



Eastern Green Link 2 - Marine Scheme

Environmental Appraisal Report Volume 2

Chapter 18 - Summary and Conclusions

nationalgrid



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18. Summary and Conclusion

18.1 Introduction

This chapter of the Environmental Appraisal Report (EAR) presents a summary of the environmental appraisal undertaken for Eastern Green Link 2 Marine Scheme.

The Marine Scheme extends from Mean High Water Springs (MHWS) at the Scottish landfall within Sandford Bay, to MHWS at the English landfall at Fraisthorpe Sands on the East Riding of Yorkshire coast.

The Marine Scheme comprises a corridor of approximately 436 km length and 500 m maximum width within which the cables will be installed (hereinafter referred to as the 'Marine Installation Corridor').

The Marine Installation Corridor is measured through a series of kilometre points (KPs) which extend from kilometre point (KP) 0, at the Scottish landfall, to KP436, at the English landfall. The Marine Scheme activities cover the following phases: Installation, Operation and Maintenance and Decommissioning. Detailed descriptions of each of the Marine Scheme phases can be found in Chapter 2: Project Description.

A summary and conclusion of Chapter 7 to Chapter 16 of the EAR, which present the baseline conditions, appraisal of the likely significant environmental effects resulting from the Marine Scheme, and proposed measures to mitigate those effects are as follows:

18.2 Physical Environment

Chapter 7: Physical Environment of the EAR appraises the potential interaction of the Marine Scheme with the physical environment.

Baseline

The appraisal establishes a baseline of marine geology and sediments, oceanographic conditions (comprising waves, currents and tides) and water quality. This includes consideration of key features and sensitivities such as Smithic Bank and the Holderness coastline, as well as relevant designated sites.

Embedded Mitigation

Embedded mitigation measures have been identified to minimise potential interactions of the Marine Scheme with the physical environment; this is discussed in further detail within Chapter 7: Physical Environment and includes the production of the Construction Environmental Management Plan (CEMP) including an Emergency Spill Response Plan (ESRP), a Waste Management Plan which will be developed and agreed with relevant stakeholders, use of biologically inert drilling fluids during HDD installation and micro-routeing within the Marine Installation Corridor (informed by pre-installation evaluation of site-specific survey data) to avoid or minimise localised engineering and environmental constraints.

Potential Impacts

The potential impacts on the physical environment are seabed disturbance, increases in suspended sediment concentrations (SSC), alteration of seabed morphology, changes in water quality, changes to coastal processes and coastal erosion. No significant effects of these impacts were identified, after consideration embedded mitigation and the localised nature of the proposed works.

Project Specific Mitigation

It is not considered that any additional project specific mitigation and monitoring measures will be required during Installation, Operation and Maintenance and Decommissioning Phases.

Conclusions

During all three phases (Installation, Operation and Maintenance and Decommissioning), the residual effects are reported as between **negligible** and **minor**, which are **not significant**.

18.3 Benthic Ecology

Chapter 8: Benthic Ecology of the EAR appraises the potential interaction of the Marine Scheme with subtidal benthic ecology.

Baseline

The appraisal establishes a baseline of subtidal benthic ecology, protected habitats and species of conservation importance including Annex I reefs, cryptogenic species, non-native species and relevant designated sites.

Embedded Mitigation

Embedded mitigation measures have been identified to avoid and / or minimise impacts on benthic ecology receptors. These measures include micro-siting of the cable to avoid sensitive areas of the seabed and the selection of the Marine Installation Corridor to optimise the balance of environmental, technical, commercial and financial considerations. This will involve avoiding designated sites, detailed route development and micro-routeing within the Marine Installation Corridor (informed by pre-installation evaluation of site-specific survey data) to avoid or minimise localised engineering and environmental constraints, and the production of the CEMP including an ESRP.

Potential Impacts

The potential impacts of the Marine Scheme on benthic ecology are temporary physical disturbance to, or permanent loss of, subtidal benthic habitats and species, temporary increase in SSC and sediment deposition, changes to water quality, changes in electromagnetic fields (EMF) and accidental introduction of invasive non-native species. No significant effects were identified when considering the embedded mitigation and localised and nature of proposed works.

Project Specific Mitigation

No additional project specific mitigation and monitoring measures will be required during Installation, Operation and Maintenance and Decommissioning Phases.

Conclusions

The appraisal concluded that residual effects will range from **Negligible** to **Minor**, which are **not significant**.

18.4 Fish and Shellfish Ecology

Chapter 9: Fish and Shellfish Ecology of the EAR appraises the potential interaction of the Marine Scheme with fish and shellfish ecology.

Baseline

The appraisal establishes a baseline of general fish and shellfish communities, diadromous fish, spawning and nurse grounds, relevant designated sites and species, commercial fisheries (from an ecological perspective) and species-specific information.

Embedded Mitigation

Embedded mitigation measures identified to avoid and / or minimise impacts to fish and shellfish ecology receptors. These include micro-siting of the cable to avoid sensitive areas of the seabed and the selection of the Marine Installation Corridor to optimise the balance of environmental, technical, commercial and financial considerations, such as avoiding designated sites, detailed route development and micro-routeing to be undertaken within the Marine Installation Corridor, informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, and the production of the CEMP including an ESRP.

Potential Impacts

The potential impacts of the Marine Scheme on fish and shellfish ecology are temporary physical disturbance to, or permanent loss of, habitats and species, temporary increase in SSC and sediment deposition, changes to marine water quality, vessel collision, changes to EMF, thermal changes and

underwater sound effects. No significant effects were identified when considering the embedded mitigation and localised and nature of proposed works.

Project Specific Mitigation

No additional project specific mitigation and monitoring measures will be required during Installation, Operation and Maintenance and Decommissioning Phases.

Conclusions

The appraisal concluded that residual effects will range ranging from **Negligible** to **Minor**, which are **not significant**.

18.5 Marine Mammals

Chapter 10: Marine Mammals of the EAR appraises the potential interaction between the Marine Scheme and marine mammals.

Baseline

The appraisal establishes a baseline of two groups of marine mammals occurring in UK waters, namely cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals).

A total of 28 cetacean species have been observed, most commonly harbour porpoise, bottlenose dolphin, white-beaked dolphin and minke whale, and two species of seal (harbour seal and grey seal) are present in UK waters; however, most are occasional visitors and within the Greater North Sea Ecoregion¹.

Embedded Mitigation

The embedded mitigation measures for marine mammals include the JNCC guidelines (2017) for minimising the risk of injury in marine mammals from geophysical surveys when using sub-bottom profilers (SBP) and the Scottish Marine Wildlife Watching Code (SMWWC). The mitigation measures will be included in a Marine Mammal Protection Plan (MMPP), as part of the CEMP developed for the Project.

Potential Impacts

The potential impacts of the Marine Scheme on marine mammals include underwater sound, changes in water quality and vessel and marine mammal collision risk. No significant effects were identified when considering the embedded mitigation and localised and nature of proposed works.

Project Specific Mitigation

No additional project specific mitigation and monitoring measures will be required during installation, operation (including maintenance and repair) and decommissioning phases.

Conclusions

The appraisal concluded that residual effects will be **Minor**, which are **not significant**.

18.6 Ornithology

Chapter 11: Ornithology of the EAR contains an appraisal of the potential interaction of the Marine Scheme and ornithology.

Baseline

The appraisal establishes a baseline of breeding, migratory and over-wintering populations of seabirds and waterbirds using the intertidal area and offshore waters.

Embedded Mitigation

Embedded mitigation measures have been incorporated into the design of the Marine Scheme to avoid and minimise effects on marine ornithological receptors. This includes a commitment to be included

¹ The Greater North Sea ecoregion includes the North Sea, English Channel, Skagerrak, and Kattegat

within the CEMP to ensure that transiting vessels move at low speeds allowing any rafts of birds to disperse naturally well in advance of an approaching vessel, minimising vessel lighting and following the SMWWC.

Potential Impacts

The potential impacts of the Marine Scheme on ornithology include temporary physical disturbance and displacement of species associated with sound, visual effects and presence from vessel and construction activity, changes in prey availability, and alteration of water quality due to unplanned releases, accidental leaks and spills from vessels. No significant effects were identified when considering the embedded mitigation and localised and nature of proposed works.

Project Specific Mitigation

No additional project specific mitigation and monitoring measures will be required during Installation, Operation and Maintenance and Decommissioning Phases.

Conclusions

The appraisal concluded that residual effects will range from **Negligible** to **Minor**, which is **not significant**.

18.7 Marine Archaeology

Chapter 12: Marine Archaeology of the EAR appraises the potential interaction of the Marine Scheme with the known and potential marine archaeology and cultural heritage resource below MHWS.

Baseline

The appraisal establishes a baseline of seabed prehistory, seabed features (maritime and aviation), marine recorded loses and intertidal heritage potential.

Embedded Mitigation

Embedded mitigation measures have been incorporated into the design of the Marine Scheme to avoid and minimise effects on marine archaeology and cultural heritage resources. These measures include pre-installation surveys to inform detailed engineering and cable installation planning. They will focus on collection of detailed information within the preferred route for each of the cables, all within the marine installation corridor. They will confirm the absence or presence of any new obstructions or significant changes to seabed conditions and bathymetry, and also help to inform detailed unexploded ordnance (UXO) assessment.

Potential Impacts

The potential impacts of the Marine Scheme on marine archaeology include direct and indirect damage to known and unknown maritime and aviation receptors, as well as potential seabed feature assets such as seabed prehistory receptors and geophysical anomalies of possible anthropogenic origin.

In some cases, the application of appropriate project specific mitigation, such as an archaeological investigation of seabed anomalies (as discussed below) prior to could lead to effects of minor to moderate beneficial significance.

Project Specific Mitigation

The following project specific mitigation measures have been recommended for marine archaeology:

- Further investigation by means of geoarchaeological assessment of geotechnical samples;
- Implementation of Written Scheme of Investigation (WSI);
- Avoidance and protection of known archaeological assets will be achieved through the implementation and monitoring of Archaeological Exclusion Zones (AEZs);
- Further investigation through potential opportunities, where possible, for diver or ROV survey; archaeological watching briefs during clearance of A2s;
- Implementation of WSI (and any supporting activity Method Statements); and

- Implementation of Protocol of Archaeological Discoveries (PAD) for any archaeological discoveries.

Conclusions

The marine archaeology appraisal concluded that all residual effects will be **Negligible**, which is **not significant**.

18.8 Shipping and Navigation

Chapter 13: Shipping and Navigation of the EAR appraises the potential interaction of the Marine Scheme with shipping and navigation. It constitutes a full Navigational Risk Assessment (NRA) including Marine Traffic Survey (MTS) and Formal Safety Assessment (FSA).

Baseline

The appraisal establishes a baseline of key navigational features, emergency response, maritime incidences, and marine traffic.

Embedded Mitigation

Embedded mitigation measures have been incorporated into the design of the Marine Scheme to ameliorate each identified impact. These include guard vessels using RADAR with Automatic RADAR Plotting Aid (ARPA) to monitor vessel activity, a temporary 500 m Recommended Clearance Zone will be established around all vessels associated with the works and predict possible interactions, issuing a Notice to Mariners (including Kingfisher Bulletins) and using AIS Broadcast at all times, to mitigate against the potential for vessel-to-vessel collision.

Potential Impacts

The potential impacts of the Marine Scheme on shipping and navigation include vessel-to-vessel collision, deviation from established vessel routes and areas, interaction with vessel anchors and anchoring activity and interaction with fishing gear. Where risks were not considered ALARP ('as low as reasonably possible'), additional risk reduction measures have been put in place (see below).

Project Specific Mitigation

Project specific mitigation is also proposed, including:

- Minimising the duration between cable laying and associated trenching and protection works insofar as is practicable, to minimise the period when exposed cables are present on the seabed;
- Establishment of High Traffic Density Specific procedures;
- Liaison with Peterhead Port Authority;
- Minimisation of duration of exposed / unprotected cable;
- Dissemination of as built information regarding locations of external protection with fisheries stakeholders;
- Consultation with MCA regarding compass deviation; and
- Planning of maintenance activities on a case by case basis and in line with best industry practice to minimise collision risk.

Conclusions

Following the implementation of the project specific mitigation measures the residual risks, from all phases of the Marine Scheme, can be considered **ALARP**.

18.9 Commercial Fisheries

Chapter 14: Commercial Fisheries of the EAR appraises the potential interaction of the Marine Scheme with commercial fisheries.

Baseline

The appraisal establishes a baseline of commercial fishing activities within the International Council for the Exploration of the Sea (ICES) Division IVb (Central North Sea), including scallop dredge fishery, lobster and crab fishery, and squid fishery.

Embedded Mitigation

A range of embedded mitigation measures have been proposed such as the development of a Fisheries Liaison and Co-existence Plan (FLCP)² in consultation with fisheries stakeholders and the appointment of a Fisheries Liaison Officer.

Potential Impacts

During the Installation Phase of the Marine Scheme, the potential impacts include temporary loss or restricted access to fishing grounds, displacement of fishing activity into other areas, interference with fishing activities, snagging risk (loss or damage to fishing gear) and impacts on target species for commercial fisheries. Impacts to static fishing gear were assessed as moderate during Installation, while during the Operation and Maintenance Phase of the Marine Scheme the potential impacts are the same, but instead, long-term impact on fishing grounds are considered.

Project Specific Mitigation

During the Operation and Maintenance Phase project specific mitigation is required for commercial fisheries relating to where static gear may be removed or relocated. Appropriate mitigation will be implemented for affected vessels following an evidence-based approach, in line with Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) guidance which will reduce the significance of the impact to **Minor**, which is **not significant**.

Conclusions

The commercial fisheries appraisal concluded with residual effects appraised as **Negligible to Minor**, which are **not significant**.

18.10 Other Sea Users

Chapter 15: Other Sea Users of the EAR appraises the potential interaction of the Marine Scheme with other sea users.

Baseline

The appraisal establishes a baseline of marine recreational activities (including recreational boating and fishing, scuba diving, kayaking, paddleboarding and canoeing, surfing, windsurfing and kite surfing and open water swimming), offshore wind farms, pipeline and cable crossings, oil & gas operations, dredging and disposal sites, aquaculture and other developments.

Embedded Mitigation

Embedded mitigation measures have been built into the Marine Scheme to avoid and / or minimise impacts to other sea users. This includes the establishment of a temporary 500 m Recommended Clearance Zone and Proximity and Crossing Agreements will be agreed with cable and pipeline owners.

Potential Impacts

The potential impacts of the Marine Scheme on other sea users are disruption to marine recreational users, disruption to other sea users and offshore infrastructure and the risk of damage to or interference with a third-party cable or pipeline asset.

Project Specific Mitigation

No project specific mitigation measures or monitoring for other sea users have been recommended.

² Note that this will be a single document that will perform the role of other fisheries liaison plans, for instance, a Fisheries Management and Mitigation Strategy.

Conclusions

Following implementation of appropriate mitigation measures set out in this chapter; the other sea users' appraisal concluded that all residual effects would be **Negligible** and therefore **not significant**.

18.11 Cumulative and In-combination Effects

Chapter 16: Cumulative and In-Combination Effects of the EAR appraises the potential interaction of the Marine Scheme with other projects / plans, and in-combination effects (where receptors could be affected by more than one environmental impact).

Long list

The appraisal has been based on the best available data from other plans, projects, marine activities, and associated information that is currently in the public domain or has been provided to the Marine Scheme. A long list of other developments within a study area of 20 km of the Marine Scheme was established, and each development screened for its potential spatial or temporal overlap with the Marine Scheme.

Short list

Where there was potential for potential spatial or temporal overlap these developments were shortlisted and taken forward for cumulative appraisal and comprise:

- Green Volt Floating Offshore Wind Farm Export Cable;
- ScotWind Offshore Wind Proposed Site 6 (ScotWind Plan Option E3);
- ScotWind Offshore Wind Proposed Site 1 (ScotWind Plan Option E1);
- Potential for the implementation of closures to commercial fishing within the Firth of Forth Banks Complex Marine Protection Area;
- Seagreen 1A (Bravo) Offshore Wind Farm;
- Berwick Bank Offshore Wind Farm;
- Dogger Bank C Export Cable / Sofia Export Cables;
- Northern Endurance Partnership (NEP) CO2 Pipelines (Teesside and Humber); and
- Hornsea Project Four (HOW04) Offshore Wind Site Export Cable;

Appraisal

Each shortlisted development was screened for potential impact pathway interactions for each technical chapter of this EAR and the impact pathway either included or excluded from further appraisal.

Mitigation and conclusions

No project specific mitigation measures have been recommended. The outcomes of the cumulative effects appraisal ranges between **Negligible** to **Minor** effects which are **not significant**.

In-combination effects

In-combination effects are where receptors could be affected by more than one environmental impact. Where a receptor has been identified as only experiencing one effect, or where only one topic has identified effects on that receptor, there is no potential for in-combination effects. The receptor groups within this EAR do not interact between chapters, therefore receptors have been wholly appraised within their respective topic chapter and therefore, in-combination effects have not been identified within this appraisal.

18.12 Summary of Significant and Residual Effects

Table 18-1 provides a summary of the identified residual effects associated with the Installation, Operation and Maintenance and Decommissioning Phases of the Marine Scheme. There are no significant residual effects.

Table 18-1: Summary of Significant and Residual Effects

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect
Installation								
Physical Environment	Seabed Morphology	Changes to seabed features in water depths >10 m	Low	Low	Negligible	None required	Low	Not significant
		Changes to seabed bathymetry and morphology in shallow water depths	Low	Low	Negligible	None required	Low	Not significant
		Increased suspended sediment	Low	Low to medium	Negligible to minor	None required	Low to medium	Not significant
	Flamborough Head SAC	Changes to physical environment – features of interest	Low	Low	Negligible	None required	Low	Not significant
	Firth of Forth Complex MPA		Low	Low	Minor	None required	Low	Not significant
	Smithic Bank		Medium	Low	Minor	None required	Low	Not significant
	Holderness Coast		Medium	Low	Minor	None required	Low	Not significant
	Release of HDD drilling fluids	Reduction in water quality	Low	Low	Negligible	None required	Low	Not significant
	Mobilisation of contaminants		Low	Low	Negligible	None required	Low	Not significant
	Discharges, leaks and spills from vessels, including loss of oils		Low	Low	Negligible	None required	Low	Not significant
Benthic Ecology	Annex I Reefs	Temporary physical disturbance to subtidal benthic habitats and species	Medium	Low	Minor	None required	Low	Not significant
	Seapens and burrowing megafauna		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Subtidal sands and gravels		Low	Negligible	Negligible	None required	Negligible	Not significant
	Annex I Sandbanks		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Ocean quahog		High	Negligible	Negligible	None required	Negligible	Not significant
	Annex I Reefs	Temporary increase in SSC and sediment deposition leading to contaminant mobilisation, turbidity and smothering effects	Low to Medium	Negligible to Low	Negligible	None required	Negligible	Not significant
	Seapens and burrowing megafauna		Low	Low	Negligible	None required	Negligible	Not significant
	Subtidal sands and gravels		Low	Negligible	Negligible	None required	Negligible	Not significant
	Annex I Sandbanks		Low	Negligible	Negligible	None required	Negligible	Not significant
	Ocean quahog		Low	Low	Negligible	None required	Negligible	Not significant
	All benthic habitats and species	Changes to marine water quality from the use of HDD drilling fluids, contaminant mobilisation and accidental spills from vessels, including loss of fuel oils and INNS	Negligible to high	Unlikely / Low	Negligible / Minor Risk	None required	Unlikely / Low	Not significant
Fish and Shellfish Ecology	Herring	Temporary physical disturbance to fish and shellfish habitats and species during cable lay	Medium	Low	Minor adverse	None required	Low	Not significant
	Sandeel		Medium	Low	Minor adverse	None required	Low	Not significant
	Elasmobranchs		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Shellfish		Medium	Low	Minor adverse	None required	Low	Not significant
	Herring	Temporary increased suspended sediment concentrations, and subsequent settlement of sediment causing smothering of fish habitat	Low	Negligible	Negligible	None required	Negligible	Not significant
	Sandeel		Medium	Low	Minor adverse	None required	Low	Not significant
	Diadromous species		Low	Negligible	Negligible	None required	Negligible	Not significant
	Shellfish		Medium	Low	Minor adverse	None required	Low	Not significant
	Fish		Underwater sound effects on fish and shellfish	Low to high	Negligible	Negligible	None required	Negligible

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect
	Shellfish		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Fish and shellfish	Changes to marine water quality from the use of HDD drilling fluids, contaminant mobilisation and accidental spills from vessels, including loss of fuel oils	Low to high	Unlikely / Negligible	Negligible	None required	Unlikely / Negligible	Not significant
	Fish and shellfish	Vessel collision risk	Low to high	Negligible	Negligible	None required	Negligible	Not significant
Marine Mammals	Cetaceans and Pinnipeds	Underwater sound disturbance during geophysical activities (USBL and SBP)	Medium to High	Negligible	Minor	None required	Negligible	Not significant
	Cetaceans and Pinnipeds	Vessel collision risk	High	Unlikely	Minor	None required	Unlikely	Not significant
	Cetaceans and Pinnipeds	Reduction in water quality due to discharges and unplanned releases, accidental leaks and spills from Vessels	High	Unlikely	Minor	None required	Unlikely	Not significant
Ornithology	Shag	Temporary disturbance and displacement from installation activities	High	Low	Minor to negligible	None required	Low	Not significant
	Red-throated diver							
	Fulmar		Low					
	Kittiwake		Medium					
	Guillemot							
	Herring gull		Low					
	Gannet		Medium					
	Razorbill							
	Shag	Changes in prey availability	Low	Low	Negligible	None required	Low	Not significant
	Fulmar							
	Kittiwake							
	Guillemot							
	Herring gull							
	Gannet							
	Razorbill							
Red-throated diver								
Shag	Reduction of water quality due to unplanned, releases, accidental leaks and spills from vessels and plant	Low	Low	Negligible	None required	Low	Not significant	
Fulmar								
Kittiwake								
Guillemot								
Herring gull								
Gannet								
Razorbill								
Red-throated diver								
Marine Archaeology	Known and potential seabed prehistory receptors	Direct disturbance to seabed causing damage to receptors	High	Low	Moderate	Further investigation by means of geoarchaeological assessment of geotechnical samples	Negligible	Not significant
	Known and recorded maritime receptors and aviation receptors (A1s)		High	High	Major	Implementation of AEZs	Negligible	Not significant

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect	
	Geophysical anomalies of possible anthropogenic origin (A2s)		High	High	Major	Further investigation through potential opportunities, where possible, for diver or ROV survey; archaeological watching briefs during clearance of A2s	Negligible	Not significant	
	Currently unknown archaeological sites and artefacts		High	High	Major	Implementation of AEZs	Negligible	Not significant	
	Direct impacts to known and potential seabed prehistory receptors; maritime and aviation receptors	Use of anchors by vessels (spread mooring anchoring systems or spud cans)	High	Medium	Major	Implementation of AEZs	Negligible	Not significant	
	Known and potential seabed prehistory receptors; maritime and aviation receptors (caused by changes to the hydrodynamic and sedimentary regimes due to spoil removal and suspended sediment redistribution)	Indirect disturbance to receptors	High	Negligible	Negligible	None required	Negligible	Not significant	
Shipping and Navigation	Shipping and Navigation	Vessel-to-Vessel Collision	High	Remote	Tolerable	High Traffic Density Specific procedures established. Liaison with Peterhead Port Authority.	ALARP		
		Deviation from Established vessel routes and areas	Low	Likely	Tolerable	Liaison with Peterhead Port Authority to agree how interactions between Project vessels and routine traffic using Peterhead Port will be managed within the statutory port limits.	ALARP		
		Interaction with vessel anchors and anchoring activity	High	Unlikely	Tolerable	Duration of exposed / unprotected cable minimised	ALARP		
		Foundering due to fishing gear snagging or dragging cable	High	Unlikely	Tolerable	Duration of exposed / unprotected cable minimised	ALARP		
Commercial Fisheries	Potters/Creelers	Temporary loss or restricted access to fishing grounds	Medium	Medium	Moderate	Where the removal or relocation of static gear may be required during the installation phase, appropriate mitigation will be implemented for affected vessels following an evidence-based approach, in line with FLOWW guidance.	Low	Not significant	
	Scallop dredgers		Medium	Low	Minor	None required	Low	Not significant	
	Demersal trawlers		Low	Low	Negligible	None required	Low	Not significant	
	Pelagic trawlers		Low	Low	Negligible	None required	Low	Not significant	
	Potters/Creelers	Displacement of fishing activity into other areas	Medium	Medium	Moderate	Where the removal or relocation of static gear may be required during the installation phase, appropriate mitigation will be implemented for affected vessels following an evidence-based approach, in line with FLOWW guidance.	Low	Not significant	
	Scallop dredgers		Medium	Low	Minor	None required	Low	Not significant	
	Demersal trawlers		Low	Low	Negligible	None required	Low	Not significant	
	Pelagic trawlers		Low	Low	Negligible	None required	Low	Not significant	
	Static gear	Interference with fishing activities	Medium	Low	Minor	None required	Low	Not significant	
	Mobile gear		Low	Low	Negligible	None required	Low	Not significant	
	All fisheries	Snagging risk – loss or damage to fishing gears	Medium	Low	Minor	None required	Low	Not significant	
	All fisheries	Potential impacts on commercial fishing as a result of impacts on target species	Not significant, see Chapter 9: Fish and Shellfish Ecology						
	Other Sea Users	Recreational boaters	Disruption to marine recreational users	Negligible	Low	Negligible	None required	Low	Not significant
Recreational fishing		Negligible		Low	Negligible	Low		Not significant	
Other recreational activities		Scottish landfall: low		Low	Negligible	Low		Not significant	
Oil and gas operations			Low	Low	Negligible	None required	Low	Not significant	

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect
	Dredging and disposal sites	Disruption to other sea users and offshore infrastructure	Low	Low	Negligible		Low	Not significant
	Simultaneous operations with offshore wind farms, pipelines and cables		Low	Low	Negligible		Low	Not significant
	Interaction with diffusers		Low	Low	Negligible		Low	Not significant
	Military practice areas		Low	Low	Negligible		Low	Not significant
	Cable and pipeline asset owners	Damage to or interference with a third-party asset	Moderate	Unlikely	Minor Risk	None required	Unlikely	Not significant
Operation and Maintenance								
Physical environment	Seabed	Changes to seabed bathymetry caused by cable crossing and cable protection	Low	Low	Negligible	None required	Low	Not significant
	Seabed	Changes to seabed morphology, bedforms and suspended sediment concentration	Low	Low	Negligible	None required	Low	Not significant
	Seabed	Cable exposure	Low	Low	Negligible	None required	Low	Not significant
	Water environment	Changes to water quality	Low	Low	Negligible	None required	Low	Not significant
	Holderness Coast Smithic Bank	Coastal process of Holderness Coast	Medium	Low	Minor	None required	Low	Not significant
	Coastline at Scottish and English landfalls. Holderness Coast	Coastal erosion	Low to medium	Low	Negligible to minor	None required	Low	Not significant
Benthic Ecology	Annex I Reefs	Permanent loss of and/or disturbance subtidal benthic habitats and species due to placement of hard substrates on the seabed	Medium	Low	Minor	None required	Low	Not significant
	Seapens and burrowing megafauna		Medium	Low	Minor	None required	Low	Not significant
	Subtidal sands and gravels		Low	Low	Negligible	None required	Negligible	Not significant
	Annex I Sandbanks		High	Negligible	Negligible	None required	Negligible	Not significant
	Ocean quahog		High	Negligible	Negligible	None required	Negligible	Not significant
	All benthic habitats and species	Effects of EMF emissions from buried cable	Medium	Negligible	Negligible	None required	Negligible	Not significant
	All benthic habitats and species	Effects of thermal emissions from buried cable	Low to Medium	Negligible	Negligible	None required	Negligible	Not significant
	All benthic habitats and species	General maintenance repair.	Maintenance effects the same as Installation Phase					
Fish and Shellfish Ecology	Herring	Permanent physical disturbance to and/or loss of fish and shellfish habitats and species due to placement of hard substrates on the seabed	Medium	Low	Minor adverse	None required	Low	Not significant
	Sandeel		Medium	Low	Minor adverse	None required	Low	Not significant
	Flatfish		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Shellfish		Medium	Negligible	Negligible	None required	Negligible	Not significant
	Diadromous species	Effects of Electromagnetic field (EMF) emissions from buried cable	Low	Negligible	Negligible	None required	Negligible	Not significant
	Pelagic species		Low	Negligible	Negligible		Negligible	
	Demersal species		Low	Negligible	Negligible		Negligible	
	Elasmobranchs		Medium	Low	Minor adverse		Low	
	Spawning fish, eggs, larvae and juvenile fish		Low to medium	Negligible	Negligible		Negligible	
	Shellfish		Medium to high	Negligible	Negligible		Negligible	
	Spawning grounds		Medium	Negligible	Negligible		None required	

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect
	Shellfish	Effects of thermal emissions from buried cable	Medium to high	Negligible	Negligible		Negligible	
	All fish and shellfish	General maintenance repair.	Maintenance effects the same as Installation Phase					
Marine Mammals	Cetaceans and Pinnipeds	Underwater sound (USBL and the SBP) from maintenance and cable repairs.	Medium to High	Negligible	Minor	None required	Negligible	Not significant
Ornithology	Shag	Temporary disturbance during cable repairs and maintenance	Low	Low	Negligible	None required	Low	Not significant
	Fulmar							
	Kittiwake							
	Guillemot							
	Herring-gull							
	Gannet							
	Razorbill							
	Red-throated diver							
	Shag	Changes in prey availability	Low	Low	Negligible	None required	Low	Not significant
	Fulmar							
	Kittiwake							
	Guillemot							
	Herring-gull							
	Gannet							
Razorbill								
Red-throated diver								
Marine Archaeology	Known and potential seabed prehistory receptors; maritime and aviation receptors	Direct disturbance to previously not impacted seabed causing damage to receptors	High	High	Major	Implementation of AEZs	Negligible	Not significant
	Direct impacts to known and potential seabed prehistory receptors; maritime and aviation receptors	Use of anchors by vessels	High	High	Major	Implementation of AEZs	Negligible	Not significant
	Known and potential seabed prehistory receptors; maritime and aviation receptors (caused by potential scour and plume effects resulting in increased protection to, or deterioration through erosion)	Indirect disturbance to receptors	High	Negligible	Negligible	None required	Negligible	Not significant
Shipping and Navigation	Shipping and Navigation	Vessel-to-Vessel Collision	High	Remote	Tolerable	Maintenance activities to be planned on case-by-case basis and in line with best industry practice to minimise collision risk	ALARP	
		Deviation from Established vessel routes and areas	Low	Unlikely	Broadly Acceptable	None required	ALARP	
		Interaction with vessel anchors and anchoring activity	High	Unlikely	Tolerable	None required	ALARP	
		Foundering due to fishing gear snagging or dragging cable	High	Remote	Tolerable	Dissemination of post- lay survey to relevant organizations and stakeholders for information	ALARP	
		Reduction in Under Keel Clearance	Medium	Remote	Broadly Acceptable	None required	ALARP	
		EMF with Marine Navigational Equipment	High	Remote	Tolerable	Consultation with Maritime and Coastguard Agency (MCA) to Identify acceptable mitigation where compass deviation	ALARP	

Topic	Receptor	Potential Impact	Receptor Sensitivity	Magnitude of Change	Significance (Embedded Mitigation)	Additional Project Specific Mitigation Summary	Magnitude After Additional Mitigation	Significance of Residual Effect
						cannot be reduced to within acceptable limits through optimisation of the cable configuration.		
Commercial Fisheries	Potters/Creelers	Long-term loss of grounds or restricted access to fishing grounds	Medium	Negligible	Negligible	None required	Negligible	Not significant
	Scallop dredgers		Medium	Low	Minor	None required	Low	Not significant
	Demersal trawlers		Low	Low	Negligible	None required	Low	Not significant
	Pelagic trawlers		Low	Low	Negligible	None required	Low	Not significant
	Potters/Creelers	Displacement of fishing activity into other areas	Medium	Negligible	Negligible	None required	Negligible	Not significant
	Scallop dredgers		Medium	Low	Minor	None required	Low	Not significant
	Demersal trawlers		Low	Low	Negligible	None required	Low	Not significant
	Pelagic trawlers		Low	Negligible	Negligible	None required	Negligible	Not significant
	All fisheries	Snagging risk – loss or damage to fishing gears	Medium	Low	Minor	None required	Low	Not significant
	All fisheries	Potential impacts on commercial fishing as a result of impacts on target species	Not significant – See Chapter 9: Fish and Shellfish Ecology					
Other Sea Users	Oil and gas operations	Disruption to vessel routeing and access to other sea user working areas	Low	Low	Negligible	None required	Low	Not significant
	Dredging and disposal sites		Low	Low	Negligible	None required	Low	Not significant
	Simultaneous operations with offshore wind farms, pipelines and cables		Low	Low	Negligible	None required	Low	Not significant
	Military practice areas		Low	Low	Negligible	None required	Low	Not significant
	Cable and pipeline asset owners	Risk of damage to or interference with a third-party cable or pipeline assist	Moderate	Unlikely	Minor Risk	None required	Unlikely	Minor Risk
Decommissioning								
All technical topics	Effects of decommissioning the same as Installation Phase.							

