

ESB MONEYPOINT HUB PROJECT

SI Works - Assessment of Impacts on the Maritime Usage (AIMU) Report



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SI Works - Assessment of Impacts on the Maritime Usage (AIMU) Report

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1 INTRODUCTION

1.1 Overview

Offshore wind will play a significant role in Ireland's decarbonisation. A key part of ESB's strategy is to increase their renewable generation capacity and replace coal fired generation with low-carbon and renewable technologies to assist Ireland in moving towards climate neutrality by 2050 as set out in the Ireland's National Energy & Climate Plan 2021-2030 (DCCAE, 2020). It is envisaged that much of this renewable generation will come from Floating Offshore Wind (FOW) in deep water areas off the west and south coasts, where Ireland is uniquely positioned to avail of the considerable wind resources.

FOW turbines work by connecting the buoyant substructure of the turbine base to the seabed using a system of anchors and mooring cables. FOW turbines can be deployed in deeper waters and are not as dependent on the condition of the seabed as fixed-bottom turbines, thus allowing floating turbines to utilise the strongest and most consistent winds to generate greater volumes of electricity. In addition, wind installations further offshore have a lesser impact on the environment by significantly reducing the visual impact on the landscape/seascape and reducing impacts on migratory birds through collision.

In Ireland, there is no dedicated port facility that is capable of producing FOW turbines on a scale that is necessary to meet the current and future demands. Based on market consultation and comparative studies, it is considered that any dedicated facility would require a deep-water to act as a staging point and sufficient land availability to facilitate the construction of the floating platform structures.

ESB propose to deliver a dedicated hub facility at Moneypoint for the construction and deployment of FOW turbines. The Moneypoint Generating Station site in County Clare was identified as having the essential physical and geographical attributes to act as a FOW Hub and aligns with the site-specific objectives for Moneypoint set out in the Clare County Development Plan 2023-2029 (Clare County Council, 2023a) and the cross-jurisdictional Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary (Clare County Council, 2023b) which aims to facilitate the long-term sustainable development of the Shannon Estuary.

ESB intends to undertake a survey campaign in the marine area at Moneypoint to inform the engineering design of the proposed Moneypoint Hub Project. The marine surveys will include geophysical, geotechnical, environmental, and met ocean surveys. These surveys are summarised in Section 2 of this report.

1.2 Purpose of the Report

This document has been prepared by RPS on behalf of the ESB to provide an overview of the marine site investigation works proposed to be undertaken at the Moneypoint site in support of the Maritime Usage Licence Application to the Maritime Area Regulatory Authority (MARA). The Maritime Usage Licence Application is for site survey and investigation works to inform engineering design. The results of these surveys will also provide baseline data for any subsequent Environmental Impact Assessment Report (EIAR) and Appropriate Assessment Natura Impact Statement (NIS) should the development be taken forward to the planning/consenting stage.

1.3 Statement of Authority

This report has been prepared by RPS on behalf of the ESB. The technical competence of the authors is outlined below:

██████████ is Technical Director in the Environmental Services Business Unit in RPS. He has over 24 years' experience. He holds an honours degree in Civil Engineering (B.E.) from NUI, Galway, a postgraduate diploma in Environmental Sustainability from NUI, Galway, and a Master's in Business Studies from the Irish Management Institute/ UCC. Gareth is also a Chartered Engineer. He has managed the delivery of numerous environmental projects including marine and terrestrial projects that have required environmental impact assessment, appropriate assessment, and Annex IV species reports.

██████████ is a Senior Scientist in the Environmental Services Business Unit in RPS. She has over 15 years' experience in the marine ecology field. She holds an honours degree in Marine Science from NUI, Galway, and a master's in marine biology from UCC. Maeve has contributed to numerous marine environmental projects including appropriate assessments, Annex IV species reports, natura impact statements and EIA chapters.

2 PROJECT DESCRIPTION

2.1 Site Location

Moneypoint is located on the northern shore of the Shannon Estuary in Co. Clare, approximately 3 km west of Killimer and 6 km south-east of Kilrush (Figure 2.1 and Figure 2.2). The site was acquired by ESB in the late-1970s to develop a coal fired power plant as part of its strategy to diversify from oil dependent electricity generation. It consists of both a terrestrial and marine area; along with the interface between the two.

The large industrial facility includes the power station and substations as well as overhead powerlines and towers, wind turbines and ash storage areas. At present, marine operations at the sites existing 380m long jetty structure are limited to coal and Heavy Fuel Oil (HFO) importation. The jetty is connected to the landside by a 105m long approach arm carrying a roadway, conveyor housing, oil and water pipeline and electrical cabling. Moneypoint is one of six terminals within the Shannon Estuary. There are usually between six and eight deliveries per annum accepted at Moneypoint.

The Shannon Estuary handles up to 1,000 ships carrying 12 million tons of cargo per annum (Clare County Council, p.17, 2023b). A car and passenger ferry operates between Killimer, Co. Clare, and Tarbert, Co. Kerry all year-round. Fishing activity also takes place in the estuary. Additionally, a large number of pleasure crafts exist year-round in the estuary.

The total area of the Moneypoint Generating station site is approximately 180 hectares (ha) and comprises lands on either side of the Kilrush-Killimer road (N67) as well as an additional c.40 ha within the marine environment, below the High-Water Mark (HWM). The terrestrial area of the site is inter-connected by a service road running beneath the N67. The main station site (c. 130 ha) is located on the south side of the N67; whilst the ash storage area (c. 50 ha) is located to the northwest on the landward side of the N67 where it adjoins the shoreline of Ballymacrinan Bay.

The general land-side ground conditions comprise of solid rock foundation with successive beds of mudstone, siltstone and sandstone overlain by stiff glacial till of variable thickness. The main site is situated adjacent to the deep sheltered water of the Shannon Estuary. The conditions will be verified through site investigation and associated interpretative studies.

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Figure 2.1 Location of Moneypoint Generating Station Site in the context of the Shannon Estuary, Co. Clare

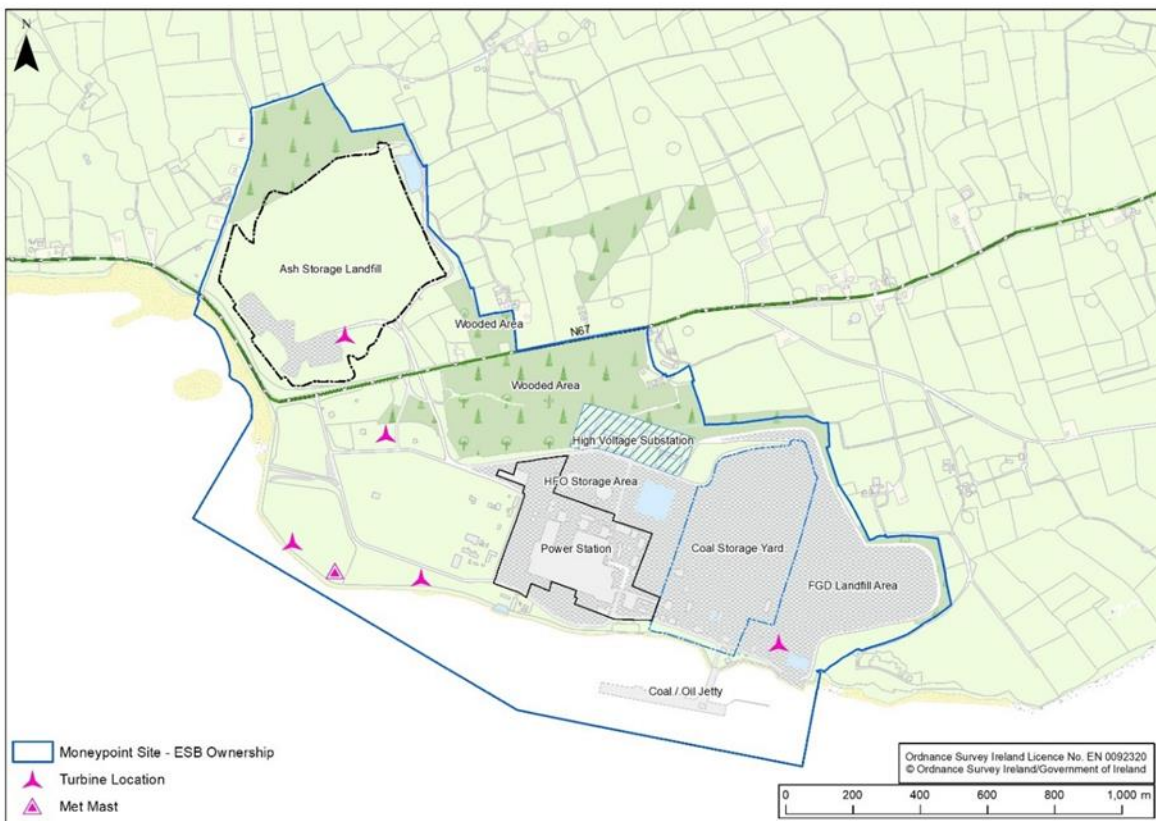


Figure 2.2 Moneypoint Generating Station Site, Co. Clare

2.2 Description of the SI Works

2.2.1 Overview

In order to provide a reliable basis for design and development the following surveys and investigations are considered necessary. The aim of the site investigation is to acquire data to a high quality and specification for the site as summarised below and described in the following sections.

- Phase 1 Marine Site Investigation Works:
 - Task 1: Marine Geophysical Surveys.
 - Task 2: Metocean Surveys.
 - Task 3: Marine Environmental/ Ecological Surveys.
- Phase 2 Marine Site Investigation Works:
 - Task 4: Marine Geotechnical Investigations.
- Phase 2 Land-based Site Investigation Works
 - Land-based site investigations previously consented by Clare County Council (planning reference: P23/32, decision dated 18th April 2023).

These works are collectively referred to as the Site Investigation (SI) works throughout this report.

It should be noted that all locations shown are provisional only and subject to change on-site due to the presence of obstructions/ refusals at individual locations.

It is noted that the requirement for additional and more refined works may arise as the SI works progress and are analysed. This may include areas of particular interest using more targeted techniques and/or refined borehole locations and quantities.

The following drawings have been prepared in support of the Maritime Usage Licence to the Maritime Area Regulatory Authority (MARA):

- Site Location Map (Dwg Ref: QS-000339-01-D460-007-001-000);
- Maritime Usage Licence Area (Dwg Ref: QS-000339-01-D460-007-002-000);
- Geophysical Survey Area Map (Dwg Ref: QS-000339-01-D460-007-003-000);
- Site Investigation Map (Dwg Ref: QS-000339-01-D460-007-004-000); and
- Licenced Aquaculture Sites Map (Dwg Ref: QS-000339-01-D460-007-005-000)

The drawings are included in Appendix A to this report.

2.2.2 Task 1: Marine Geophysical Surveys

The geophysical survey scope is intended to provide significant seabed and sub-seabed information to assist in the consenting, design, and construction phases of the project. It is therefore foreseen to gather, as a minimum, detailed information on:

- Water depths, reduced to LAT, throughout the defined survey area;
- The nature of any seabed features, obstructions, sediments, and shallow geological conditions throughout the defined survey area;
- The nature of the sub-seabed conditions and horizons down to circa 50m below seabed level;
- Seabed conditions/ hazards to any project equipment which may need to be located on the seabed;
- Seabed habitats to inform further benthic surveys and preparation of environmental impact assessment reports (EIAR); Identify sensitive marine habitats which will need to be avoided during geotechnical and environmental sampling; and
- Archaeological features within the development area.

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The foreseen scope of marine SI works will consist of primarily non-intrusive survey methods, in that they will not physically interact with the seabed, such as Multi Beam Echosounder (MBES), sub-bottom profiler (SBP), Side Scan Sonar (SSS) and Magnetometer surveys but may also incorporate visual surveys (e.g., drop-down video, ROV, etc.) pending the development of the project's ground model.

As detailed in Section 2.2.4 below some intrusive seabed sampling will also be undertaken during the geophysical survey campaign to ground-truth geophysical data, assist in early seabed characterisation and provide data for benthic analyses and archaeological interpretation.



Figure 2.3 Typical offshore geophysical survey vessel (Fugro Discovery IMO 915882)

Typical vessels for geophysical surveys will be circa 15 – 80m in length (smaller vessels may be required for the nearshore / shallower water areas). See Figure 2.3 for an example of a geophysical survey vessel.

A brief description of the geophysical survey methods has been provided in the subsequent sections. The exact technical specifications of the equipment necessary will not be known until the survey contract has been awarded. However, a description of the standard equipment typical used and survey parameters is described. Typical acoustic properties of equipment are provided in Section 2.2.6.

The intertidal area will be subject to surveys using terrestrial geophysical survey methods and techniques such as Ground Penetrating Radar (GPR), shallow seismic, electrical resistivity and magnetometer.

2.2.2.1 Multibeam Echo sounder

Full 100% coverage of the area concerned associated with the survey and area classification will be required. Surveys shall identify the level, nature, and detailed coverage of the seabed to ensure identification of features on the seabed within the area shown, identify potential large upstanding archaeological features and guide habitat mapping with the backscatter function if available. Processing of data sets shall include processing for archaeological indicators. The area shall be surveyed in such a way as to produce a comprehensive data set required to enable the generation of multiple sections through the survey area in any direction.

Method: A remote sensing acoustic device which will be either attached to the vessel(s) hull at the bow or mounted on a side pole.

Indicative Equipment:

- GeoAcoustics GeoSwath Plus interferometric;
- Teledyne Reson SeaBat T50-R;
- R2 Sonic 2024 – see **Figure 2.4**; or
- similar.

Swath width: Swath width will be optimised to provide 100% seafloor coverage with typical swath widths of 3 to 6 times water depth depending on arrangement of equipment hardware.

Location: MBES survey may be performed throughout the entire area illustrated as “Area A” in Dwg Ref: QS-000339-01-D460-007-003-000 (Appendix A). The estimated survey area is 927.5 hectares (9.27 km²).



Figure 2.4 MBES R2Sonic 2024 typical configuration and equipment

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2.2.2.2 Side Scan Sonar (SSS)

Method: A submerged acoustic device (SONAR – Sound Navigation & Ranging) for imaging areas of the seafloor will be either hull mounted or towed.

Indicative Equipment:

- Kongsberg Geoacoustic 160;
- Edgetech 4200;
- C-Max CM2 system (see Figure 2.5);
- Klein Hydro Scan; or
- similar.



Figure 2.5 Counting pulley for winch-towed C-Max CM2 SSS

Swath width: The swath width will be based on the water depth encountered. It is anticipated that the width of each swath will be approximately 50m with a 100% overlap between each swath.

Location: SSS survey may be performed throughout the entire area illustrated as “Area A” in Dwg Ref: QS-000339-01-D460-007-003-000 (Appendix A). The estimated survey area is 927.5 hectares (9.27 km²).

2.2.2.3 Sub-bottom Profiling

A typical sub bottom profiling (SBP) survey is completed using a multi-channel seismic reflection system such as a Boomer, Chirp or Sparker system. Sub bottom profiling over the site and specified runs is yet to be determined.

The geophysical SBP survey shall identify the bed level and the nature, thickness, and location of the sub surface strata to rock head.

The survey shall include both items detailed below:

1. Completion of specified runs.
2. Completion of a Free Line Survey.

Method: SBP are acoustic devices for imaging sections of the seabed. The images produced are used to produce profiles beneath the seafloor, enabling delimitation of major sedimentary interfaces. They are either mounted on the vessel / pole or towed behind the vessel.

Indicative Equipment:

- Edgetech 3100;
- Edgetech 3300 (see Figure 2.6);
- Geopulse 5430A;
- 400 Joule Generic sparker;
- 350 Joule Generic Boomer;
- Innomar Parametric (dual frequency); or
- similar.



Figure 2.6 Left - Applied Acoustics AA300 being deployed & Right - Typical Hull Mounted SBP - Edgetech 3300

Swath width: n/a

Location: SPB survey may be performed throughout the entire area illustrated as “Area A” in Dwg Ref: QS-000339-01-D460-007-003-000 (Appendix A). The estimated survey area is 927.5 hectares (9.27 km²).

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2.2.2.4 Magnetometer

The magnetometer survey will be undertaken at suitable line spacing to ensure complete coverage of the seabed for archaeological purposes, i.e., identify large metal debris or metallic archaeological remains.

Method: Magnetometers provide information on embedded magnetic/ferrous objects such as cable crossings, debris and potentially UXO's. They are towed from the vessel.

Indicative Equipment:

- Geometrics G-882 caesium vapour magnetometer – see Figure 2.7;
- Marine Magnetics SeaSPY;
- G-Tec Magwing System; or
- similar.



Figure 2.7 Geometrics G-882

Survey spacing: 25m centres, with additional runs of higher density line spacing within areas where any magnetic signal is recorded.

Location: Magnetometer surveys may be performed throughout the entire area illustrated as “Area A” in Dwg Ref: QS-000339-01-D460-007-003-000 (Appendix A). The estimated survey area is 927.5 hectares (9.27 km²).

2.2.3 Task 2: Metocean Surveys

The main purpose of the meteorological and oceanographic (metocean) campaign is to collect accurate wind wave, temperature, current and water levels information from the project site. The information collected will be used to inform engineering design and environmental assessments. The exact details of the surveys (equipment, locations, and deployment/retrieval methods) will be confirmed upon appointment of a preferred contractor.

2.2.3.1 Equipment Deployment & Recovery Vessel

The methodology for deployment of metocean monitoring equipment will be using a suitable vessel to either tow &/or lift and deploy from vessel deck via onboard crane. An example of a suitable vessel for this scope would be a shallow draft anchor handling tug or a utility type vessel such as that shown in Figure 2.8 or similar.



Figure 2.8 Dennis Murphy IMO 9268784

2.2.3.2 Acoustic Doppler Current Profiler (ADCP) to measure ocean currents.

An Acoustic Doppler Current Profiler (ADCP) is used to collect data on water movements, current speeds, and directions at the project site.

Indicative Quantity: One.

Method: Deployed to the seabed via a crane from a survey vessel for a duration of at least 5 weeks to capture a full lunar cycle including spring and neap tides.

Indicative Equipment: The ADCP unit (see Figure 2.9) is mounted in a seabed frame (circa 1.8m wide and 0.6m high) with a weight of approximately 300kg. This will be attached to a ground line, a clump weight and to an acoustic release system carrying a rope retrieval system.



Figure 2.9 Typical seabed frame with ADCP (Ocean Scientific International Ltd)

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Location: An indicative location for the deployment of the ADCP is illustrated on Dwg Ref: QS-000339-01-D460-007-004-000 (Appendix A). The actual location will be determined based upon interpretation of the geophysical data and following a navigation safety assessment.

2.2.4 Task 3: Marine Environmental/ Ecological Surveys

The aim of the environmental surveys is to collect baseline data which will be used to inform the EIAR. This will comprise a benthic sampling programme using grab sampling, video or still photographs and static acoustic monitoring to measure marine mammal activity and other background noise.

2.2.4.1 Benthic Sampling/ Grab Samples

Seabed samples will be recovered to inform benthic habitat distribution mapping as well as contamination testing (where relevant). Standard sampling techniques for subtidal and intertidal collection will be employed to include collection of macrofauna and associated sediment particle size and organic content.

Macrofaunal grab samples may be taken with different grab types depending on the substrate type, e.g., Day grab, Van Veen, mini-Hamon (not suitable for undisturbed samples). The benthic sampling will be complimented by video and still photography. Seabed sampling will be undertaken as part of either the geophysical or geotechnical surveys or may be a standalone survey.

Indicative Quantity: It is anticipated that approximately 20 no stations will be required to be sampled. It is proposed that two grab samples will be taken at each sampling location, one for macrofaunal analysis and particle size analysis and one for sediment chemistry analysis. GPS coordinates and depths will be recorded for each location.

Method: Surface grab sample by box corer, grab sampler (e.g., Day grab, Van Veen grab or similar). These devices are typically deployed from a crane on the vessel.

Depth: Grab sample will be taken on the seabed at depths ranging between -15mCD and -25mCD. It is estimated that each sample will have a sample up to 0.1m².

Location: Grabs Sampling will be performed within the area of privately held foreshore held by ESB – Refer to Dwg Ref: QS-000339-01-D460-007-004-000 (Appendix A). The final sampling locations will be determined based upon interpretation of the geophysical data and selected to sample different marine habitats.

2.2.4.2 Static Underwater Acoustic Recorders

It is intended to deploy static underwater acoustic recorder(s) within the area of the ESB foreshore. The recorder(s) will be Wildlife Acoustics Model: SM2M Unit with hydrophones contained in a single unit (see Figure 2.10), or similar. The location for the deployment of the recorder(s) is yet to be determined.



Figure 2.10 Deployment of static underwater acoustic recorders

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Indicative Quantity: It is anticipated that one static recorder will be deployed.

Method: The recorder will be deployed from a vessel and anchored to the seabed by way of chains, ropes and/ or weights for the duration of the deployment. Deployment is typically from the back of a vessel, usually by means of an 'A' frame or winch. A tethered buoy will be attached to the recorder to facilitate recovery of the recorder, ropes, chains, and weights. It is anticipated that a recorder will be deployed for a two-to-three-week duration.

Depth: The recorders will be positioned within the water column. A marker buoy will clearly highlight the location of the recorder.

Location: An indicative location for the deployment of the static underwater noise recorder is illustrated on Dwg Ref: QS-000339-01-D460-007-004-000 (Appendix A). The actual location will be determined based upon interpretation of the geophysical data and following a navigation safety assessment.

2.2.4.3 Other Environmental Surveys

Further marine environmental surveys will be undertaken during the project's development comprising the following:

- Ornithology surveys
 - Bird sighting surveys will be undertaken either from a vessel or aerially in addition to onshore vantage point locations.
- Marine Mammal surveys
 - Complimentary to the Static Acoustic Monitoring ongoing within the Shannon estuary, vessel based sighting surveys will be undertaken.
- Shipping and Navigation Surveys
 - The need for Shipping and Navigation surveys will be determined following consultation with the relevant stakeholders.
- Marine Archaeology Surveys
 - The aim of the surveys, which will be undertaken by a suitable qualified archaeologist, is to collect baseline data which will be used to inform the EIAR. Surveys will be undertaken in advance of any intrusive survey work and coordinated with the geophysical survey proposed herein. Surveys will comprise an identification programme using marine magnetometer survey (see Section 2.2.2.4), side scan sonar (see Section 2.2.2.2) data analysis and diving as required in order to identify and assess metallics and other targets.
- Marine Habitat Surveys
 - The aim of the surveys, which will be undertaken by a suitable qualified marine ecologist, are to collect baseline habitat data which will be used to inform the EIAR and Appropriate Assessment. Surveys will be undertaken in advance of any geotechnical survey work and coordinated with the geophysical survey proposed herein. Surveys will comprise drop-down camera and/or Remote Operated Vehicle (ROV) inspection and diving as required to identify benthic habitats.

2.2.5 Task 4: Marine Geotechnical Investigations

The aim of the geotechnical survey is to provide sufficient geotechnical data to allow the characterisation of the sub-seabed strata and composition of the seabed and the level of Rock head (including follow on coring to confirm rock head).

Normal industry standards for performance of all positioning, drilling, sampling, SPT testing, CPTU testing, laboratory testing and analysis and reporting will apply. Material sampling, in-situ testing, data logging, laboratory testing and reporting (factual and interpretative) will be required.

The works will include the following:

- Sampling/ coring boreholes at 20 locations to a maximum of 30m investigation depth below seabed level.

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- Vibrocores at c.25 locations.

The indicative quantities given above relate to the requirements for the preliminary geotechnical campaign, the final quantity, location, and specification of equipment will be determined following interpretation of the geophysical survey data and considering environmental constraints (i.e., proximity to sensitive receptors). The final proposed locations will be subject to environmental conditions. The geotechnical survey will be undertaken from either a dedicated geotechnical vessel (length 50-90m, see Figure 2.11) or alternatively a jack-up barge.



Figure 2.11 Typical Offshore geotechnical survey vessel – Fugro Synergy IMO 9452488

2.2.5.1 Geotechnical Boreholes

Indicative Quantity: 20 focused primarily in the survey area in front of the Moneypoint Site.

Method: A drill head is lowered to the seabed from the vessel via a drill string and stabilised using a seabed frame. The drill head penetrates the seabed via rotation of the drill string and the application of a downward pressure. Soils and rock samples are then retrieved for laboratory testing via the drill string.

Sample Diameter: up to 102mm.

Depth: Up to 30m below the seabed or refusal.

Indicative Equipment: Drilling equipment used will follow the ISO and API technical specifications for drilling equipment. Indicative equipment to be used would be traditional API drill string or a triple core barrel system (e.g., Geobor 'S') or similar (see Figure 2.12). For investigation within the intertidal zone, a tracked borehole / CPT rig and ancillary equipment would be used.

Location: Indicative geotechnical locations for the boreholes are illustrated on Dwg Ref: QS-000339-01-D460-007-004-000 (Appendix A). The final borehole locations will be determined based upon interpretation of the geophysical data and selected based on the preliminary engineering design. The micro siting of individual geotechnical site investigation locations will take into consideration environmental constraints such as the position of sensitive habitats or archaeological features.



Figure 2.12 Typical marine drill (Fugro)

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2.2.5.2 Vibrocore Sampling

Indicative Quantity: 25 vibrocores

Method: Gravity or piston core (self-weight penetration sampler)

Sample Diameter: up to 150mm

Depth: Vibrocore up to 3m depth,

Indicative Equipment: The exact equipment to be used will be confirmed following a tender process to procure the site investigation contractor.

Location: Vibrocore sampling will be performed at representative locations within the development area - Refer to Dwg Ref: QS-000339-01-D460-007-004-000 (Appendix A). The final sampling locations will be determined based upon interpretation of the geophysical data and selected based on the preliminary engineering design. Some locations may need to be avoided due to environmental reasons including sensitive archaeological features or unsuitable substrate types.

2.2.6 Marine Noise Level Summary

All survey works that involve the use of acoustic instrumentation will follow the *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (DAHG, 2014).

A summary of the noise sources for the main activities proposed to be undertaken as part of the project surveys is included in Table 2.1.

Table 2.1 Summary of Noise Sources and Activities Included in the Subsea Noise Assessment

Equipment	Source level [SPL]	Primary frequencies (-20 dB width)	Source model details	Impulsive/non-impulsive
Survey vessel (based on "Fugro Discovery", IMO 9152882)	165 dB SPL	10-2,500 Hz	(Wittekind, 2014; Simard, et al., 2016; Heitmeyer, 2001)	Non-impulsive
Multibeam echosounder Based on: "Teledyne Reson Seabat T50-R", "Kongsberg GeoAcoustics GeoSwath Plus interferometric" & "R2 Sonic 2024"	182 dB SPL (ping rate dependent, equivalent spherical level)	200,000 Hz & 250,000 Hz	Source levels based on von Hann windowed FM or CW pulses at max SPL as given by manufacturer.	Impulsive
Side scan sonar Based on: "Kongsberg Geoacoustic 160", "Edgetech 4200", "C-Max CM2 system" & "Klein Hydro Scan"	170 dB SPL (ping rate dependent, equivalent spherical level)	300,000 – 445,000 Hz	Source levels based on von Hann windowed FM or CW pulses at max SPL as given by manufacturer.	Impulsive
Sub-bottom profiler 1 Based on: "Edgetech 3100", "Edgetech 3300", "Geopulse 5430A", "400 Joule Generic sparker", "350 Joule Generic Boomer"	188 dB SPL (ping rate dependent, off-axis level) 220 dB Lp (on-axis)	600 – 12,000 Hz	Source levels based on von Hann windowed FM or CW pulses at max SPL as given by manufacturer as well as generic models for Sparker and Boomer.	Impulsive

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Equipment	Source level [SPL]	Primary frequencies (-20 dB width)	Source model details	Impulsive/non-impulsive
Sub-bottom profiler 2	197 dB SPL (ping rate dependent, off-axis level)	1000 – 4,000 Hz & 85,000 – 115,000 Hz	Source levels based on von Hann windowed FM or CW pulses at max SPL as given by manufacturer.	Impulsive
Based on: “Sub-bottom profiler 1” & “Innomar Parametric (dual frequency)”	247 dB Lp (on-axis)			
Vibro-coring / drilling	195 dB SPL	10 – 3,000 Hz	(Bureau of Ocean Energy Management) (Center for Marine Acoustics, 2023)	Non-impulsive

2.2.7 Land-based Site Investigations

In January 2023, ESB applied to Clare County Council for planning permission for the onshore site investigation works at Moneypoint Generating Station.

The land-based SI works comprise the drilling of boreholes and excavation of trial pits at various locations cross the site above the High-Water Mark. The investigation aims to determine the sub surface strata and composition of the ground and the level of rockhead (including follow on coring to confirm rock head).

It is proposed that approximately 26 no borehole stations and shallow exploratory investigations will be undertaken. The methods to be employed during the investigation works are cable percussive boreholes, rotary core boreholes, and trial pits. It is anticipated that the maximum depth of the boreholes will be 20m. Trail pits are anticipated to be a maximum of 4.5m deep.

Planning permission for the onshore site investigation works was granted by Clare County Council on 18th April 2023. The expiry date of the grant is 17th April 2028.

2.2.8 Programme and Timescale

ESB propose a site investigation activities schedule that will be phased over a total of 1.5 years (18 months). The intention is to begin survey activities as soon as feasible following license award, with a phased programme of investigations, capitalising on suitable weather windows over this time period. This phased approach will progress the overall development towards detailed design stage. The exact mobilisation dates will not be known until the process of procuring a contractor is complete.

The exact dates for the surveys are to be determined pending the appointment of survey contractors but based on the estimated scope of works to be conducted the duration of each project phase scope has been estimated in Table 2.2 below. The estimated durations are subject to change based on variables such as weather conditions onsite, unforeseen seabed conditions, unforeseen obstructions etc. ESB will consult with relevant stakeholders where appropriate prior to the commencement of the surveys.

Table 2.2 Estimated Project Schedule

Phase	Scope of Work	Total No of SI Locations	Survey Area	Estimated Duration	Estimated Commencement date
Phase One SI	Marine Geophysical Surveys	n/a	927.5 ha	4-6 weeks	Q1 2024
	Benthic Sampling	20	40 ha	4-6 weeks	Q1/Q2 2024
	Deployment of Static Underwater Acoustic Recorders	1	n/a	4-6 weeks	Q1/Q2 2024
	Metocean Surveys (ADCPs)	1	n/a	4-6 weeks	Q1/Q2 2024

Preliminary Engineering Design to be undertaken in Q3 / Q4 2024

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Phase	Scope of Work	Total No of SI Locations	Survey Area	Estimated Duration	Estimated Commencement date
Phase Two SI	Marine Geotechnical Boreholes	20		2-3 months	Q4 2024 / Q1 2025
	Vibrocore Sampling	25		2-3 months	Q4 2024 / Q1 2025
	Land-based Site Investigations	26	105 ha	2-3 months	Q4 2024 / Q1 2025
Finalised Engineering Design (Q1 2025)					

2.3 General Survey Requirements

All appointed survey contractors shall obtain and comply with all necessary marine operational permits including routine and customary vessel/crew/equipment clearances from Customs Agencies, Port Authorities, Marine Survey Office, etc..

2.3.1 Quality Assurance

Each of the appointed survey contractors shall comply with the following as a minimum:

- Quality and Environmental Management Systems based on ISO9001:2015.
- Provision of Quality Management Plans for all the marine operations.
- Provision of site and activity specific Method Statements for all the marine operations within their scope.

2.3.2 Health & Safety

Health, safety, environment, and welfare considerations will be a priority in the evaluation of possible contractors for the various survey scopes and will be actively managed during the survey scopes of work.

Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work.

Prior to survey works taking place, both Project Supervisor for Design Process (PSDP) and Project Supervisor for Construction Stage (PSCS) will be appointed under the relevant legislation and project / survey specific HSE plans will be put in place which will form part of the survey project execution plans.

Temporary barriers, warning notices, lighting, and other measures necessary to provide for the safety of the workers on the site and/or the public will be erected and maintained for the duration of the SI works.

2.3.3 Working Hours

The working hours for the SI works are proposed to be 24 hours a day, seven days a week.

Weather conditions and/or sea-state will impact on the working hours and it may be necessary to temporarily suspend operations when adverse weather conditions and/or sea-state are encountered or forecast. Similarly, equipment maintenance and repair may impact on operational activities resulting in downtime.

Following downtime or suspension of operations, recommencement of sound producing activities shall only occur after the successful implementation of the measures contained in the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014).

2.3.4 Environmental Procedures

Environmental procedures to be followed by the appointed survey contractors are detailed within the Assessment of Impact on the Maritime Area (AIMA) Report and/or Appropriate Assessment reports.

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2.3.5 Vessels

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended, including the requirements of MARPOL. In addition, all vessels will adhere to published guidelines and best working practices such as: the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations.

Vessels shall have a Health, Safety and Environmental Managements system which should conform to the requirements of the latest International Maritime Organization (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in.

The SI works will be undertaken from vessels in accordance with the relevant guidelines required to manage the risk to marine mammals from man-made sound sources in Irish waters.

3 NEED AND ALTERNATIVES

A review of all available site investigation data at Moneypoint between 1979 and 2022 has been conducted as part of the Moneypoint Hub project development. The majority of available marine ground investigation data and borehole logs were collected at the site in the 1970s/1980s during geotechnical surveys that were undertaken prior to the construction of the Moneypoint Generating Station. The majority of marine logs are focused in the area surrounding the existing coal jetty only.

Given the limited amount of data that is currently available in the potential development areas, further site investigation (SI) information is required to progress the Moneypoint Hub design options to the next stage.

With regards to alternative considered, there are no alternatives to undertaking site investigations. Site investigation information is critical to the assessment of ground conditions and for civil engineering design. The use of the historic data that is available at Moneypoint may result in inadequate and unsafe design that could have significant life and economic consequences for the project.

4 PLANNING AND DEVELOPMENT

4.1 EIA Directive

4.1.1 Overview

In accordance with Directive 2011/92/EU, as amended by Directive 2014/52/EU (hereafter, the EIA Directive), projects that are likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location must be subject to an EIA.

The Maritime Area Planning Act, 2021 (as amended) established the Maritime Area Regulatory Authority (MARA). One of the functions of MARA is to consider licence applications and the granting of licences. For a licence application, the MARA is required to carry out a screening for environmental impact assessment (EIA) in accordance with Section 117(5)(a) of the Act having regard to Schedules 5 and 7 to the Planning and Development Regulations 2001 (as amended)

EIA Screening is the process of deciding whether a development requires an EIA to be carried out. The EIA Screening exercise first assesses the development to ascertain if it is subject to Mandatory EIA, using classifications defined in the EIA Directive (projects listed in Annex I of the EIA Directive are subject to an EIA). If the project is not listed in Annex I, and no mandatory EIA is required, the EIA Screening process progresses to consider projects listed under Annex II of the EIA Directive. Projects listed in Annex II of the EIA Directive are subject to an EIA if (i) they exceed certain thresholds (set out in Annex II and by each Member State); or (ii) if they do not meet or exceed the threshold, but where the project is deemed likely to have significant environmental effects, with regards to the project's scale, nature, location, and context. Such projects need to be assessed on a case-by-case basis. EU Guidance on EIA Screening states that whilst Member States may set thresholds or criteria for the purpose of determining which projects are to be assessed on the basis of their environmental effects, they "should not be required to examine projects below those thresholds or outside those criteria on a case-by-case basis".

Section 172 of the Planning and Development Act 2000 (as amended), sets out the statutory basis for the requirements for environmental impact assessment. Annexes I and II of the EIA Directive have been transposed into Irish legislation through the Planning and Development Regulations 2001 (as amended). Regulation 93 and Schedule 5 of the Regulations prescribe classes of development for which EIA is required. Furthermore, if a project is a type of project listed in Schedule 5 but does not equal or exceed the relevant quantity, area or other limit specified, that project may be considered a "sub-threshold" development and should therefore be screened for EIA to determine whether the project is likely to have a significant effect on the environment.

4.1.2 Schedule 5, Part 1 Considerations

Schedule 5 Part 1 of the Planning and Development Regulations 2001 (as amended) sets out a number of classes of development that require mandatory EIA. The SI works, as set out in Section 2, do not fall under any of the classes as set out in Schedule 5 Part 1 and therefore mandatory EIA is not required.

4.1.3 Schedule 5, Part 2 Considerations

Schedule 5 Part 2 of the Planning and Development Regulations 2001 (as amended) sets out classes of development for which EIA must be carried out where such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified or, where no quantity, area or other limit is specified in the Part in respect of the development concerned. The SI works, as set out above, do not fall under any of the classes as set out in Schedule 5 Part 2.

In line with the Office of the Planning Regulator (OPR, 2021) Practice Note PN02 Environmental Impact Assessment Screening, if a project *'is not of a class of development in Schedule 5, Parts 1 and 2, it is not "sub-threshold" development, and no EIA or EIA Screening is required.'*

4.2 Habitats and Birds Directives

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) provides protection for habitats and species of European importance; Council Directive 79/409/EEC (the Birds Directive) aims to protect all of the 500 wild bird species naturally occurring in the European Union (EU). Areas designated for protection under the Habitats Directive are described as Special Areas of Conservation (SAC) and those designated under the Birds Directive, as Special Protection Areas (SPA) and the sites are known collectively as Natura 2000 sites. As each member of the EU is required to designate areas in their jurisdictions, the establishment of this network of Natura 2000 sites under Articles 3 to 9 of Directive 92/43/EEC is the key measure to protect nature and biodiversity in the EU.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of Natura 2000 sites. Article 7 of the Habitats Directive extends the scope of its articles 6(3) and 6(4) to the Birds Directive.

The Habitats and Birds Directives have been transposed into Irish Legislation under the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

The impact(s) from the SI works in relation to the Habitats and Birds Directives are separately discussed in the following report:

- Supporting Information for Screening for Appropriate Assessment (document ref: IE000210RP0026).

4.3 Water Framework Directive (WFD)

Since 2000, the Water Framework Directive (WFD) [Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy] has been the main law for water protection in Europe. It applies to inland, transitional, and coastal waters as well as groundwaters. An objective of the WFD is to achieve the protection of aquatic ecology and habitats, drinking resources and bathing waters through river basin management planning and monitoring. This objective is summarised as Good Ecological Status (GES) and Good Ecological Potential (GEP) for artificial or heavily modified water bodies.

With the mitigation measures proposed as part of the works (see Section 6) and considering the limited nature, scale, size, and duration of the SI works there will not be deterioration in WFD GES in any water body and the works will not impact on achieving or maintaining WFD GES.

4.4 Marine Strategy Framework Directive (MSFD)

The Marine Strategy Framework Directive (MSFD) (2008) is European legislation, which aims to protect the marine environment. It requires the application of an ecosystem-based approach to the management of human activities, enabling a sustainable use of marine goods and services. The MSFD Directive aims to ensure clean, healthy, and productive oceans and seas and sustainable use of marine environment for current and future generations.

In order to implement the Directive each member state is required to:

- Describe what they consider is a clean, healthy, and productive sea i.e., Good Environmental Status (GES);
- Monitor and assess the quality of their seas against Good Environmental Status; and
- Ensure they take appropriate action by 2020 to maintain or achieve Good Environmental Status.

Good Environmental Status is key to compliance with the MSFD Directive. GES is described by 11 Descriptors which are as follows:

- D1 Biodiversity;
- D2 Non-indigenous species;
- D3 Population of commercial fish/shellfish;
- D4 Elements of marine food webs;
- D5 Eutrophication;

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- D6 Sea floor integrity;
- D7 Alteration of Hydrographical conditions;
- D8 Contaminants;
- D9 Contaminants in fish and seafood for human consumption;
- D10 Marine litter; and
- D11 Introduction of energy, including underwater noise.

The basic principle of GES is to ensure sustainable use of marine resources. When assessing a project against MSFD requirements it is assessed on its impact on GES. A project may not improve GES statuses, but it should not have a permanent negative impact on any of the GES criteria and is required to be assessed against each of the MSFD GES Descriptors.

Four of the above descriptors are particularly relevant to the SI works, namely: D1 Biodiversity; D6 Sea floor integrity, D10 Marine litter, and D11 Introduction of energy, including underwater noise.

With the mitigation measures proposed as part of the works and considering the limited nature, scale, size, and duration of the SI works there will not be deterioration in MSFD GES and the works will not impact on achieving or maintaining MSFD GES.

4.5 National Maritime Planning Framework (NMPF)

The National Marine Planning Framework (NMPF) stresses the need to transition to a low carbon and climate resilient society while conserving and enhancing natural and environmental resources. While the NMPF stresses the importance of offshore renewable energy development it does so in tandem with emphasising effective environmental management, including regulating water services, landscape, flood risk planning, protection of designated sites and species, coastal and marine management, climate mitigation and adaptation, and land use change.

The NMPF highlights the importance of Appropriate Assessment in determining impacts on the natural environment. The importance of public authorities' roles in avoidance of deterioration of natural habitats and in particular Natura 2000 sites is stressed in the plan, together with reduction or elimination of impact wherever possible.

The SI works are essential to providing scientific, environmental, and engineering information to support the future development of Moneypoint and as such are in compliance with the policies of the NMPF as summarised in Table 4.1.

Table 4.1 Policies of the NMPF Relevant to the Development of Moneypoint

NMPF Reference	Policy
Energy – Offshore Renewables Policy 1	Proposals that assist the State in meeting the Government's offshore renewable energy targets, including the target of achieving 5GW of capacity in offshore wind by 2030 and proposals that maximise the long-term shift from use of fossil fuels to renewable electricity energy, in line with decarbonisation targets, should be supported. All proposals will be rigorously assessed to ensure compliance with environmental standards and seek to minimise impacts on the marine environment, marine ecology, and other maritime users.
Energy – Offshore Renewables Policy 2	Proposals must be consistent with national policy, including the Offshore Renewable Energy Development Plan (OREDPA) and its successor. Relevant Projects designated pursuant to the Transition Protocol and those projects that can objectively enable delivery on the Government's 2030 targets will be prioritised for assessment under the new consenting regime. Into the future, areas designated for offshore energy development, under the Designated Marine Area Plan process set out in the Maritime Area Planning Bill, will underpin a plan-led approach to consenting (or development of our marine resources).

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NMPF Reference	Policy
Energy – Offshore Renewables Policy 6	Proposals for infrastructure enabling local use of excess energy generated from emerging marine technologies (wave, tidal, floating wind) should be supported.
Energy – Offshore Renewables Policy 7	Where potential for ports to contribute to ORE is identified, plans and policies related to this port must encourage development in such a way as to facilitate ORE and related supply chain activity.
Energy – Offshore Renewables Policy 10	Opportunities for land-based, coastal infrastructure that is critical to and supports development of ORE should be prioritised in plans and policies, where possible.

4.6 Offshore Renewable Energy Development Plan (ORED P)

Published in 2014, Ireland's first Offshore Renewable Energy Development Plan (ORED P) provided a framework for the sustainable development of Ireland's ORE (Offshore Renewable Energy) resources, setting out key principles, policy actions and enablers for delivery of Ireland's significant potential in this area (DCENR, 2014). The ORED P identifies the opportunity for the sustainable development of Ireland's abundant offshore renewable energy resources for increasing indigenous production of renewable electricity, thereby contributing to reductions in our greenhouse gas emissions, improving the security of our energy supply and creating jobs in the green economy. ORED P lays out the overall framework and national spatial strategy to guide the long-term, sustainable, and planned development of ORE in the maritime area.

The Draft ORED P II was published for consultation in early 2023. When finalised it will replace the current ORED P.

The ORED P states (DCENR, 2014, p.15): "The development of offshore renewable energy represents a significant opportunity for our ports, particularly those along the western seaboard. They will play a crucial role in facilitating the necessary development of both offshore renewable generation and grid infrastructure, requiring investment to handle the necessary plant, equipment and cabling, and the associated shipping during both the construction, and operation and maintenance phases of future projects."

The ORED P sets out policy actions and enablers that are key to the development of the renewable energy sector. The more relevant ones to the future development of Moneypoint are:

5. Develop the Supply Chain for the Offshore Renewable Energy Industry in Ireland; and
10. Ensure Appropriate Infrastructure Development.

The SI works are essential to providing scientific, environmental, and engineering information to support the future development of Moneypoint and as such are in compliance with the policy actions and enablers of the ORED P.

4.7 Clare County Development Plan 2023-2029

The Clare County Development Plan 2023-2029 is very supportive of future development at Moneypoint with direct reference to the ESB's Brighter Future Strategy and Green Atlantic project throughout the plan. Moneypoint is seen as one of the strategic areas in County Clare to support the transition to greener energies, provide port and harbour access to the Shannon Estuary and the creation of employment. Moneypoint is identified on Map 12B as Strategic Development Location B. The following Table 4.2 lists policies from the plan with relevance to the future development at Moneypoint.

Table 4.2 Policies of the Clare County Development Plan Relevant to the Development of Moneypoint

Policy	Topic
CDP6.10	Shannon Estuary
CDP6.17	Energy Supply

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Policy	Topic
CDP6.18	Green Technology
CDP6.19	Circular Economy
CDP11.22	Ports and Harbours
CDP11.44	Energy Security
CDP11.50	Power Stations and Renewable Energy
CDP12.1	Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary
CDP12.3	Marine-Related Industry/Large-Scale Industry on the Estuary
CDP12.4	Strategic Development Locations
CDP12.6	Strategic Development Location B– Moneypoint
CDP12.7	Shipping and Navigation
CDP13.5	Offshore Renewable Energy (ORE) Development
CDP14.4	Shannon Estuary Working Landscape

The SI works are essential to providing scientific, environmental, and engineering information to support the future development of Moneypoint and as such are in compliance with the policies of the Clare County Development Plan 2023-2029.

4.8 Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary

The Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary was commissioned in 2011 by Clare, Kerry, Limerick City and County Councils, along with the Shannon Development and the Shannon Foynes Port Company. The SIFP has been incorporated into the Clare County Development Plan 2023-2029 (Clare County Council, 2023b). A key component of the SIFP is to aide development of an integrated approach for environmental management/safeguarding while supporting the multi-functional nature of the Shannon Estuary and facilitate economic growth within the area. Moneypoint is recognised as a strategic energy location capable of supporting other “*synergistic industries such as renewable energy*”. The development of the Moneypoint hub would go toward the economic growth, local employment, and support for renewable energy development in Ireland.

Section 5.4.4.2 of the SIFP deals directly with Moneypoint as Strategic Development Location B. The following Table 4.3 lists some of the SIFP development objectives relevant to Moneypoint.

Table 4.3 Objectives of the SIFP Relevant to the Development of Moneypoint

Reference	Objective
MRI 1.2.2	<p>Moneypoint Strategic Energy Location</p> <p>To safeguard the role and function of ESB Moneypoint as a key strategic driver of economic growth in the Region, encouraging its sustainable growth, operational expansion, and diversification in accordance with national and regional energy</p>

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Reference	Objective
MRI 1.2.2	<p>Moneypoint Marine Related Industry</p> <p>To support and facilitate the development of marine related industry on lands adjacent to Moneypoint, which is compatible with the primary use of this SDL, as a Strategic Energy Location, subject to compliance with the criteria in SIFP MRI 1.2.</p>
OS RE 1.10	<p>Servicing the renewable sector</p> <p>To actively explore and pursue opportunities to service the renewable energy sector at existing ports, and to facilitate associated development required, subject to compliance with sustainable planning, and the requirements of the Habitats and Birds Directive, Water Framework Directive, and all other relevant EU Directives.</p>

The SI works are essential to providing scientific, environmental, and engineering information to support the future development of Moneypoint and as such are in compliance with the objectives of the SIFP.

4.9 Shannon Estuary Economic Taskforce Report

The Programme for Government 2020 committed to supporting the Shannon Estuary region through the establishment of an Economic Taskforce to evaluate the economic development potential of the Shannon Estuary area, and to determine how this potential can be realised in both an economically and environmentally sustainable way. The independent Shannon Estuary Economic Taskforce was established on 21st April 2022, with the twofold objective to create a long-term vision for the region and to outline a practical action plan to realise it.

The Shannon Estuary Economic Taskforce Report was subsequently published in July 2023. It is supportive of the ESB's Green Atlantic at Moneypoint plans to allow for the efficient production of floating wind turbines at scale.

4.10 Shannon Foynes Port Vision 2041 Strategic Review

The Shannon Foynes Port Company carried out a review in September 2022 of their Vision 2041, published in 2013. The review recommends the establishment of four core facilities on the Shannon Estuary to support the delivery of floating offshore wind at scale, one of which is the development of Moneypoint. The following Figure 4.1 is extracted from the report and highlights Moneypoint as a key element in the future support for offshore wind in the Shannon Estuary.

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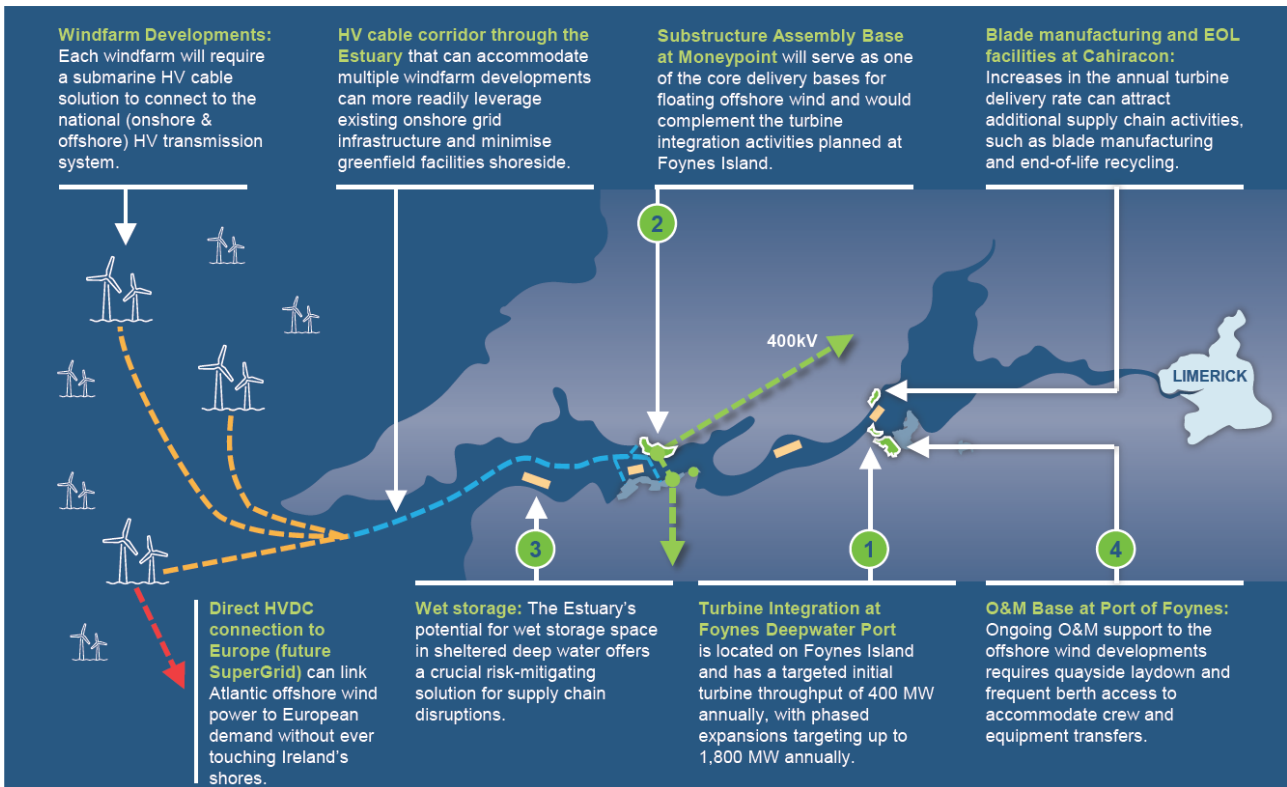


Figure 4.1 Shannon Estuary Infrastructure to Enable FLOW at scale (source: Shannon Foynes¹)

¹ Shannon Foynes Port Company (2022) Vision 2041 Strategic Review; available: <https://www.sfpc.ie/vision-2041-strategic-review/>

5 LAND AND SOILS

The land and soils of the area are described below. The marine sediments and habitats are discussed in further detail under the Biodiversity chapter (Section 7).

The bedrock geology of the site is anticipated to be underlain by Sandstone, Siltstone and Mudstone of the Clare Shale Formation.

The drift geology is anticipated to be Till derived from Namurian sandstones and shales however industrial sediments (Made Ground) cover the majority of the terrestrial site. Bedrock subcrop or outcrop is present most notably to the north-west of the site.

The GSI characterises the site as being a Locally Important Aquifer (Lm), bedrock is moderately productive in local zones. The groundwater vulnerability is mapped as being 'high' with some pockets of 'extreme' groundwater vulnerability, indicating that the natural groundwater is likely to be easily contaminated by human activities. There are also areas which are mapped as being rock or at near Surface or Karst. An assessment carried out under the Water Framework Directive (WFD) 2013-2018 groundwater body has concluded that the groundwater within the bedrock aquifer is presently of 'Good Status'.

As outlined in Section 2.2.7, the land-based SI works have been previously consented by Clare County Council (planning reference: P23/32, decision dated 18th April 2023). With the mitigation measures proposed as part of the works and considering the limited nature, scale, size, and duration of the SI works there will be no likely significant effects on land and soils.

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6 WATER

The assessment of the potential impacts arising from the SI works on Water is presented in Table 6.1.

Table 6.1 Assessment of Potential Impacts on Water

Aspect of the Impact	Assessment of the Impact
Nature of the Impact	<p>The Moneypoint site is within the Tonavoher WFD river sub-basin, which forms part of the Cloon [Clare] WFD sub-catchment, within the Shannon Estuary North catchment (EPA ID 27). There is one watercourse located to the west of the Moneypoint site, the Molougha Stream, an order 2 stream (EPA ref: IE_SH_27T2308802). The marine waters beside Moneypoint are within the Lower Shannon Estuary transitional waterbody which is deemed to be “not at risk” and the water quality is “unpolluted”.</p> <p>There is no pathway between the land-based SI works and the Molougha stream and therefore no risk of marine pollution from the land-based SI works.</p> <p>There is some potential for adverse impacts on marine waters during the marine SI works. The geotechnical investigation works may give rise to a potential pollution risk arising from disturbance of contaminated sediment creating underwater plumes. Plumes of fine sediment carrying suspended silt and/or contaminants can potentially cause deterioration of water quality, with subsequent negative impacts on downstream aquatic habitats and communities, and the species which depend upon them (e.g., fish, foraging birds, resident dolphin etc.).</p> <p>The SI works are within the Lower Shannon Estuary which flows into the Atlantic to the west. The SI works are not anticipated to result in a significant amount of disturbance of sediments given the predominant substrate type in the estuary and the relatively small footprint of the equipment and number of stations proposed.</p> <p>In the event that any small amount of silt and/or contaminants does enter the estuary system, this is not anticipated to be in large enough quantities to significantly impact water quality or aquatic habitats/species. Best practice construction methods and mitigation measures (outlined below) will ensure that significant impacts on surface waters do not arise during construction.</p>
Magnitude and spatial extent of the impact	Given the nature, scale, size, and duration of the SI works, the magnitude of impacts on Water are not deemed significant.
Transboundary nature of the impact	There is not considered to be any risk of transboundary impacts occurring.
Intensity and complexity of the impact	The intensity and complexity of impacts on Water arising from the SI works are typical to that of similar types of marine surveys that utilise standard SI techniques, with no novel or complex methodologies. The SI phase is anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations. Adverse impacts will be mitigated through standard management measures (see mitigation measures below).
Probability of the impact	Impacts on Water arising from SI activities are deemed to be likely but not significant, however any impacts will be minimised further with the implementation of best practice methods and mitigation measures (outlined below). With the implementation of mitigation measures, residual impacts on surface waters are not deemed significant.
Expected onset, duration, frequency, and	The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations, so impacts related to Water will be brief to temporary in nature. The potential for impacts on Water will commence when the vessels are in use and may occur across the duration of

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Aspect of the Impact	Assessment of the Impact
reversibility of the Impact	the SI phases. SI activities that contribute to effects on Water will be carried out in accordance with best practice and mitigation measures (see below) to ensure that no significant effects arise.
Cumulation of the impact with the impact of other existing or permitted developments	<p>There are two projects which may have a cumulative impact in combination with the SI works, these include:</p> <ul style="list-style-type: none"> • The ESB have a foreshore application approved for the installation of an underwater submarine cable across the Lower Shannon Estuary between Moneypoint to Kilpaddocke which was granted in 13/06/2023 and is due to commence construction in 2024. • There are several maintenance dredging campaigns along the Shannon Estuary to Foynes, e.g., Shannon Foynes Port Company dredging at Limerick docks, the approach channel and at Foynes Port which do not spatially overlap with the project but may do temporally. <p>The ESB will liaise with the relevant stakeholders and operators to minimise any in-combination effects. This will reduce the possibility of overlap with the limited timeframe of the SI works, therefore it is not deemed significant.</p>
Possibility of effectively reducing the impact	<p>The potential effects on Water during the SI works will be reduced by ensuring that best practice methods and surface water management measures are followed. To further ensure that outside contaminants are not introduced all vessels involved will comply with MARPOL conventions.</p> <p>Mitigation measures during the SI phase include:</p> <ul style="list-style-type: none"> • Slow lowering of the equipment through the water column to reduce potential impact plumes from the seabed and reduce chances of equipment damage. • Emergency containment measures available on-board all vessels. This will include an emergency procedure to deal with accidental spillages. • All chemicals will be stored in bunded containers and/or areas. • Spill kits will be retained on site, to ensure that any spillages or leakages are dealt with immediately. • Waste will be stored within bunded storage areas prior to removal by an appropriate waste disposal contractor for off-site/vessel treatment/recycling/disposal. • Procedures for fuel and/or chemical handling and storage are to be developed. Handling and storage areas will be located on an impervious area with a bunding facility capable of handling spills.

Conclusion: With the inclusion of the above best practice methods and mitigation measures, significant effects are not anticipated on Water from the SI works.

7 BIODIVERSITY

A summary of the assessment of potential impacts arising from the SI works on biodiversity is presented in Table 7.1.

Table 7.1 Assessment of Potential Impacts on Biodiversity

Aspect of the Impact	Assessment of the Impact
Nature of the Impact	<p>The SI works will be conducted wholly within the area outlined in the drawings in Appendix A covering a total area of 9.27 km² (927.5ha).</p> <p>Mobile species, such as mammals (otters, cetaceans, seals), turtles, fish and shellfish can be found throughout the Lower River Shannon Estuary with bottlenose dolphins, otter, sea lamprey, river lamprey, salmon and being Qualifying Interest (QI) species of the Lower River Shannon SAC (002165). The River Shannon and River Fergus Estuaries SPA (004077) is designated for 21 bird species within which the SI works overlap.</p> <p>MERC undertook a dropdown video survey in 2021, during which the subtidal habitat in the immediate area (within 500m) of the Moneypoint Generation Station was denoted as a “<i>subtidal cobble with an anemone dominated epifauna</i>”. This corresponds to the EU Habitats Directive Annex I habitat Reefs (1170).</p> <p>Reefs are designated as a QI of the Lower River Shannon SAC and reef communities are also protected as part of the Estuaries Qualifying Interest (1130). The removal of very small sediment samples required for the environmental grab samples and geotechnical borehole drilling will result in some very localised biodiversity loss. Similarly, anchoring, or spudding of legs from a jack-up-barge may also result in very localised biodiversity loss. There may also be some very localised brief to temporary smothering by the deposition of arisings from these activities.</p> <p>A total of 20 benthic sampling stations, 20 sampling/ coring boreholes and 25 vibrocores for geotechnical investigation will affect a footprint of approximately 8 m² within the overall survey area of 9,270,000 m² (9.27 km²). Prior to undertaking the geotechnical investigations, drop-down camera and geophysical survey information will be analysed to locate and avoid sensitive habitats (e.g., Annex 1 Reef). Following completion of the drilling activities the grab sample and borehole locations will be allowed to naturally backfill with sediments and cutting materials. Therefore, the nature of the impact is considered to be negligible.</p> <p>During field surveys (June 2022 and September 2023), RPS ecologists confirmed that otters are using the rock armour along the foreshore of the Moneypoint Site at a variety of locations. Three couch/seat areas were found on the grassland/rock armour interface in June 2022 and two of these were again recorded in September 2023. Old and fresh spraints were recorded along the rock armour. One possible holt was identified within rock armour under the bridge to the jetty, and the second was located under the pier towards the east of the site. Multiple large accumulations of spraints were noted at these locations. Moneypoint power station operates on a 24-hour, seven day a week schedule. There is therefore constant activity on-site including personnel, vehicle movements, deliveries, noise, artificial lighting, etc. It can be reasonably assumed that any otter activity on the site will be habituated to the existing site operations. It is considered highly unlikely that there will be any significant disturbance to otter as a result of the SI works. Therefore, the overall impact from the SI works on otter is considered to be negligible.</p> <p>Bats are known to be active in the general area around Moneypoint with the following bat species recorded during static detector surveys in 2023:</p> <ul style="list-style-type: none"> • Myotis spp. • Pipistrellus spp. • <i>Pipistrellus pipistrellus</i> (Common pipistrelle)

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Aspect of the Impact	Assessment of the Impact
	<ul style="list-style-type: none"> • <i>Pipistrellus pygmaeus</i> (Soprano pipistrelle) • <i>Nyctalus leisleri</i> (Leisler's bat) • <i>Plecotus auritus</i> (Brown long eared bat) • <i>Rhinolophus hipposideros</i> (Lesser horseshoe bat) <p>During the 2023 bat surveys, most bat activity was recorded on the northern boundary of the Moneypoint site, adjacent to wooded/ woodland and hedgerow areas. Features surveyed included built structures and trees. It is not anticipated that the marine SI works will impact negatively on bat species on the site. Any artificial lighting used will be localised to either the vessels or at onshore borehole locations. The Moneypoint site is an active industrial site with 24/7 activity. Existing artificial lighting is used extensively across the site. The SI works will not be disturbing bat foraging and commuting routes along scrub and wooded areas. Therefore, there is no likelihood of any significant disturbance or displacement of bat species.</p> <p>Twenty-five species of cetacean have been recorded in the waters around Ireland. The Irish Whale and Dolphin Group (IWDG, 2023) holds 117 records of cetacean sightings off the coast of County Clare for the period November 2022 to November 2023. Species identified include bottlenose dolphin (<i>Tursiops truncatus</i>), common dolphin (<i>Delphinus delphis</i>), harbour porpoise (<i>Phocoena phocoena</i>), minke whale (<i>Balaenoptera acutorostrata</i>), and humpback whale (<i>Megaptera novaeangliae</i>).</p> <p>The Shannon Estuary is one of the most important areas for bottlenose dolphins in Ireland, and the species are a QI of the Lower River Shannon SAC. Within the Shannon Estuary bottlenose dolphin were noted as the most frequently recorded species (34 sightings recorded between November 2022 to November 2023) with just one sighting of harbour porpoise in the outer reaches of the estuary at Loop Head over the same time period (IWDG, 2023). No other cetacean species was recorded in the Shannon Estuary between November 2022 to November 2023.</p> <p>MERC Consultants carried out a preliminary overview of marine ecological data for the Moneypoint Hub project (MERC, 2021). This review identified that bottlenose dolphins are present throughout the year and are genetically discrete compared to bottlenose dolphins found elsewhere in Irish waters (Mirimin et al. 2011) and that the estuary is an important calving area (MERC, 2021). The population is estimated at around 145 individuals with only 80 adults (Baker et al., 2018 in MERC, 2021). This small, genetically discrete population is vulnerable to even small increases in adult mortality or a reduction in reproduction rates (Blásquez et al., 2021 in MERC, 2021). An overview of existing data on bottlenose dolphin populations in the Lower Shannon Estuary shows that there is a well-known hotspot for the species in the waters off Moneypoint Power Station (MERC, 2021). Rogan et al (2000) recorded bottlenose dolphins in the Estuary all year round with a peak from May to September and noted the presence of neo-natal calves from July to September as evidence of a well-defined breeding season in the Shannon Estuary.</p> <p>Harbour porpoise have been recorded also along the lower Shannon though sightings are few, but with one adjacent to Moneypoint in 2018 (IWDG), and strandings have been recorded as far up the estuary as Foynes (O'Callaghan et al, 2021).</p> <p>Potential impacts to cetaceans, and on the strict protections afforded to these species, associated with the SI works are largely associated with underwater noise generated during the geophysical and geotechnical surveys resulting in injury and/or disturbance with the potential for collisions with survey vessels, resulting in injury. Further discussion on this is provided in Section 10 Noise and Vibration chapter.</p> <p>Both harbour and grey seals, have been recorded in small numbers (one grey seal and four individual harbour seals) within the Lower Shannon Estuary. Due to the scarcity of seals within the Shannon Estuary and the limited scale and duration of the SI works, it is concluded that there will be no likely significant effects on seal species.</p>

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Aspect of the Impact	Assessment of the Impact
	<p>From June 2007, there is a single record of a leatherback turtle (<i>Dermochelys coriacea</i>) at the mouth of the Shannon Estuary (circa 3.5 km to the east of Loop Head, Co. Clare) approximately 38 km from the SI works area (NBDC, 2022a). Records of leatherback turtle are reported mainly in coastal waters, rarely within estuaries. Loggerhead turtles (<i>Caretta caretta</i>) have been recorded all along the west coast of Ireland, however, only one loggerhead turtle has been observed in the vicinity of the Shannon Estuary at Kilbaha, Loop Head in 1998 (NBDC, 2022b), approximately 30 km to the west of the SI works area. the occurrence of turtles in Irish waters is relatively rare, with the leatherback and loggerhead turtles the most common species. No turtle sightings have been recorded at the Moneypoint site in the Shannon Estuary. Due to the rarity of turtles within the Shannon Estuary and the limited scale and duration of the SI works, it is concluded that there will be no likely significant effects on turtle species.</p> <p>The SI works area overlaps with the Lower River Shannon SAC which is designated for Annex II diadromous fish species such as: Sea Lamprey (<i>Petromyzon marinus</i>); Brook Lamprey (<i>Lampetra planeri</i>); River Lamprey (<i>Lampetra fluviatilis</i>); and Salmon (<i>Salmo salar</i>).</p> <p>There are no SACs designated for Twait shad (<i>Alosa fallax</i>) on the west coast of Ireland, and as such, it is considered highly unlikely that this species will migrate through the Shannon Estuary. Brook lamprey have been recorded at the Dromore Nature Reserve approximately 48 km north, it is considered highly unlikely that this species will migrate through the Shannon Estuary (NBDC, 2023c). Atlantic salmon has also been recorded at the Dromore Nature Reserve and at Dromore Lough. It is possible that Atlantic salmon may utilise the Shannon Estuary while returning to their natal rivers but as these rivers are located approximately 48 km north of the SI works impact is expected to be negligible.</p> <p>Sea lamprey nests have been recorded in the Lower River Shannon at Ennis and upstream of Limerick City, therefore they may use the Lower River Shannon Estuary to transit though during their migratory period between autumn to late spring (July- September) (NBDC, 2023d). Juvenile smelt may use the Lower River Shannon Estuary as a transit channel during their migratory periods (February to March). Smelt have been recorded upstream of the Lower River Shannon in the River Fergus, River Owenogarney, and River Mague (NBDC, 2023d). It is noted in Section 2.2.8 that the proposed environmental and geophysical works are scheduled to commence in Q1/Q2 of 2024. While the timing of these works does not overlap with the migratory period for sea lamprey (therefore no avenue for impact) it does for smelt. Although disturbance to smelt during its migratory season is possible it is unlikely. This is due to the already busy shipping area within the Lower Shannon Estuary, and the scale and localised nature of the SI works.</p> <p>Catadromous species such as the European eel (<i>Anguilla anguilla</i>) have also been recorded within the Lower River Shannon Estuary. Evidence suggests that the River Shannon is an important migratory route for this species between October and December (Inland Fisheries Ireland, 2021). There is potential for European eel to travel through the Lower Shannon Estuary (upstream) to their natal river(s) to spawn. European eel have been recorded at Killaloe and Ardnacrusha. These sites are located approximately 53 km and 67 km upstream of the SI works. Although the European eel migratory period does overlap with the timeframe for the geotechnical investigation works, the Lower Shannon Estuary is a busy shipping area, and therefore disturbance from the SI works are considered to be insignificant.</p> <p>River Shannon and River Fergus Estuaries SPA (004077) is designated for populations of seabirds and wildfowl, 20 of which are migratory, non-breeding overwintering populations². These species vary considerably in aspects of their ecology due to adaptations and specialisations that influence their uses of different habitats, and the resulting behaviours affects how species are distributed across the site as a whole. Reliance on and use of alternative habitats varies between species, through time, from seasonally through to daily, and different habitats may be used by day and night (Shepherd <i>et al.</i> 2003, cited in NPWS,</p>

² [Site specific cons obj \(npws.ie\)](https://www.npws.ie/site-specific-cons-obj)

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Aspect of the Impact	Assessment of the Impact
	<p>2012b). Different waterbird species utilise habitats in different ways. When tidal flats are covered at high water, intertidally foraging waterbirds are unable to forage, and may move to nearby fields to feed. Some species are generalists, and make use of a range of habitats, for example the Black-tailed godwit do forage across intertidal mudflats but also readily use grassland habitats.</p> <p>Certain species of seabird can forage considerable distances from their colonies (Woodward <i>et al.</i>, 2019), however, given the limited size, scale and duration of the SI works, it is considered unlikely that there is a reasonable impact pathway to SPAs beyond the immediate SI works area, as it becomes increasingly unlikely that individuals from distant SPAs will be present. Seabirds are more likely to forage in the open sea where they can access the rich foraging habitat of continental shelf waters (Cummins <i>et al.</i>, 2019), as opposed to foraging within estuaries where availability of fish prey may be more limited. Wintering waders and wildfowl tend to be fairly sedentary once they arrive in their over-wintering areas; often only moving short distances between roosting and feeding areas. Therefore, it is considered unlikely that wintering birds from other SPAs will travel to/from the Shannon Estuary to feed or roost. It is concluded that none of the populations of these species for which the site is selected are expected to be present in the area of the SI works in numbers, or for sustained periods, and they will be unlikely to be exposed to significant disturbance or displacement effects. Therefore, disturbance from the SI works are considered to be insignificant.</p> <p>Pollution to water during SI works may result from direct effects such as Suspended Sediment Concentrations (SSC) into the Lower River Shannon SAC. Suspended silt and contaminants can potentially cause degradation of water quality and smother or contaminate habitats and associated communities. However, the works are not anticipated to result in a significant amount of SSC into the Lower River Shannon and, in the event that any small amount of silt and/or contaminants is remobilised into the water column, this is not anticipated to be in large enough quantities to significantly impact water quality or aquatic habitats/species.</p> <p>Best practice methods and mitigation measures (outlined below) will ensure that significant impacts on benthic habitats, water, mammals, turtles, fish, sedentary species such as shellfish, and birds, do not arise during the SI works.</p>
Magnitude and spatial extent of the impact	<p>Given the scale and nature of the SI works, the magnitude and spatial extent of impacts on the biodiversity is, on the whole, not deemed significant. As the geophysical marine SI works will be focused on underwater activities and the geotechnical marine SI works are to be carried out in a localised area around Moneypoint, the magnitude and spatial extent of the impact on bird species, bats, and otter is not considered significant. The spatial extent of potential habitat loss impacts is limited to the immediate environs of the investigation locations and/ or anchoring or spudding sites. The magnitude and spatial extent of the geophysical survey is much greater given that sound-producing activities are required and these have the potential to impact on marine mammals. This is separately discussed in Section 10 and a Subsea Noise Technical Report is included in Appendix B. .</p>
Transboundary nature of the impact	<p>There is not considered to be any risk of transboundary impacts.</p>
Intensity and complexity of the impact	<p>The intensity and complexity of impacts on biodiversity arising from the SI works are typical in nature to that of similar types of marine SI works that utilise standard survey techniques, with no novel or complex methodologies. The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations. Based on the characteristics and location of the SI works, the impacts on Biodiversity during construction and operation are not deemed to be intense or complex.</p>
Probability of the impact	<p>Impacts on biodiversity relating to marine mammals arising from SI works are deemed to be likely, however these impacts will be minimised with the implementation of best practice methods and mitigation measures (outlined below). With the implementation of mitigation</p>

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Aspect of the Impact	Assessment of the Impact
	<p>measures, residual impacts on biodiversity and species that depend upon them is not deemed significant, however marine mammals may exhibit avoidance behaviour during the active periods of the geophysical SI works. The impacts on marine mammals will be significantly reduced through the implementation of the mitigation measures outlined below.</p> <p>The probability of impacts on fish species is unlikely, given the busy nature of the Shannon Estuary in terms of existing shipping and fishing activities.</p> <p>The probability of impacts on birds is unlikely, given the underwater nature of the SI works and the localised geotechnical works area around Moneypoint, an industrial site operating 24/7.</p> <p>The probability of impacts on otters is unlikely, given the underwater nature of the SI works and the localised geotechnical works area around Moneypoint, an industrial site operating 24/7.</p> <p>The probability of impacts on bat species is unlikely, given the underwater nature of the SI works and the localised geotechnical works area around Moneypoint, an industrial site operating 24/7.</p>
Expected onset, duration, frequency, and reversibility of the Impact	<p>The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations, so impacts related to Biodiversity will be brief to temporary in nature. SI activities that contribute to effects on biodiversity will be carried out in accordance with SI works best practice and mitigation measures (see below) to ensure that no significant effects arise.</p>
Cumulation of the impact with the impact of other existing or permitted developments	<p>There are two projects which may have a cumulative impact in combination with the SI works, these include;</p> <ul style="list-style-type: none"> • The ESB have a foreshore application approved for the installation of an underwater submarine cable across the Lower Shannon Estuary between Moneypoint to Kilpaddoge which was granted in 13/06/2023 and is due to commence construction in 2024. • The dredging maintenance campaigns along the Shannon Estuary to Foynes e.g., Shannon Foynes Port Company dredging at Limerick docks, the approach channel and at Foynes Port which do not spatially overlap with the project but may do temporally.
The ESB will liaise with the relevant stakeholders and operators to minimise any in-combination effects. This will reduce the possibility of overlap with the limited timeframe of the SI works, therefore it is not deemed significant.	
Possibility of effectively reducing the impact	<p>The potential effects on biodiversity during the SI works will be reduced by ensuring that best practice methods are followed and standard control measures for prevention of impacts on the environment during the SI works are complied with.</p> <p>Mitigation for biodiversity includes:</p>
	<ul style="list-style-type: none"> • A suitably qualified and experienced marine mammal observer (MMO) will be onboard for the duration for the geophysical and geotechnical surveys. They will be responsible for advising and ensuring compliance with the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014) for the duration of the SI works. • An appropriately experienced ecologist (onboard the vessel) will (along with standard duties of conducting the environmental surveys) be responsible for reviewing the non-invasive techniques (SSS, multibeam, drop-down video). In addition, information from the geophysical surveys and drop-down video will be reviewed by the project team in advance of any geotechnical investigations to ensure that boreholes are micro-sited to avoid Annex I Reef habitat. • Control measures for the general protection of watercourses and response to environmental incidents and accidents, including requirements for the storage of hazardous and waste construction materials, the usage of spill kits.

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Aspect of the Impact	Assessment of the Impact
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- By adopting the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014), it is proposed that impacts on marine mammals will be reduced to the lowest possible risk to ensure there is no significant risk to marine mammals from impulsive noise and collision.
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Conclusion: With the inclusion of the above best practice methods and mitigation measures, significant effects are not anticipated on biodiversity from the SI works. While marine mammals are likely to be temporarily impacted (temporary avoidance behaviour of the area due to noise from geophysical works), this disturbance will be brief in nature due to the restricted time-frame and limited duration of the works.

8 FISHERIES AND AQUACULTURE

The assessment of the potential impacts arising from the SI works on Fisheries and Aquaculture is presented in Table 8.1

Table 8.1 Assessment of Potential Impacts on Fisheries and Aquaculture

Aspect of the Impact	Assessment of the Impact
Nature of the Impact	<p>The SI works will be conducted wholly within the area outlined in the drawings in Appendix A and covers a total area of 9.27 km².</p> <p>There are four designated shellfish waters within which clams, scallops and oysters are harvested. These areas are the West Shannon Ballylongford (4 km southwest of Moneypoint), West Shannon Carrigaholt (26 km west of Moneypoint), West Shannon Poulnasherry (11 km northwest of Moneypoint), and West Shannon Rinevella (32 km west of Moneypoint). There are three known nursery grounds for commercially important fish species including: cod (<i>Gadus morhua</i>), mackerel (<i>Scomber scombrus</i>) and horse mackerel (<i>Trachurus trachurus</i>) found approximately 16 km to the west of the SI works at the mouth of the Shannon Estuary. The SI works do not overlap these areas. It is anticipated the SI works will not have a significant impact on the nursery grounds for these commercial species.</p> <p>The Lower Shannon Estuary is a busy fishing area with pot and net fishing being the most common methods used within the area. Shrimp, lobster, and crab are caught at Tarbert Harbour (approximately 2 km south-east) and Ballylongford Bay (approximately 2 km south). The SI works do not overlap these areas. The SI works will be localised and small scale relative to vessel activity levels in the Shannon Estuary. Therefore, the SI works are not deemed likely to cause a significant level of disturbance.</p> <p>At the mouth of the Shannon Estuary (approximately 14 km west) and further offshore net-fishing is common but due to the size, scale and localised nature of the SI works significant effects on this inshore fishing activity is not expected.</p> <p>There are 43 aquaculture sites within the Lower Shannon Estuary. As illustrated in the Map 5 (Ref: QS-000339-01-D460-007-005-000), only one aquaculture operation licence (owned by Atlantic Shellfish Limited for Pacific oyster (site ID T08-004BOFO, area 45.5 km²) overlaps slightly with the SI survey area to the west. Other aquaculture sites in close proximity to the SI works include:</p> <ul style="list-style-type: none"> • Pacific Oyster (site ID T08-004BOFO) approximately 2 km to the south-east at Tarbert. • Seven aquaculture sites for blue mussel (Site ID: T06-233) approximately 2 km to the south at Ballylongford Bay. • Two for Pacific Oyster (site ID: T06-331-A and T06-347C) and approximately 5 km to the south at Bunaclugga Bay. • A further 31 Pacific Oyster sites approximately 6 km west of the SI works at Poulnasherry Bay. <p>The SI works involve the removal of very small sediment samples during the environmental and geotechnical surveys (20 benthic sampling stations, 20 sampling/ coring boreholes and 25 vibrocores for geotechnical investigation) this will result in some localised SSC. Localised smothering by deposition from the geotechnical boreholes and positioning of the equipment on the seabed e.g., jack-up barge legs, moorings/or anchors is also possible. Increased SSC can result in excess mortality among oysters (Poirier et al., 2021). The Shannon Estuary is a very busy shipping area handling 1,000 ships carrying 12 million tonnes of cargo (Clare County Council, 2023b), it is a highly turbid environment and any minor increases in SSC due to the SI works will be insignificant against background levels. As the SI works will be localised in nature SSC is expected to be within the immediate vicinity of the works and insignificant relative to background levels. Therefore, no significant effect is expected.</p>

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Aspect of the Impact	Assessment of the Impact
Magnitude and spatial extent of the impact	<p>The SI works do not overlap with any key nursery or spawning grounds for fish species (closest nursery ground approximately 14 km west). Transitory fish species may utilise the Lower Shannon Estuary to migrate to their natal rivers at specific times but relative to background activity levels found within the estuary, magnitude and spatial extent on fisheries is deemed not significant. The spatial extent of potential SSC disturbance on the overlapping aquaculture operations area (T08-004BOFO) is possible and it is therefore recommended that engagement with Atlantic Shellfish Limited is conducted prior to commencement of works. The expected disturbance is deemed insignificant in overall terms, and it will be limited to the immediate environs of the investigation locations. Given the scale and nature of the SI works, the magnitude of impacts on Fisheries and Aquaculture is not deemed significant.</p>
Transboundary nature of the impact	<p>There is not considered to be any risk of transboundary impacts occurring.</p>
Intensity and complexity of the impact	<p>The intensity and complexity of impacts on fisheries and aquaculture arising from the SI works are typical in nature to that of similar types of marine SI works that utilise standard survey techniques, with no novel or complex methodologies. The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations. Adverse impacts will be mitigated by standard management measures (see mitigation measures below). As stated above, transitory species may use the Lower Shannon Estuary to migrate to their natal rivers, but due to the size, location and nature of the SI works, the impacts will not be significant relative to background levels already noted in the estuary. Therefore, the intensity and complexity of impacts on fisheries is deemed not significant. The spatial overlap between the SI works survey area and the aquaculture operations area (T08-004BOFO) can be mitigated by engagement with Atlantic Shellfish Limited prior to commencement of works, reducing the potential for significant impacts.</p>
Probability of the impact	<p>There is the potential for likely significant effects from the SI works due to the survey area overlapping the aquaculture operations area for pacific oyster (site ID T08-004BOFO) to the west due to SSC. However, the probability of impact is low given the nature and scale of the SI works. Engagement with Atlantic Shellfish Limited is recommended. The geophysical works will aid in the micro siting of the geotechnical samples prior to commencing those works and it is expected that areas that may contain pacific oyster trestles will be avoided. With the implementation of best practice methods and mitigation measures residual impacts on fisheries and aquaculture are not deemed to be significant.</p>
Expected onset, duration, frequency, and reversibility of the Impact	<p>The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations, so impacts related to Fisheries and Aquaculture will be brief to temporary in nature. SI activities that contribute to effects on Fisheries and Aquaculture will be carried out in accordance with best practice and mitigation measures (see below) to ensure that no significant effects arise. The SI works relative to the background noise levels and SSC in comparison to the busy shipping area within the Lower Shannon Estuary will be temporary in nature and only for the programme of works.</p>
Cumulation of the impact with the impact of other existing or permitted developments	<p>There are two projects which may have a cumulative impact in combination with the SI works, these include:</p> <ul style="list-style-type: none"> <li data-bbox="355 1720 1445 1809">• The ESB have a foreshore application approved for the installation of an underwater submarine cable across the Lower Shannon Estuary between Moneypoint to Kilpaddoge which was granted in 13/06/2023 and is due to commence construction in 2024; and <li data-bbox="355 1827 1445 1951">• There are several maintenance dredging campaigns along the Shannon Estuary to Foynes e.g., Shannon Foynes Port Company dredging at Limerick docks, the approach channel and at Foynes Port which do not spatially overlap with the project but may do temporally.

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Aspect of the Impact	Assessment of the Impact
	The ESB will liaise with the relevant stakeholders and operators to minimise any in-combination effects. This will reduce the possibility of overlap with the limited timeframe of the SI works, therefore it is not deemed significant.
Possibility of effectively reducing the impact	<p>The potential effects on Fisheries and Aquaculture during the SI works will be reduced by ensuring that best practice methods are followed and standard control measures for prevention of impacts on the environment during the SI works are complied with.</p> <p>Mitigation for Fisheries and Aquaculture includes:</p> <ul style="list-style-type: none"> • Non- invasive techniques (SSS, multibeam, drop-down video) will be analysed to enable micro-siting or avoidance of sensitive sites. • Slow lowering of the equipment through the water column to reduce potential impact plumes from the seabed (SSC) and reduce chances of equipment damage. • Control measures for the general protection of watercourses and response to environmental incidents and accidents, including requirements for the storage of hazardous and waste construction materials, the usage of spill kits.

Conclusion: With the inclusion of the above best practice methods and mitigation measures, significant effects are not anticipated on Fisheries and Aquaculture, from the SI works.

9 AIR QUALITY

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) deals with each Member State in terms of Zones and Agglomerations. For Ireland, four zones (A, B, C and D) are defined in the Air Quality Standards Regulations 2011. The study area is located within EPA Zone D which covers rural Ireland. Air quality in this zone is consistently classed as 'good' as measured by the EPA monitoring network.

Dust from the SI Works are only expected from the land-based investigations, and these will not be significant in terms of the overall industrial nature of the Moneypoint site. There will be greenhouse gas emissions from vessels, plant and machinery associated with the SI works but these are insignificant in comparison to the emissions from the Moneypoint power station which is operating 24/7.

Therefore, the potential for air quality impact from the SI works is not considered significant.

10 NOISE AND VIBRATION

A summary of the assessment of potential impacts from noise arising from the SI works are presented in Table 10.1.

No impacts from Vibration are considered likely and are therefore not considered further in this assessment.

Table 10.1 Assessment of Potential Impacts from Noise

Aspect of the Impact	Assessment of the Impact
Nature of the Impact	<p>The Lower Shannon Estuary is a busy shipping area, and Moneypoint is one of six terminals within the Shannon Estuary. The Shannon Estuary handles up to 1,000 ships carrying 12 million tons of cargo per annum (Clare County Council, 2023b). There are usually between six and eight deliveries per annum accepted at Moneypoint.</p> <p>While there is potential for visual disturbance to bottlenose dolphin and otter due to the presence of marine survey vessels during SI works, it is expected that a maximum of two vessels will be operating at any one time within the survey area. Bottlenose dolphins and otters are likely to be habituated to marine traffic, and the increase in vessel traffic as a result of the SI works is very low and temporary. It is considered highly unlikely that there will be any significant disturbance to marine species as a result of the presence of survey vessels.</p> <p>When assessing the potential impact of underwater noise sources on the marine environment a range of variables such as source level, frequency, duration, and directivity were considered. Increasing the distance from the sound source usually results in attenuation with distance. The factors that affect the way noise propagates underwater include; water column depth, pressure, temperature gradients, salinity, as well as water surface and seabed type and thickness. When sound encounters the seabed the amount of noise/sound reflected back depends on the composition of the seabed, i.e., mud or other soft sediment will reflect less than rock. The water depth at Moneypoint ranges between 20-40m with a mixed substrate type, of muds, sands, coarse gravels, and exposed bedrock. All factors listed above reduce the propagation of the sound, decreasing the zone of influence of the geophysical survey.</p> <p>The active acoustic instruments, such as those proposed for this survey, operate by emitting extremely short pulses and are highly directional. While the swathe of the sonars and echosounders will have a range of 4 to 100m in diameter, many of the sources used for this survey, such as single beam, multibeam and sidescan sonar, operate at high frequency and attenuate quickly as they spread from the source. Coupled with the narrow beam angle illustrated and short duty cycles ('on' for microseconds or milliseconds per second) means that surveying sonars have relatively low acoustic impact.</p> <p>Auditory injury in cetaceans can be defined as a permanent threshold shift (PTS) leading to non-reversible auditory injury, or as a temporary threshold shift (TTS) in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g., to communicate, navigate, locate prey) for a period of minutes, hours, or days. With increasing distance from the sound source, where it is audible to the animal, the effect is expected to diminish through identifiable stages (i.e., PTS or TTS in hearing, avoidance, masking, reduced vocalisation) to a point where no significant response occurs. Factors such as local propagation and individual hearing ability can influence the actual effect (DAHG, 2014).</p> <p>Should the noise levels from sources exceed the thresholds, there is the potential for underwater noise generated during the geophysical survey to result in injury and/or disturbance to bottlenose dolphin in the vicinity of the SI works.</p>
Magnitude and spatial extent of the impact	<p>The noise modelling presented in Appendix B, shows the underwater noise levels from the impulsive sources. The modelling shows that for porpoises (VHF hearing group) the minimal starting range to avoid TTS risk is 3100 m. This range is mainly determined by the sparker. If the sparker output is reduced, the range will be determined by the parametric SBP if used. The HF hearing group (which includes bottlenose dolphins) has minimal starting ranges to avoid TTS at <50 m (or approximately 300 m if using parametric SBP). This range is determined by a sparker if no parametric SBP is used, otherwise the parametric SBP will determine the range.</p>

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Aspect of the Impact	Assessment of the Impact
	Continuous sources (i.e., survey vessels) are shown as almost 20 dB lower than the continuous noise threshold. Taking this and directionality into account there is no significant risk to marine mammals or fish from continuous noise.
Transboundary nature of the impact	There is not considered to be any risk of transboundary impacts.
Intensity and complexity of the impact	The intensity and complexity of impacts of noise arising from the SI works are typical in nature to that of similar types of marine SI works that utilise standard survey techniques, with no novel or complex methodologies. The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations. Adverse impacts will be mitigated by standard management measures (see mitigation measures below). Based on the characteristics and location of the SI works, including the application of mitigation measures, the intensity and complexity of the impacts from underwater noise can be managed to reduce the risk to marine mammals to less than significant.
Probability of the impact	Impacts arising from SI works are deemed to be likely, however these impacts will be minimised with the implementation of best practice construction methods and mitigation measures (outlined below). With the implementation of mitigation measures, residual impacts on biodiversity and species that depend upon them (i.e., other fish, marine mammals) is not deemed significant, however marine mammals may exhibit avoidance behaviour during the active periods of the geophysical SI works. The impacts on marine mammals will be significantly reduced through the implementation of the mitigation measures outlined below.
Expected onset, duration, frequency, and reversibility of the impact	The SI works are anticipated to take place over two phases: 4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations. Noise generating activities will be limited to the survey areas. When a noise source ceases emissions, the impact ceases. Therefore, impacts related to noise will be brief lasting less than 1-day. SI activities that contribute to noise will be carried out in accordance with SI works best practice and mitigation measures (see below) to ensure that impacts will be minimised.
Cumulation of the impact with the impact of other existing or permitted developments	<p>There are two projects which may have a cumulative impact in combination with the SI works, these include:</p> <ul style="list-style-type: none"> • The ESB have a foreshore application approved for the installation of an underwater submarine cable across the Lower Shannon Estuary between Moneypoint to Kilpaddoge which was granted in 13/06/2023 and is due to commence construction in 2024. • There are several maintenance dredging campaigns along the Shannon Estuary to Foynes e.g., Shannon Foynes Port Company dredging at Limerick docks, the approach channel and at Foynes Port which do not spatially overlap with the project but may do temporally. <p>The ESB will liaise with the relevant stakeholders and operators to minimise any in-combination effects. This will reduce the possibility of overlap with the limited timeframe of the SI works, therefore it is not deemed significant.</p>
Possibility of effectively reducing the impact	<p>The potential effects of noise during the SI works will be reduced by ensuring that best practice methods are followed and standard control measures for prevention of impacts on the environment during the SI works are complied with.</p> <p>Mitigation for noise includes:</p> <ul style="list-style-type: none"> • A suitably qualified and experienced marine mammal observer (MMO) will be onboard for the duration for the geophysical and geotechnical surveys. They will be responsible for advising and ensuring compliance with the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014).

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Aspect of the Impact	Assessment of the Impact
	<ul style="list-style-type: none">Any equipment used should not exceed the modelled equipment broadband levels (see Appendix B, (Table 4.1) or band-wise levels for overall levels (Figure 4.1 and Figure 4.2)).

Conclusion: With the inclusion of the above best practice methods and mitigation measures, significant effects are not anticipated from noise and vibration from the SI works.

11 LANDSCAPE AND SEASCAPE

The SI works include both marine and land-based SI works. As outlined in Section 2.2.7, the land-based SI works have been previously consented by Clare County Council (planning reference: P23/32, decision dated 18th April 2023). The extent of the marine SI works are described in Section 2 and illustrated in the drawings in Appendix A.

The Shannon Estuary area in the vicinity of Moneypoint can be considered of “Poor” Landscape Quality as it contains frequent and prominent industrial features (Moneypoint and Tarbert power stations) with very few valued features and is degraded in character. Therefore, it has a low sensitivity to change,

In terms of the seascape, vessels associated with the geophysical survey will be present in the Shannon Estuary for a period of 4-6 weeks. As the Shannon Estuary is already a busy shipping area, there is no likely significant effects on the seascape from vessels.

Within the ESB owned foreshore, vessels, and possibly a jack-up-barge, will be present for the duration of geophysical and geotechnical investigations. In terms of the existing visual impact of the Moneypoint power station, these vessels will have no likely significant effects on the seascape.

The metocean equipment (e.g., ADCP and underwater noise recorders) will have location buoys attached to highlight their presence close to Moneypoint and within the ESB owned foreshore but this is not deemed significant.

The SI works are temporary in nature and fully reversible in terms of landscape and seascape impacts and effects. Considering the limited nature, scale, size, and duration of the SI works, particularly in the context of the existing Moneypoint power station and industrial nature of the site, there will be no likely significant effects on landscape and seascape.

12 SHIPPING AND NAVIGATION

The Lower Shannon Estuary is a busy shipping area that handles up to 1,000 ships carrying 12 million tons of cargo per annum (Clare County Council, 2023b). There are usually between six and eight deliveries per annum accepted at Moneypoint.

Including Moneypoint, the Shannon Estuary has six facilities to accommodate all types and sizes of vessel, the other terminals being Tarbert, Foynes, Limerick Docklands, Aughinish and Shannon Airport. The Tarbert Oil Terminal is located approximately 1.7nm from the current Moneypoint Jetty which imports heavy fuel oil for use at the Tarbert Power Station. The terminal can accommodate tankers of up to 250 m length and 14m draught. Other ports of importance in the Shannon Estuary include Cappa located approximately 3.3 nm northwest of the existing Moneypoint Jetty in the Kilrush Channel with facilities comprising a pier for use by general cargo vessels of up to 85 m length and 4.5 m draught. There is also the Kilrush Marina located adjacent to the Cappa pier which has 120 berths.

In addition, there are five designated anchorage areas located on the northern side of the channel 1.6-3.0 nm to the west of the Moneypoint Jetty designated M, N, O, P and R. These anchorages are suitable for coaster vessels with anchorage P being designated for tankers.

The survey area is located on the northern side of the navigational channel which has depths of 30m or greater through the shipping and navigation study area except for the Bridge which is in the centre of the channel near the Moneypoint Jetty comprising a shallower bank at 16.3 m depth of water below Chart Datum.

Tides in the Shannon Estuary are influenced by the prevailing weather conditions. In south to west winds there is an increase in the tidal height whilst a decrease in the tidal height when north to east winds are experienced. The tidal range in the estuary is on average 4.5 m and tidal currents run on average 2-3 knots in a north-easterly/south-westerly orientation, the strongest tidal currents are experienced on the spring ebb in the lower region of the estuary. The prevailing winds experienced on the Shannon Estuary are from the west and southwest. On average the region experiences winds of gale force and above on average ten days annually. The local topography provides shelter from northerly and southerly winds.

A Vessel Traffic Service is not provided for the Shannon Estuary however there are three radars located at Loop Head, Kilcredaun Head and Tarbert Point. This allows the Shannon Foynes Port Company to monitor vessel traffic through the area. Pilotage is mandatory for all vessels over 50GT navigating eastwards of Scatterry Island with four Pilot boarding stations for differing sizes and tonnages of vessel. Pilot boarding station 4 is located 2 nm west of the existing Moneypoint Jetty which is used for vessels under 5000GT.

A study was undertaken for the Shannon LNG project (2021), looking at vessel transits in the vicinity of Ardmore Point using AIS data. During 2019, there were 1,612 transits (4.4/day). These included 212 tanker transits (0.6/day) and 1,230 dry cargo transits (3.4/day). There were three passenger ship calls in 2019, including the 198 m Seabourn Quest and the 203m Prinsendam. The Shannon Ferry Group operates a car ferry between Killimer and Tarbert. Recreational vessels are not necessarily required to carry AIS but are known to be seasonally active in the shipping and navigation study area. A variety of tugs, workboats and other small craft transit passed Moneypoint, with 137 transits recorded in 2019. Fishing activity was shown to be minimal in the shipping and navigation study area, and principally creel fishing for shrimp and lobsters. The majority of vessel transits proceeded through the main deep-water channel with a small number of vessels transiting closer to the shore.

For the duration of the limited survey period (4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations), It is expected that a maximum of two vessels would be operating at any one time within the survey area. Due to the nature of the surveys, the vessels would be stationary, or travelling at low speeds (<5 kts).

The location of the survey area to the north of the main River Shannon Shipping channel ³, limited duration of the surveys and vessel numbers will not pose a navigational risk to other vessels using the Lower Shannon Estuary or transiting through to other ports and harbours.

³ https://eoceanic.com/sailing/routes/30/river_shannon_overview

13 CULTURAL HERITAGE (INCLUDING UNDERWATER ARCHAEOLOGY)

Recorded losses represent maritime and aviation losses that are known to have occurred in the vicinity but to which no specific location can be attributed. Recorded losses are often grouped with reference to a geographic, hydrographic, or other point of reference, making the positional data of these records unreliable. However, they do provide information on the historical marine traffic of the general region and therefore the archaeological potential. Recorded losses may be attributed to unknown anomalies identified by the geophysical survey or they may be positioned outside SI works area.

Geophysical surveys will be undertaken in advance of any intrusive geotechnical investigations. This will allow for the identification of any underwater archaeological features of interest including the potential for dive surveys if deemed necessary. Any areas identified as having cultural heritage significance will be avoided for the geotechnical investigations.

Any wrecks located within the study area that are more than 100 years old are protected under the National Monuments Act which states that “*a person shall not dive on, damage, or generally interfere with, any wreck which is more than one hundred years old*” and that a licence needs to be sought from the Minister for Culture, Heritage and the Gaeltacht in order to survey shipwrecks over 100 years old and/or those that are protected by legislation.

There are six confirmed records of wrecks within the Lower Shannon Estuary, all of which are located outside the SI works area, to the west and south-west. At present there are no Underwater Heritage Orders or recorded wrecks located within SI works area. Therefore, no likely significant impact on cultural heritage including underwater archaeology) is expected.

14 POPULATION AND HUMAN HEALTH

The SI works will have no appreciable impact on population (e.g., demographics) and human health (PHH). The SI works will involve the use of a variety of vessels and associated machinery on-site. This may give rise to brief and/or temporary impacts on some human receptors from noise and light. The noise associated with the SI works has the potential to impact on neighbouring properties for the duration of the works. Similarly, lights from vessels associated with the SI works may be visible from onshore receptors. Given that the Moneypoint Generation Station is an industrial site that is licenced to operate 24 hours a day seven days a week, and that the Shannon Estuary is already a busy shipping route, the nature of the impact on PHH is not considered significant.

There is potential for slight positive effects within the Shannon region and wider environs, associated with a temporary increase in the use of ancillary support services at a local and regional level in the supply of services and technical professions. This is considered a slight local positive effect of a temporary nature.

15 MAJOR ACCIDENTS AND DISASTERS

Seveso sites are industrial sites regulated under what is commonly referred to as the “Seveso Directive.” In Ireland, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the “COMAH Regulations”), implement the Seveso III Directive (2012/18/EU). Seveso sites are categorised as Lower, or Upper, by the type and quantity of hazardous substances stored at the site. The Health and Safety Authority (HSA) maintain a list of active Seveso sites within Ireland.

Moneypoint power station is an Upper Tier Seveso site. The following major hazards have been identified:

- Release of dangerous substances with potential for adverse environmental effects;
- Fire; and
- Fire and explosion.

While the SI works will be taking place adjacent to the power station they will be wholly within the marine environment where no potential impacts have been identified. Therefore, the potential for major accidents and disasters to arise from the SI works is not considered likely.

16 CLIMATE

The impacts on climate from the SI works relate to greenhouse gas (GHG) emissions from vessels and personnel transport. As outlined in Section 2, the SI works are of a relatively short duration (4-6 weeks for geophysical surveys and environmental sampling and 2-3 months for geotechnical investigations). It is expected that a maximum of two vessels would be operating at any one time within the SI survey area (9.27 km²). The survey vessels will be travelling at low speeds (<5 kts) or stationary within the survey area. Therefore, due to the small footprint of the project and limited vessel use, the impacts on climate from the SI works are deemed to be not significant.

17 WASTE

The SI works do not involve any demolition or removal of structures, so no demolition waste will be produced. Waste arising from the SI works will be managed on the vessels used for the surveys. Waste materials are limited to those produced on the vessel. Quantities will vary depending on the vessel. Likely materials will include bilge water, oily residues (sludge), sewage (black water), greywater, plastics, food wastes, domestic wastes, cooking oil, operational wastes, cargo residues, other non-common waste streams (e.g., ballast water) (EMSA/OP/02/2016).

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. All vessels will be required to manage waste in accordance with the accepted EU and international standards. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended, including the requirements of the International Convention on the Prevention of Pollution from Ships (MARPOL Convention). These include the Sea Pollution Act, 1991, 1999, 2005 and 2006, the Dumping at Sea Act 1996, the European Communities (Port Reception Facilities for Ship-Generated Waste and Cargo Residues) Regulations 2003 (S.I. No. 117 of 2003), the Sea Pollution (Prevention of Pollution by Garbage from Ships) Regulations 2012 (S.I. No. 372/2012) and Sea Pollution (Prevention of Pollution by Sewage from Ships) (Amendment) Regulations 2012 (S.I. No. 492/2012), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations. Each Port will also have a Port WMP which must be abided by and if waste is taken ashore the Waste Management Act 1996 (as amended) will apply.

If unforeseen waste or hazardous material is encountered during the Project, the appropriate authorities will be notified, and the material will be deposited at an appropriate waste facility.

18 MATERIAL ASSETS

The SI works will be conducted wholly within the area outlined in the drawings in Appendix A covering a total area of 9.27 km². The Lower Shannon Estuary is a busy shipping area handling up to 1,000 ships and 12 million tonnes of cargo per annum (Clare County Council, 2023b). There is no sailing, racing or recreational boating routes, shore angling, surfing and recreational diving sites within the SI works area so therefore potential adverse effects on recreational activities is expected to be negligible.

There are harbours and marinas close by, e.g., Killimer Ferry Port is located approximately 2 km to the east and Kilrush Marina is located approximately 5 km to the west. As stated above, there will be a maximum of two vessels operating at any one time. Therefore, relative to the background levels of shipping traffic in the Lower Shannon Estuary, the increase in vessel traffic due to the SI works is considered negligible.

There are 400 kV, 220 kV and 110 kV power lines radiating from Moneypoint but as these are onshore, they are outside the scope of the SI works listed above and no impact is expected.

There are two landfill areas onshore at Moneypoint which are not hydrologically connected to the SI works.

Within the estuary there is the existing Moneypoint-Kilpaddocke 220 kV submarine cable running roughly north to south from just east of the existing jetty at Moneypoint to connect to Kilpaddocke on the south side of the estuary. The geophysical survey area extends over the route of these cables but will have no impact on the operation of those cables.

With no interaction between the SI works and existing materials assets, there is no likelihood of significant impacts.

19 INTERACTIONS

Other marine projects could potentially give rise to either direct impacts on habitats or species (loss of habitat, disturbance to species) or indirect impacts (e.g., activities which could affect water quality or hydrology which could in turn affect the status/health of populations of water dependant habitats or species).

The nature of the SI works is temporary and limited in scale. There will be no permanent land take and no continuous emissions or discharges arising from the SI works.

For all projects considered as part of this assessment, in-combination effects are possible due to the spatial and/or temporal overlap for some of the offshore marine SI works. As some of these projects are still at the applied stage and are awaiting a granted licence, if consent is granted in the near future for these projects the ESB will liaise with the relevant operators and stakeholders to minimise any in-combination effects.

19.1 Cross Shannon Cable Project

The Cross Shannon Cable Project is a submarine cable that will link the electricity substation at Kilpaddoge in North Kerry to the Moneypoint Generation Station in Clare. Planning permission was granted by An Bord Pleanála in June 2021 and the foreshore license executed in June 2023. It is planned to construct the Cross Shannon Cable project in 2024, with it being energised in 2025.

When construction and laying of the cable commences in 2024, there is the potential for interactions with the SI works. However, given that the SI works will involve a small number of vessels over a much wider geographical area, the SI works can be scheduled so as to avoid any impacts on the construction activities for the cable. Similarly, it is expected that geotechnical SI works within the ESB owned foreshore can be undertaken at a time and in a manner that will avoid interaction with the construction of the cable at the landfall in Moneypoint.

The ESB will liaise with the Cross Shannon Cable Project team to mitigate any potential for impacts.

19.2 Dredging

Dredging occurs in certain areas of the Shannon Estuary from time to time. Applications for dredging are made to the MARA and previously the Foreshore Unit of the Department of Housing. In advance of dredging operations, marine notices are published to advise mariners and shipping on the timing, duration, and extent of operations.

ESB will liaise with the appropriate authorities to ensure that the SI works do not interact with dredging activities.

19.3 Consented Onshore Site Investigations

In January 2023, ESB applied to Clare County Council for planning permission for the onshore site investigation works at Moneypoint Generating Station.

The land-based SI works comprise the drilling of boreholes and excavation of trial pits at various locations cross the site above the High-Water Mark. The investigation aims to determine the sub surface strata and composition of the ground and the level of rockhead (including follow on coring to confirm rock head).

It is proposed that approximately 26 borehole stations and shallow exploratory investigations will be undertaken. The methods to be employed during the investigation works are borehole cable percussive, borehole rotary core and trial pits. It is anticipated that the maximum depth of the boreholes will be 20m. Trail pits are anticipated to be a maximum of 4.5m deep.

Planning permission for the onshore site investigation works was granted by Clare County Council on 18th April 2023. The expiry date of the grant is 17th April 2028.

20 SUMMARY OF MITIGATIONS

Certain aspects do not require mitigation due to the nature of the works or ultimately lack of interaction with the feature, these include; land and soils, air quality, landscape and seascape, shipping and navigation, cultural heritage, population and human health, major accidents and disasters, climate, waste, and material assets.

The potential for likely significant effects from the SI works will be reduced by ensuring that best practice methods are followed and standard control measures for prevention of impacts on the environment are complied with. These mitigation measures include:

- Slow lowering of the equipment through the water column to reduce potential impact plumes from the seabed and reduce chances of equipment damage.
- Control measures for the general protection of watercourses and response to environmental incidents and accidents, including requirements for the storage of hazardous and waste construction materials, the usage of spill kits.
- Procedures for fuel and/or chemical handling and storage are to be developed. Handling and storage areas will be located on an impervious area with a bunding facility capable of handling spills.
- Non-invasive techniques (SSS, multibeam, drop-down video) will be assessed by the project team to enable micro-siting or avoidance of any sensitive underwater features, including shellfish areas, Annex 1 habitats, and underwater archaeological features.
- A suitably qualified and experienced marine mammal observer (MMO) will be onboard for the duration for the geophysical and geotechnical surveys. They will be responsible for advising and ensuring compliance with the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014).
- Equipment used should not exceed the modelled broadband levels detailed in Appendix B.
- Machinery will be fitted where possible with noise reducing features and where not possible, noise screens will be used if appropriate.
- Machinery will be turned off when not in use and will be regularly maintained to limit the noise emissions from the vessel(s).
- The ESB will liaise with the relevant operators, developers, and promoters of other projects that may have an interaction with the SI works and seek to agree measures to avoid and/or mitigate any likely significant environmental impacts.

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Appendix A

Drawings

Appendix B

Subsea Noise Technical Report