <https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/> [Accessed October 2022].

**24** ERM. (2019). Oil Spill Modelling Report, Offshore Ireland. OSRL Document Number: PRJ01003/02/ R01. Issued: 16 October 2019. Available on request from: [GSRO@decc.gov.ie](mailto:GSRO@decc.gov.ie)

**25** Fliessbach, K. L., Borkenhagen, K., Guse, N., Markones, N. Schwemmer, P. and Garthe, S. (2019). A

Ship Traffic Disturbance Vulnerability Index for Northwest European Seabirds as a Tool for Marine Spatial Planning. *Marine Spatial Planning*. *Front. Mar. Sci.* 6:192. doi: 10.3389/fmars.2019.00192

**26** Franklin, J., Tyrrell, S., Morton, A., Frei, D., & Mark, C. (2019). Triassic sand supply to the Slynne Basin, offshore western Ireland—new insights from a multi-proxy provenance approach. *Journal of the Geological Society*, 176(6), 1120-1135.

**27** Garthe, S., and Hüppop, O. (2004). Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *J. Appl. Ecol.* 41, 724–734. doi: 10.1111/j.0021-8901.2004.00918.x

**28** Hynes, S., Aymelek, M., Corless, R. and Evers, N. (2020). *A Survey Of Marine And Coastal Overseas Tourism Activity In Ireland*. The Socio-Economic Marine Research Unit (SEMRU)., p.44.

**29** Intertek, (2022a). Irish Offshore Strategic Environmental Assessment 6 - SEA Screening Report. Prepared for DECC. Report reference: P2510\_R5645\_Rev1. February 2022.

**30** Intertek, (2022b). Irish Offshore Strategic Environmental Assessment 6 - SEA Scoping Report. Prepared for DECC. Report reference: P2510\_RN5756\_Rev1. July 2022.

**31** Intertek, (2022c). Irish Offshore Strategic Environmental Assessment 6 – Stage 1: Screening for Appropriate Assessment. Prepared for DECC. Report reference: P2510\_R5664\_Rev2. July 2022.

**32** IWT. (2017). *Seaweed Harvesting Policy*. [Online]. Available at: <https://iwt.ie/wp-content/uploads/2017/09/IWT-Seaweed-Harvesting-Policy.pdf> (Accessed September 2022).

**33** Laist, D. W., Knowlton, A. R., Mead, J. G., Collet, A. S. and Podesta, M. (2001). Collisions Between Ships and Whales. *Marine Mammal Science*, 17 (1), pp.35–75. [Online]. Available at: doi:10.1111/j.1748-7692.2001.tb00980.x [Accessed August 2022]

**34** Leopold, M. F. & Camphuysen, C.J. (2009). Local birds in and around the Offshore Wind Park Egmond aan Zee (OWEZ) (T-1). NoordzeeWind Rapport OWEZ R 221 T1 20080201.

**35** Marzeion, B. and Levermann, A. (2014). Loss of cultural world heritage and currently inhabited places

to sea-level rise. Environmental Research Letters, 9 (3), p.034001. [Online]. Available at: doi:10.1088/1748-9326/9/3/034001 [Accessed June 2022].

36 NMS, (2022a). National Monuments service - Wreck Inventory of Ireland. [Online]. Available at: <https://data.gov.ie/dataset/national-monuments-service-wreck-inventory-of-ireland> [Accessed May 2022].

37 NMS, (2022b). National Monuments Service: Wreck Viewer. [Online]. Available at: <https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640> [Accessed May 2022].

38 OSPAR. 2009. Background document on Polycyclic Aromatic Hydrocarbons (PAHs).

39 OSPAR (2022). Impacts of offshore oil and gas industry on the marine environment shown to have decreased in the North-East Atlantic. Press release: 27 September 2022. Available online: <https://www.ospar.org/news/oicassessment#:~:text=Today%20OSPAR%20published%20its%20latest,offshore%20oil%20and%20gas%20industry>. (Accessed September 2022).

40 O'Reilly B.M., Hauser F., Jacob A.W.B. and Shannon P.M. (1996) The Lithosphere below the Rockall Trough: wide angle seismic evidence and extensive serpentinisation. Tectonophysics 255, P 1 – 23.

41 O'Sullivan, K., (2021). Cop26: Ireland joins alliance to phase out oil and gas production. Irish Times, [online] Available at: <https://www.irishtimes.com/news/environment/cop26-ireland-joins-alliance-to-phase-out-oil-and-gas-production-1.4725965#:~:text=Cop26%3A%20Ireland%20joins%20alliance%20to%20phase%20out%20oil,on%20end%20date%20for%20exploration%20of%20fossil%20fuels> [Accessed 9 June 2022].

42 Reef Resilience. (2022). Aquaculture Production Cycles. [Online]. Available at: <https://reefresilience.org/management-strategies/aquaculture/aquaculture-introduction/aquaculture-production-cycles/> (Accessed September 2022).

43 SEPA. (2018). *FINFISH AQUACULTURE SECTOR PLAN*. [Online]. Available at: <https://sectors.sepa.org.uk/media/1155/finfish->

[aquaculture-sector-plan.pdf](#) (Accessed September 2022).

44 Waggitt, J. J. et al. (2020). Distribution maps of cetacean and seabird populations in the North-East Atlantic. Journal of Applied Ecology, 57 (2), pp.253–269. [Online]. Available at: doi:10.1111/1365-2664.13525 [Accessed June 2022].

# APPENDIX A

## Plans, Programmes and Policy Review

# APPENDIX B

## Consultation Responses

# APPENDIX C

## Environmental Baseline

# APPENDIX D

## Full Assessment Results