East Anglia ONE North Offshore Windfarm

Chapter 17

Infrastructure and Other Users

Environmental Statement
Volume 1

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Appendix number	Title
17.1	Infrastructure and Other Users Consultation Responses

Glossary of Acronyms

BBL	Balgzand Bacton Line
BEIS	Department for Business, Energy and Industrial Strategy
CIA	Cumulative Impact Assessment
CIGRE	International Council on Large Electric Systems
DCO	Development Consent Order
DCLG	Department for Communities and Local Government
DECC	Department of Energy and Climate Change
DML	Deemed Marine Licence
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESCA	European Subsea Cables Association
ICES	International Council for the Exploration of the Sea
ICPC	International Cable Protection Committee
IEC	International Electrotechnical Commission
GWFL	Galloper Wind Farm Ltd
HDD	Horizontal Directional Drilling
km	kilometres
MCA	Maritime and Coastguard Agency
MDA	Military Defence Area
MMO	Marine Management Organisation
MOD	Ministry of Defence
MW	Megawatt
NPS	National Planning Statement
NSIPs	Nationally Significant Infrastructure Projects
O&M	Operations and Maintenance
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Areas
PIDs	Public Information Days
SoS	Secretary of State
SPR	ScottishPower Renewables
SSC	Suspended Sediment Concentration
UKCPC	UK Cable Protection Committee
UKHO	United Kingdom Hydrological Office
UXO	Unexploded Ordinance

Glossary of Terminology

Applicant	East Anglia ONE North Limited.
Construction, operation and maintenance platform	A fixed structure required for construction, operation and maintenance personnel and activities.
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms..
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Marking buoys	Buoys to delineate spatial features / restrictions within the offshore development area.
Met mast	An offshore structure which contains meteorological instruments used for wind data acquisition.
Monitoring buoys	Buoys to monitor *in situ* condition within the windfarm, for example wave and metocean conditions.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs.
Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the offshore construction, operation and maintenance platform and the offshore electrical platforms.
Platform link cable	An electrical cable which links one or more offshore platforms.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.

17 Infrastructure and Other Users

17.1 Introduction

1. This chapter of the Environmental Statement (ES) describes existing infrastructure and other human activities (with a marine component) occurring within the East Anglia ONE North offshore development area. Other human activities beyond the East Anglia ONE North offshore development area that have potential to be affected are also discussed. Other human activities considered include offshore windfarm projects, oil and gas activity, marine aggregate extraction, marine disposal sites, telecommunications and electricity cables.

2. This chapter provides an assessment of the potential impacts of the proposed East Anglia ONE North project on these receptors over the construction, operation and maintenance (O&M) and decommissioning phases, along with proposed mitigation measures, where appropriate.

3. Other activities which require more detailed consideration are covered in ***Chapter 13 Commercial Fisheries, Chapter 14 Shipping and Navigation*** and ***Chapter 15 Civil and Military Aviation and Radar***.

17.2 Consultation

4. Consultation is a key driver of the Environmental Impact Assessment (EIA) process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent.

5. To date, consultation regarding infrastructure and other users has been sought through the East Anglia ONE North Scoping Report (ScottishPower Renewables (SPR) 2017), and the Preliminary Environmental Information Report (PEIR) (SPR 2019) and through direct liaison with operators and developers. The responses received through this process has been considered in preparing the ES where appropriate and this chapter has been updated for the final assessment submitted with the Development Consent Order (DCO) application.

6. The responses received from stakeholders with regards to the Scoping Report, PEIR, as well as feedback to date discussion with operators and developers, are summarised in ***Appendix 17.1***, including details of how these have been taken account of within this chapter.

7. Consultation specific to ***Commercial Fisheries*** and ***Shipping and Navigation*** is provided in ***Chapter 13*** and ***Chapter 14***, respectively.

8. Consultation has been held with EDF Energy and National Grid Ventures to provide an opportunity to share information on respective projects and identify

opportunities for collaboration or areas of potential concern. These consultations have allowed for a greater understanding of the respective projects and sensitivities associated with existing assets (i.e. Sizewell B) and proposed projects (i.e. Sizewell C, Nautilus Interconnector and EuroLink Interconnector).

9. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs) and Public Meetings PIDs have been held throughout Suffolk in November 2017, March 2018, June / July 2018 and February / March 2019 . A series of stakeholder engagement events were also undertaken in October 2018 as part of consultation Phase 3.5.Details of the consultation phases are discussed further in ***Chapter 5 EIA Methodology***.

10. Full details of the proposed East Anglia ONE North project consultation process are presented in the Consultation Report (document reference 5.1), which is provided as part of the DCO application.

17.3 Scope

17.3.1 Study Area

11. Marine activities that have the potential to overlap, be influenced by or influence the proposed East Anglia ONE North project activities have been identified as far as possible. For the majority of cases, consideration is given to infrastructure and activities in the southern North Sea.

17.3.2 Worst Case

12. The design of the proposed East Anglia ONE North project (including number of wind turbines, layout configuration, requirement for scour protection, electrical design, etc.) is not yet fully determined, and may not be known until sometime after the DCO has been granted. Therefore, in accordance with the requirements of the Project Design Envelope (also known as the Rochdale Envelope) approach to EIA (Planning Inspectorate 2018) (as discussed in ***Chapter 5 EIA Methodology***), realistic worst case scenarios in terms of potential effects upon infrastructure and other users are adopted to undertake a precautionary and robust impact assessment.

13. Definition of the worst case scenarios has been made from consideration of the proposed East Anglia ONE North project that is presented in ***Chapter 6 Project Description***, alongside the mitigation measures that have been embedded in the design (***section 17.3.3***).

14. Note that this chapter does not consider vessel movements, the impacts of which are considered in ***Chapter 14 Shipping and Navigation***. The worst case parameters for topics considered in the impact assessment (***section 17.6***) are outlined in ***Table 17.1***.

Table 17.1 Realistic Worst Case Scenarios

Impact	Parameter / Activity	Rationale
Construction		
Impact 1: Impacts on sub-sea cables	Up to 67 wind turbines, 1 met mast, up to 427 kilometres (km) of cable and up to 113 cable crossings. Sea bed preparation and vessel movements associated with the construction of the above.	The worst case is based on the project envelope options that would result in the installation of the greatest amount of infrastructure interacting with the sea bed and therefore, a risk to existing subsea cables.
Impact 2: Impacts on EDF Energy Sizewell Infrastructure and Cefas WaveRider buoy	Installation of the offshore export cables in proximity to EDF Energy existing and known planned infrastructure in the nearshore area.	The nearest point of the offshore cable corridor is 550m from EDF Energy existing and known planned infrastructure.
	Removal of the Sizewell WaveRider buoy (owned and maintained by Cefas) which is located within the offshore cable corridor.	Depending on the cable installation route, the Sizewell WaveRider buoy may need to be temporarily moved during cable installation works.
Operation		
Impact 1: Impacts on sub-sea cables	Maintenance activities near other cables.	There is the potential to impact on existing sub-sea cables where they are in close proximity to sections of cables needing repair. Potential impacts could include disturbance / damage at cable crossing points or by anchoring of O&M vessels.
Impact 2: Impacts on EDF Energy Sizewell Infrastructure	Maintenance activities in the offshore cable corridor near EDF Energy intake infrastructure.	Maintenance vessels may need to maintain the export cable adjacent to EDF Energy Sizewell intake infrastructure, which is 550m at the closest point.
Decommissioning		
Impact 1: Physical impacts on subsea cables	Removal of cables in proximity to other cables.	Removal of cables at crossing points has the potential to impact on existing sub-sea cables, either through direct disturbance during cable cutting / removal activities or by anchoring of vessels.
Impact 2: Impacts on EDF Energy Sizewell Infrastructure	Removal of the offshore export cable, including anchoring of installation vessels during decommissioning.	The nearest point of the offshore cable corridor is 550m from EDF Energy infrastructure.

17.3.3 Embedded Mitigation

15. The location of the offshore development area has been selected to minimise potential interactions with neighbouring infrastructure. This is the key embedded mitigation with regard to infrastructure and other users. ***Chapter 4 Site Selection and Assessment of Alternatives*** describes the process of development of the offshore development area and in particular the offshore cable corridor. Key site selection decisions which have reduced potential for interaction with other users are:

- Offshore development area located away from active oil and gas wells;
- Offshore development area located outside any areas licenced for dredging and aggregate extraction;
- Offshore development area located outside any Ministry of Defence (MOD) danger areas; and
- Offshore development area located outside any MOD practice and exercise area (PEXA).

16. The offshore development area has been sited to avoid existing pipelines, telecommunication and transmission cables where possible. The East Anglia ONE North offshore export cables would be aligned so that where there are crossings with other cables as near as practicable to a 90° angle is achieved.

17. Cooling water outfall and intake infrastructure for EDF Energy's Sizewell B nuclear power station are in the nearshore area near the proposed East Anglia ONE North project landfall (***Figure 17.3***). There are also intake and outfall structures planned for EDF Energy's Sizewell C new nuclear power station. The offshore cable corridor was routed to achieve a minimum separation distance of 500m[1] between the corridor and outfall and intake structures (see ***Chapter 4 Site Selection and Alternatives and Chapter 7 Marine Geology, Oceanography and Physical Processes***).

18. In addition, there is an important sea bed geological feature near to the landfall, a Coralline Crag outcrop. This feature is important for maintenance of coastal processes in the area which are in turn important to the operation of Sizewell B nuclear power station. The routeing of the cables in the final approach to landfall and the location of the landfall itself were therefore selected to avoid any interaction with the Coralline Crag to avoid potential indirect impacts upon Sizewell B nuclear power station (see ***Chapter 4 Site Selection and Alternatives*** and ***Chapter 7 Marine Geology, Oceanography and Physical Processes***).

[1] The actual separation distance is 550m.

19. Note that since the publication of EDF Energy's Stage 4 consultation for Sizewell C New Nuclear Power Station (July 2019), the offshore boundary for that project has been moved seaward and there is potential for water cooling infrastructure to move further offshore as a result (see ***Figure 4.4***). Given that EDF Energy have yet to submit a DCO application with a final boundary (this is expected in early 2020), the Applicant does not propose to revise the offshore cable corridor for the proposed East Anglia ONE North project. The Applicant will follow the progress of the Sizewell C New Nuclear Power Station proposals and continue to liaise with EDF Energy regarding potential interactions between the projects.

20. The offshore cable corridor runs through an area identified as being of high potential aggregate resource which is covered by Policy AGG3 in the East Inshore and East Offshore Marine Plans (2014), shown in ***Figure 17.5***. The high potential aggregate resource area is crossed by a large number of telecommunication cables and export cables that connect at Aldeburgh and Sizewell (***Figure 17.5***) as well as the East Anglia ONE / East Anglia THREE offshore cable corridor. The presence of cables prevents these locations being used for aggregate extraction, therefore if cables can be aligned or placed close together, the potential area lost for extraction of aggregates can be reduced. The East Anglia ONE North offshore cable corridor route was therefore aligned with the East Anglia ONE / East Anglia THREE offshore cable corridor to minimise sterilisation of areas of potential aggregate resource after discussion with The Crown Estate (see ***Chapter 4 Site Selection Assessment of Alternatives section 4.3.3.1.2***). The overlap of the offshore cable corridor with an area of high potential aggregate resource identified within the East Marine Plan (HM Government, 2014) is approximately 50km^2 (0.9% of AGG3 area of 5,406km^2).

17.3.4 Monitoring

21. No monitoring is relevant to this assessment.

17.4 Assessment Methodology

17.4.1 Guidance

22. The assessment of potential impacts upon infrastructure and other users has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIPs). The NPS relevant to this chapter is:

    - NPS for Renewable Energy Infrastructure (EN-3) (Department of Energy and Climate Change (DECC 2011).

23. The specific assessment requirements for Infrastructure and Other Users, as detailed in the NPS EN-3, are summarised in ***Table 17.2***.

Table 17.2 NPS Assessment Requirements

NPS Requirements	NPS EN-3 Reference	PEI References
'there may be constraints imposed on the siting or design of offshore wind farms because of restrictions resulting from the presence of other offshore infrastructure or activities.'	Section 2.6, paragraph 2.6.35	***Chapter 4 Site Selection and Assessment of Alternatives*** provides the rationale for the location of East Anglia ONE North offshore development area, which includes consideration of constraints associated with other offshore infrastructure.
'where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a licence has been issued by Government, the applicant should undertake an assessment of the potential effect of the proposed development on such existing or permitted infrastructure or activities. The assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate policy for offshore wind farm EIAs.'	Section 2.6, paragraph 2.6.179	The potential impacts are assessed in *section 17.7.*
'applicants should engage with interested parties in the potentially affected offshore sectors early in the development phase of the proposed offshore wind farm, with an aim to resolve as many issues as possible prior to the submission of an application to the IPC (now the 'Examining Authority' and Secretary of State (SoS)).	Section 2.6, paragraph 2.6.180	Consultation with owners and operators of offshore infrastructure is being undertaken by ScottishPower Renewables (SPR) consultation responses received to date are shown in ***Table A.17.1.1*** in ***Appendix 17.1.***

24. In addition to the NPSs, there are recommendations provided by the International Cable Protection Committee (ICPC) and European Subsea Cables Association (ESCA) that are of relevance to this Chapter, as outlined in ***Table 17.3*** and ***Table 17.4***, respectively. These are considered throughout the chapter.

Table 17.3 Relevant Recommendations of the ICPC

Title	Details
ICPC Recommendation No. 13. Proximity of Wind Farm Developments and Submarine Cables	Section 4 Stakeholder Consultation: "Stakeholder engagement should commence as soon as is practicable following the award of a development zone or project area and continue with all Stakeholders, throughout the process, until the project is fully commissioned."
ICPC Recommendation No.13. Proximity of Wind Farm Developments and Submarine Cables	Section 4 Separation recommendations: this section outlines a method for determining separation distances between wind turbines and existing cables. It also states that "Precise separation distances should be agreed and documented between the parties during the planning process. It is also recommended that wind farm developers consult the following ICPC Recommendations: • No.1: Management of Redundant and Out of Service Cables; • No.2: Recommended Routeing and Reporting Criteria for Cables in Proximity to Others; • No3: Criteria to be applied to Proposed Crossings between Submarine Telecommunications Cables and Pipelines / Power Cables; • No.4: Recommended co-ordination procedures for repair operations near in service cable systems; and • No.7: Procedure to be Followed Whilst Offshore Civil Engineering Work Is Undertaken In The Vicinity Of Active Submarine Cable Systems.
ICPC Recommendation No. 5. Standardisation of Cable Awareness Charts	Section 2.6.6 Safe Working Distance or Cable Buffer Zone. Members may wish to designate a "safe working distance" on either side of the cable corridor. Such a zone indicates the recommended distance sea bed users who conduct activity likely to cause damage to a submarine telephone cable shall keep from the cable.
ICPC Recommendation No. 2 Recommended Routeing and Reporting Criteria for Cables in Proximity to Others	Provides generalised cable routeing and notification criteria that the ICPC recommend be used when undertaking cable route planning activities where the cable to be installed crosses, approaches close to or parallels an existing or planned system.
ICPC Recommendation No. 3 Criteria to be Applied to Proposed Crossings Between Submarine Telecommunications Cables and Pipelines/Power Cables	Describes the basic considerations required and lists issues that should be addressed when pipeline/power cables cross telecommunications.

Table 17.4 Relevant Recommendations of the ESCA (2016)

Title	Details
Guideline 01 - Fishing Liaison, Issue 6, March 2016	Provides recommendations for cable industry standards and formats relating to how a cable owner should undertake fisheries liaison.
Guideline 02 - UKHO Liaison, Issue 7, March 2016	The UK Hydrological Office (UKHO) must be informed of route co-ordinates and the progress of the cable laying operations, as well as as-laid coordinates once the cable has been installed and when a cable has been withdrawn from service. This document provides guidance on how best to liaise with UKHO, including timescales, format of information and information stages, to enable adherence to UKHO's submarine cable charting policy.
Guideline 04 - Offshore Liaison, Issue 7, March 2016	Provides recommendations on liaison with other sea bed users / stakeholders (i.e. non-fishermen) prior to and during cable installation activities. Also provides advice to third parties and authorities in relation to approval for works adjacent to existing or proposed submarine plant.
Guideline 05 - Inclusion of SCUK Recommendations, Issue 5, March 2016	Summarises the available ESCA and ICPC guidelines for use when drawing up project contracts and undertaking O&M procedures.
Guideline 06 - Proximity of Wind Farms Issue 5 March 2016	Describes the consideration which should be given to separation requirements for cable vessels and offshore wind farms. Guideline 6 provides an overview of relevant guidance in relation to safety zones, discussed further in *Chapter 14, Shipping and Navigation.*
Guideline 07 - Rock Placement, Issue 5, March 2016	A guide to best practice for rock placement activities based on consultation with the cable, fishing and rock placement industries.
Guideline 08 - Submarine Cable Decommissioning, Issue 5, March 2016	Guidance on industry best practice when decommissioning in relation to safety and risk management, cable recovery and abandonment, licences and permits, liaison activities, cable and plant disposal, and reporting.
Guideline 14 - Power Cable Installation Issue 2 March 2016	Provides guidance on installing subsea power cables, including the sequence of operations, route engineering, quality control, installation methods, vessel and equipment expectations, onboard jointing, and strategic planning and cable repair.
Guideline 15 - Power and Renewable Energy Cable Repair Issue 2 March 2016	High level guidance on cable repair.
Guideline 17 - Testing of AC and DC Subsea Power Cables, Issue 2, April 2016	Provides considerations when developing a test plan for subsea power cables, including signposts to other available guidance, e.g. from the International Council on Large Electric Systems (CIGRE) and the International Electrotechnical Commission (IEC).
Guideline 19 - Marine Aggregate Extraction Proximity issue 2 April 2016	Reviews considerations that should be given by all stakeholders in the development of projects requiring proximity agreements between marine aggregate interest and submarine cable projects in UK waters.

25. A number of other specific guidance documents have also been taken into account when completing this assessment. These include:

- Department of Energy and Climate Change (DECC) -– The 31st Round general guidance (Oil and Gas Authority 2018a).
- Department for Communities and Local Government (DCLG) National and Regional Guidelines for Aggregate Provision in England 2005 – 2020, (DCLG 2009).
- East Inshore and East Offshore Marine Plans (HM Government 2014).
  - Policies AGG1, AGG2 and AGG3
- International Council for the Exploration of the Sea (ICES) Guidance for the Management of Marine Sediment Extraction (ICES 2003).
- Maritime and Coastguard Agency (MCA) Marine Guidance (M+F) Note 543 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – UK Navigational Practise, Safety an Emergency Response. (MCA 2016).
- Oil and Gas UK, OP024 - Pipeline Crossing Agreement - Edition 2 and Proximity Agreement - Edition 1 (Oil & Gas UK 2008).
- Subsea Cables UK (formerly the UK Cable Protection Committee (UKCPC)): 'Guideline 6 for Proximity of Wind Farm developments and offshore cables' (UKCPC 2012).
- The Crown Estate Position Paper: Round 3 Offshore Wind and Oil & Gas – A Critical Interface (The Crown Estate 2010).
- The Crown Estate Submarine cables and offshore renewable energy installations Proximity study (The Crown Estate 2012).

17.4.2 Data Sources

26. The data sources used to inform the Infrastructure and Other Users baseline are listed in ***Table 17.5***.

Table 17.5 Data Sources Features

Data	Year	Coverage	Confidence	Notes
Offshore Cables	2018	UK	High	http://www.marinefind.co.uk/
Windfarms	2019 and 2018	UK and EU	High	The Crown Estate: https://www.thecrownestate.co.uk/media/2975/ei-offshore-wind.zip 4C offshore: http://www.4coffshore.com/windfarms/windfarms.aspx?windfarmId=UK36

Data	Year	Coverage	Confidence	Notes
Oil and gas infrastructure	2019	UK	High	Oil and Gas Authority: https://ogauthority.maps.arcgis.com
Aggregate sites	2019	UK	High	The Crown Estate: https://www.thecrownestate.co.uk/energy-minerals-and-infrastructure/downloads/marine-aggregate-downloads/
Disposal sites	2019	UK	High	Cefas: http://mapping.cefas.co.uk:8080/geoserver/MDRLive/wfs?request=GetFeature&service=wfs&version=1.0.0&typename=MDRLive:Recordset_9679&outputformat=shape-zip&srsName=EPSG:4326

17.4.3 Impact Assessment Methodology

27. The overall assessment methodology employed throughout the ES is explained in detail in ***Chapter 5 EIA Methodology***.

28. The assessment of impacts to Infrastructure and Other Users has focused on establishing potential for overlaps, interactions and the consequent potential for conflict between activities in both a geographical and temporal context. Whilst this assessment does discuss the value of assets and potential impacts in qualitative terms, potential economic impacts as a result of impacts to assets are not discussed in quantitative terms. This information has been obtained through statements made within publicly available literature (e.g. information in an EIA or Scoping Report) or through consultation with the relevant operator of the activity as discussed in ***section 17.2*** and ***17.4.1.***

17.4.3.1 Value and Sensitivity

29. The value and sensitivity of the receptor for each impact is characterised as one of four levels, high, medium, low or negligible. Economic value of a receptor is defined as whether an asset is internationally, nationally or regionally important and/or whether redundancy is available to the owner in case of damage. This assessment does not attempt to quantify lost revenue in the case of damage. Examples of definitions for differing levels of sensitivity of infrastructure and other users are provided below in ***Table 17.6***.

Table 17.6 Example Definitions of the Different Sensitivity Levels for Infrastructure and Other Users

Sensitivity / Value	Definition
High	High value activity / activity fundamental to the operator or infrastructure is asset of international or national economic importance. No redundancy available in event of impact. Asset very sensitive to the impact. For example, gas pipeline, electrical infrastructure or telecommunication cable supporting UK or European activity or nationally important aggregates area where extraction company has no access to areas of equal quality aggregates.
Medium	Medium value activity. Impact to asset would significantly reduce operators' activities but not result in complete failure to continue operations. Limited redundancy available. Asset regionally important. Asset has limited tolerance of impact. For example, gas pipeline, electrical infrastructure or telecommunication cable supporting East Anglia area, where asset owners have some potential for redundancy planning. Aggregates areas where extraction company has some, but limited access to equal quality aggregate.
Low	Low value activity. Impact to asset would have limited implications on operator/public either due to the availability of redundancy or limited pathway for impact. Asset has some tolerance of impact. For example, electrical or telecommunication cable with ability to undertake redundancy planning to limit impact. Aggregates area where extraction company has access to large area of equal quality aggregate.
Negligible	Low value activity, operators' activities would not be significantly reduced by impact. Asset generally tolerant of impact. Limited impact to asset owners or local community in case of damage or failure.

17.4.3.2 Magnitude

30. The magnitude of effect has been considered in terms of the spatial extent, duration and timing of the effect in question. The magnitude levels and definitions for infrastructure and other users are given in ***Table 17.7***.

Table 17.7 Example Definitions of the Magnitude Levels for Infrastructure and Other Users

Magnitude	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to continuation of activity. For example, accidental damage to asset resulting in permanent or long term inoperability or complete loss of access to economically important asset.
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to activity. For example, damage to an asset that results in either short term, complete inoperability or long term reduced functionality. Partial loss of access to economically important asset, or short term complete loss of access.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration activity. Accidental damage to asset resulting in short term reduction of functionality but not complete loss of function. Short term disruption to access of asset.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to activity.

17.4.3.3 Impact Significance

31. Following the identification of receptor value and sensitivity and magnitude of the effect, it is possible to determine the significance of the impact. A matrix as presented in ***Table 17.8*** will be used.

32. It is important that the matrix (and indeed the definitions of sensitivity and magnitude) is seen as a framework to aid understanding of how a judgement has been reached from the narrative of each impact assessment and it is not a prescriptive formulaic method.

Table 17.8 Impact Significance Matrix

		Negative Magnitude			Beneficial Magnitude				
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	*Major*	*Major*	*Moderate*	*Minor*	*Minor*	*Moderate*	*Major*	*Major*
	Medium	*Major*	*Moderate*	*Minor*	*Minor*	*Minor*	*Minor*	*Moderate*	*Major*
	Low	*Moderate*	*Minor*	*Minor*	*Negligible*	*Negligible*	*Minor*	*Minor*	*Moderate*
	Negligible	*Minor*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Minor*

33. As with the definitions of magnitude and sensitivity, the matrix used for a topic is clearly defined by the assessor within the context of that assessment. The impact significance categories are divided as shown in ***Table 17.9.***

Table 17.9 Impact Significance Definitions

Value	Definition
Major	Very large or large changes in receptor condition, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate changes in receptor condition, which are likely to be important considerations at a local level.
Minor	Small changes in receptor condition, which may be raised as local issues.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

34. Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual impact will remain the same. If however, additional mitigation is required there will be an assessment of the post-mitigation residual impact.

35. Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.

17.4.4 Cumulative Impact Assessment

36. Further detail on potential cumulative impacts is provided in ***section 17.7***.

17.4.5 Transboundary Impact Assessment

37. Where infrastructure originates in another member state this has been noted in the assessment, but a separate transboundary assessment has not been undertaken. Transboundary assets that interact with the offshore development area are Concerto 1N and 1S (operational), Atlantic Crossing 1, Ulysses 2, Benacre - Zandvoort 2, Benacre - Zandvoort 1, Lowestoft - Zandvoort Lowestoft - Scheveningen 1 and Lowestoft - Scheveningen 2 (all out of service) telecommunications cables and Bacton–Zeebrugge gas pipeline. Impacts to these assets have been considered within ***section 17.6*** rather than in a separate transboundary impact assessment. There are no other transboundary assets that interact with the East Anglia ONE North offshore development area.

17.5 Existing Environment

38. The characterisation of the existing environment is undertaken using data sources listed in ***Table 17.5*** plus other relevant literature.

39. This section considers other interactions with industries not already covered as EIA topics in their own right (such as ***Commercial Fisheries*** or ***Shipping and Navigation,*** provided in ***Chapter 13*** and ***Chapter 14,*** respectively). ***Table 17.10*** shows the direct overlaps with other industry infrastructure, and the following ***sections 17.5.1*** to ***17.5.8*** provide further detail on relevant infrastructure and other users.

Table 17.10 Direct Infrastructure Overlap with the Offshore Development Area

Sector	Direct overlap with Offshore Development Area
Wind	See ***section 17.5.1***
Marine energy (wave / tidal)	None
Marine Minerals (aggregates)	See ***section 17.5.5***
Cables	See ***section 17.5.4***
Pipelines	None
Disposal Sites	See ***section 17.5.6***
Meteorological Equipment	None

Sector	Direct overlap with Offshore Development Area
Carbon capture and Natural Gas Storage	None
Oil and Gas Infrastructure	None
Oil and Gas License Blocks	None

17.5.1 UK Southern North Sea Windfarms

40. The UK waters of the southern North Sea are an area of significant offshore wind development activity, having been subject to several phases of offshore wind development under The Crown Estates' various leasing rounds. There are 56 planned or existing offshore wind developments within the southern North Sea.

41. In October 2018, The Crown Estate announced that extension projects to eight existing offshore wind projects would be progressed, two of these offshore windfarms are located in the Southern North Sea. If they are fully developed, the extension project could add additional capacity of up to 3.4GW. In addition, in 2018 The Crown Estate commenced the process for a further significant tranche of offshore wind sites in UK waters, with the auction process expected to commence in summer 2019. Whilst these developments represent a significant potential future expansion of the UK offshore wind industry, as the projects remain outside the planning process at the time of writing this EIA they cannot be included within the Cumulative Imapct Assessment (CIA) for the proposed East Anglia ONE North project.

42. Offshore windfarm developments in the vicinity of the proposed East Anglia ONE North project are shown in ***Figure 17.1***. Aside from the other developments within the former East Anglia Zone, the nearest UK offshore windfarm to the East Anglia ONE North windfarm site is the 336 megawatt (MW) Galloper Wind Farm situated 39km to the south-west. ***Table 17.11*** shows the distances to other offshore windfarm developments within the southern North Sea.

Table 17.11 UK Offshore Windfarm Projects within 100km of the East Anglia ONE North Windfarm Site

Offshore Windfarm	Status	Developer	Windfarm Distance from EA1N (km)
East Anglia ONE	Under construction	ScottishPower Renewables	1
East Anglia TWO	Application submitted	ScottishPower Renewables	10
East Anglia THREE	Consented	ScottishPower Renewables	17
Norfolk Vanguard	In determination	Vattenfall	38

Offshore Windfarm	Status	Developer	Windfarm Distance from EA1N (km)
Galloper	Fully commissioned	Galloper Wind Farm Limited	39
Scroby Sands	Fully commissioned	E.ON UK Renewables	40
Greater Gabbard	Fully commissioned	SSE Renewables	43
Norfolk Boreas	Application submitted	Vattenfall	51
London Array 1	Fully commissioned	Ørsted A/S	89
Gunfleet Sands II	Fully commissioned	Ørsted A/S	95
Gunfleet Sands I	Fully commissioned	Ørsted A/S	97

43. Interference with other windfarms from the proposed East Anglia ONE North project could arise from the following:

- Navigational safety issues;
- Aviation (i.e. helicopter operations);
- Overlap of infrastructure and potential interactions during construction, operation and decommissioning; and
- Increased pressure on port facilities.

44. Issues arising from navigational safety and aviation are assessed in ***Chapter 14 Shipping and Navigation*** and ***Chapter 15 Civil and Military Aviation and Radar***, respectively. Given that these activities will be managed and regulated to ensure safe operations, there will be no residual significant impacts on these receptors.

45. As the East Anglia ONE North windfarm site has no spatial overlap with other windfarm sites, there is no potential for interactions around the windfarm infrastructure during any phase of the project. There is however potential for interaction of export cables. The East Anglia ONE North offshore cable corridor is partially shared with the East Anglia TWO offshore cable corridor northern route. The East Anglia THREE export cables pass through the East Anglia ONE North windfarm site. The East Anglia ONE North export cables would cross both the Greater Gabbard and Galloper offshore export cables. Potential interactions with other project export cables during all phases of the proposed East Anglia ONE North project are considered together with impacts on other cables (see ***section 17.5.4***).

46. Given that, with the implementation of embedded mitigation (see ***section 17.3.3***), there is no potential for interaction with other windfarms, these are not

considered further in the assessment. Interactions with export cables are considered further as part of the impact assessment for all types of sub-sea cables in ***section 17.6***.

17.5.2 European Offshore Windfarm Developments

47. The closest international windfarm developments are Borssele 1 and 2, Borssele 3 and 4 (Netherlands) and Mermaid (Belgium) which are situated approximately 50km south-east of the East Anglia ONE North windfarm site. There is no direct overlap between these projects or their export cables and these are not considered further as part of the impact assessment.

17.5.3 Oil and Gas Activity

48. There is no surface or subsurface infrastructure in the East Anglia ONE North windfarm site. Within 40km of the East Anglia ONE North offshore development area there are 12 wells, with the closest being 4.6km away. However, these wells are of 'plugged' or 'abandoned' status and will never be used or re-entered again (Oil and Gas Authority 2018b).

49. There are two gas pipelines that cross the former East Anglia Zone, the Bacton-Zeebrugge interconnector and the Balfzand Bacton Line (BBL). The Bacton Zeebrugge interconnector runs northwest to southeast and intersects the offshore cable corridor (and thus will require up to two crossings), and the BBL gas pipeline runs east – west, 35km north of the East Anglia ONE North windfarm site.

50. Crossing agreements and proximity agreements would be finalised prior to construction commencing with the owners of the Bacton-Zeebruge gas pipeline. The agreements would include conditions for the design of these crossings to ensure that there is no impact upon the operation of existing infrastructure. Crossing agreements and proximity agreements would consider industry best practice guidance such as ESCA (2016) (***section 17.4.1***)

51. No licensed blocks for oil and gas overlap the offshore development area.

52. Given that there are no overlaps between the offshore development area and oil and gas activities, (with the exception of the Bacton-Zeebrugge gas pipeline), there is no pathway for impact and these are not considered further. The Bacton-Zeebrugge gas pipeline is considered together with impact on cables in ***section 17.6.1.1***.

17.5.4 Sub-Sea Cables

53. The southern North Sea has a significant number of cables, primarily telecommunication connections between the UK and continental Europe (see ***Figure 17.2***). ***Table 17.12*** presents all subsea cables that pass through the East Anglia ONE North offshore development area.

Table 17.12 Summary of Offshore Cables Which Intersect the Offshore Development Area

Asset Name	Asset Type	Operator	General Trajectory (approximate)	Interaction
Ulyssess 2	Telecommunications cable (operational)	Verizon Business	West to East	Ulyssess 2
Benacre-Zandvoort No 1	Telecommunications Cable (not in use)	British Telecoms	West to East	Benacre-Zandvoort No 1
Lowestoft Scheveningen No 1	Telecommunications Cable (not in use)	British Telecoms	West to East	Lowestoft Scheveningen No 1
Lowestoft Scheveningen No 2	Telecommunications Cable (not in use)	British Telecoms	West to East	Lowestoft Scheveningen No 2
Lowestoft Zandvoort	Telecommunications Cable (not in use)	British Telecoms	West to East	Lowestoft Zandvoort
Concerto 1 North (1N)	Telecommunications cable (operational)	GTT Communications	East to West	Concerto 1 North (1N)
Concerto 1 South (1S)	Telecommunications cable (operational)	GTT Communications	West to East	Concerto 1 South (1S)
Atlantic Crossing 1	Telecommunications cable (out of service)	Global Crossing	West to East	Atlantic Crossing 1
Greater Gabbard export cable route	Three transmission cables (operational)	Equitix Management Services (EMS)[2]	North to South	Greater Gabbard export cable route
Galloper export cable route	Two transmission cables (operational)	Innogy[3]	North to South	Galloper export cable route
Bacton Zeebrugge	Gas pipeline (operational)	Caisse; Snam and Fluxys	North West to South East	Bacton Zeebrugge

[2] Formerly known as Greater Gabbard OFTO Plc, a consortium of Equitix Ltd and AMP Capital Ltd. Equitix Ltd became the sole owner in December 2015 (4C Offshore 2019).
[3] Innogy are leading the development and construction of the Galloper project on behalf of their partners UK Green Investment Bank, Siemens Financial Services, Sumitomo Corporation and Macquarie Capital (Russel 2017).

Asset Name	Asset Type	Operator	General Trajectory (approximate)	Interaction
Benacre-Zandvoort No 1	Telecommunications Cable (not in use)	British Telecoms	West to East	Benacre-Zandvoort No 1
Benacre Zandvoort No 2	Telecommunications Cable (not in use)	British Telecoms	West to East	Benacre Zandvoort No 2

54. There will be a maximum of 79 crossings required for inter-array and platform link cables. This is calculated from the Applicant's current understanding of the likely cables to be present (***Table 17.12***) but with contingency built in to include potential cable discoveries post consent which will be informed by pre-construction magnetometer surveys. For further information on cable protection measures see ***Chapter 6 Project Description section 6.5.10.8.*** This number could be reduced if it is possible to cut the Atlantic Crossing cable.

55. The worst case for total number of cable crossings includes contingency for potential discoveries and are as follows:

- Export cable: 30 crossings;
- Platform link cables: 49 crossings; and
- Inter-array cables: 30 crossings.

56. Shipping traffic associated with sub-sea cables is discussed in ***Chapter 14 Shipping and Navigation***.

17.5.5 Marine Aggregates

57. There are no licenced aggregate dredging areas within the offshore development area as shown in ***Figure 17.5***. The closest dredging area is licence area 430 (Southwold Aggregates Area) which lies 17.5km west of the East Anglia ONE North windfarm site (3.6km to the south of the offshore cable corridor route). This licence area is operated jointly by Cemex and Tarmac Marine Limited.

58. The offshore cable corridor runs through an area identified as being of high potential aggregate resource which is covered by Policy AGG3 in the East Inshore and East Offshore Marine Plans (2014), shown in ***Figure 17.5***. The high potential aggregate resource area covers 5,406km^2. As discussed in ***section 17.3.3*** the East Anglia ONE North offshore cable corridor southern route has been aligned with the East Anglia ONE / East Anglia THREE offshore cable corridor to minimise sterilisation of areas of potential aggregate resource to just 0.9% of the potential resource area (***see Chapter 4 Site Selection and Assessment of Alternatives section 4.3.3.1.2***). The offshore cable corridor route was also amended to avoid a former licenced aggregate

area (see ***Figure 17.5***) as far as practically possible (see ***section 17.3.3***). Therefore, the impact on high potential resource is not assessed further.

59. Given that there are no overlaps between the offshore development area and currently licensed aggregates activities, there is no pathway for impact and these are not considered further.

60. Shipping traffic associated with marine aggregate dredging is discussed in ***Chapter 14 Shipping and Navigation***.

17.5.6 Dumping and Disposal Sites

61. The East Anglia ONE North windfarm site overlaps three disposal sites (***Figure 17.4)***:

- HU212 which will be used to dispose of sea bed sediment dredged during the construction of East Anglia THREE.
- Warren Springs Environmental research Laboratory site (TH075), a closed disposal site; and
- AEA experimental site (TH026) designated for tracers[4]. The site is closed and not for waste disposal, records indicate that it has never been used.

62. Other disposal sites in the vicinity of the offshore cable corridor are shown on ***Figure 17.4*** and include site TH057, Galloper Wind Farm, open for the disposal of pre-sweep material and drill arisings during construction.

63. Offshore surveys have been undertaken within the East Anglia ONE North windfarm site and offshore cable corridor to determine if any contaminants from previous disposal activities are present. These data and the potential for impacts on sediment quality are discussed in ***Chapter 8 Marine Water and Sediment Quality***.

64. Given that all disposal sites which overlap with the East Anglia ONE North offshore development area will be closed at the time of the proposed East Anglia ONE North project's construction (as East Anglia THREE will be built prior to the proposed East Anglia ONE North project and Galloper is already operational), there is no pathway for interaction with activities within disposal sites. Therefore, impacts on disposal sites are not considered further.

17.5.7 Ministry of Defence Activities

65. No Military practice and exercise areas (PEXAs) overlap with the East Anglia ONE North offshore development area. The nearest PEXA sites are located 27km south (Outer Gabbard - X5117) and 33km south-east (North Galloper –

[4] Materials and substances that range from inert particles and soluble fluorescent dyes to radioactive / biocidal substances and bacterial microbial cells. Their deployment allows for the investigation of water and sediment movement (MMO 2014).

X5121) of the East Anglia ONE North offshore cable corridor. There are no areas designated as submarine exercise areas or live firing areas in the vicinity of the East Anglia ONE North offshore development area.

66. There are currently two MOD identified explosives dumping grounds located 13km to the south and 41km south-west of the offshore cable corridor that are currently not in use. There is also potential for wartime unexploded ordinance (UXO) within the southern North Sea (EAOW 2012). Locations of any UXO would be determined post-consent and mitigation agreed in consultation with the Marine Management Organisation (MMO). There are no areas for MOD submarine or live firing excercises within the offshore development area or its vicinity.

67. Given that there are no overlaps between the offshore development area and MOD activities, there is no pathway for impact and these are not considered further.

17.5.8 EDF Energy Infrastructure

68. Cooling water outfall and intake infrastructure for EDF Energy's Sizewell B nuclear power stations are adjacent to the offshore cable corridor (0.6km at the closest point) as it approaches landfall (***Figure 17.3***). There are also intake and outfall structures planned for EDF Energy's Sizewell C nuclear power station. The offshore cable corridor has been routed so that no outfall or intake structures are within the footprint of the offshore cable corridor and to avoid interaction with the Coralline Crag in the nearshore (see ***section 17.3.3*** for a summary, for more detail see ***Chapter 4 Site Selection and Alternatives*** and ***Chapter 7 Marine Geology, Oceanography and Physical Processes***). Note that since the publication of EDF Energy's Stage 4 consultation for Sizewell C New Nuclear Power Station in July 2019, the offshore boundary for that project has been moved seaward and there is potential for water cooling infrastructure to move further offshore as a result (see **Figure 17.3**). Given that EDF Energy have yet to submit a DCO application with a final boundary (this is expected in early 2020), the Applicant does not propose to revise the offshore cable corridor for the proposed East Anglia ONE North project. The Applicant will follow the progress of the Sizewell C New Nuclear Power Station proposals and continue to liaise with EDF Energy regarding potential interactions between the projects.

69. There is a WaveRider buoy and guard buoy within the offshore cable corridor near shore which is owned by Cefas The WaveRider is used by EDF for monitoring coastal conditions for Sizewell A and Sizewell B.

17.5.9 Anticipated Trends in Future Baseline Conditions

70. The deployment of offshore wind in the UK is set to continue and there is an existing pipeline of projects in planning until approximately 2030. The Crown

Estate is in the process of releasing new licencing areas to facilitate the next round of offshore wind projects. Offshore wind deployment in the Southern North Sea and wider North Sea is likely to increase over the next 10-20 years.

71. There are plans to further integrate the UK electrical network and the European networks through the installation of interconnector cables.

72. The East Anglia coast has been highlighted in the East Marine Plan (HM Government, 2014) as being an important area for aggregates for the UK, with a view to facilitating growth of the aggregates industry in this area of the UK sea bed. It is expected that aggregates removal activity will increase over the next 10-20 years (HM Government, 2014) as a strategic industry for this area.

17.6 Potential Impacts

73. This section outlines the potential impacts during the lifecycle of the proposed East Anglia ONE North project and their significance, using the methodology described in ***section 17.4*** and in ***Chapter 5 EIA Methodology***. They relate with those impacts listed in ***Table 17.1*** with descriptions of the worst case for each impact.

17.6.1 Potential Impacts during Construction

17.6.1.1 Impact 1: Impacts on sub-sea cables and pipelines

74. It is anticipated that the proposed East Anglia ONE North project would require up to 113 cable and pipeline crossings in total. Construction activities, such as cable and foundation installation, vessel anchoring and debris clearing operations, in proximity to other cables and the Bacton-Zeebrugge gas pipeline and at crossings, have the potential to damage other sub-sea cables. and the Bacton-Zeebrugge gas pipeline. This damage would be expensive to repair and has the potential to cause disruption to power distribution and telecommunications. It is assumed that as a worst-case scenario, damage to the asset would result in total loss of function with limited or no ability to use redundancy. It is therefore considered that the sensitivity and value of the receptor is high.

75. In order to prevent impacts, the Applicant will enter into proximity and crossing agreements with other operators. These agreements will determine how crossings are made and how close construction activities can be to the existing infrastructure cables. The resultant locations, design and construction methodologies will avoid physical impact upon other cables which may affect their operation. In the longer term this means that any maintenance activities for the proposed East Anglia ONE North project do not affect other cables as other agreed measures to reduce impacts are already in place by design. Agreements will also contain detailed requirements for the crossing and specific mitigation requirements for each crossing.

76. Cable owners are, and will continue to be, consulted by the Applicant and commercial and technical agreements would be put in place where required ahead of construction. Crossing and proximity agreements would be agreed post-consent during the outline design period and would consider:

- Location of any cable crossing (***Table 17.3 and Table A17.2.1 in Appendix 17.1***);
- Separation distances;
- Material used for protecting the crossing;
- Method of installation; and
- Methods for maintenance.

77. This mitigation will reduce the risk of impact and minimise the magnitude of the impact to negligible. Therefore, the impact would be considered to be of **minor adverse** significance.

17.6.1.2 Impact 2: Impacts on EDF Energy infrastructure and Cefas Waverider Buoy

78. As discussed in ***sections 17.3.3*** and ***17.5.8*** the East Anglia ONE North offshore cable corridor was routed to avoid direct interaction with existing and planned cooling infrastructure for Sizewell B and Sizewell C. There are two key outcomes:

- The offshore cable corridor has a minimum buffer of 500m between the order limits of the offshore cable corridor and current and planned EDF Energy infrastructure (as known prior to EDF Energy's Stage 4 consultation for Sizewell C New Nuclear Power Station). This spacing is in line with agreements made between Galloper Offshore Wind Limited and EDF Energy.
- Nearshore at the approach to landfall, the export cables will be routed south of the Coralline Crag to avoid impacts upon coastal processes.

79. However, during construction and installation of offshore export cables, the cooling intakes could be impacted indirectly. Sea bed preparation, cable laying and burial in the nearshore could result in increased levels of suspended sediment concentrations (SSC) and affect the intakes. Blocking of the outfall and intakes has the potential to cause disruption and shut down the power stations. Therefore, the sensitivity of the receptor is high. The routeing of the offshore cable corridor and location of the landfall away from the existing Sizewell B intakes reduces the risk of effect of suspended sediment being entrained (see ***Chapter 7 Marine Geology, Oceanography and Physical Processes***). With regard to Sizewell C the Applicant will follow the progress of the Sizewell C New Nuclear Power Station proposals and

continue to liaise with EDF Energy regarding potential interactions between the projects.

80. The WaveRider buoy, owned by Cefas, provides metocean data for EDF Energy and is located within the East Anglia ONE North offshore cable corridor. Depending on the final installation methodology for the installation of the export cable route, this may need to be moved to avoid interaction with installation or vessel anchoring. If required, the buoy would be moved to a location as close to its current location (which would be agreed with EDF Energy and Cefas) as possible. It is anticipated that the agreed mechanism for the relocation of the Waverider Buoy would be a revised condition of the Deemed marine Licence (DML) to provide for cable specification and an installation and relocation plan for the buoy.

81. EDF Energy and Galloper Wind Farm Limited (GWFL) agreed protective provisions for the construction, operation and decommissioning of Galloper export cables as part of their DCO[5]. These protective provisions are as follows:

- *Save for urgent reasons of vessel safety, the undertaker shall not carry out any of the authorised scheme (including the placement temporary or otherwise of anchors or moorings) within 250 metres of a central point of [the Sizewell C intake infrastructure coordinates].*
- *Save for urgent reasons of vessel safety the undertaker shall not undertake any of the authorised scheme within 250 metres to 500 metres from a central point of [the Sizewell C intake infrastructure coordinates] without having first submitted and secured approval from EDF Energy, details of the proposed method of working within these areas (such approval not to be unreasonably withheld or delayed) and thereafter the undertaker shall implement.*
- *No installation works shall prevent the passage of vessels within 250m radius of the intake infrastructure prior to the construction of any works within that location by EDF Energy or the passage of vessels within 500m radius of the intake infrastructure at any time.*

82. During the development of the East Anglia ONE North offshore cable corridor, routeing of the offshore cable corridor took into account the 500m buffer area requested in the GWFL protective provisions, therefore no cable installation or vessel activity will occur within 500m of the Sizewell B intake infrastructure. These buffers are shown in ***Figure 17.3.***

[5] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010003/EN010003-000007-The%20Galloper%20Wind%20Farm%20Order%202013.pdf

83. Sizewell infrastructure is considered to be a high value / sensitive receptor due to the sensitivity of the intake infrastructure to disturbance. However, given the minimum buffer distance incorporated into the offshore cable corridor (500m) exceeds the requirements of the EDF Energy / GWFL agreement, it is considered that there will be no pathway for direct impact from installation activity (including vessel anchoring) upon existing EDF Energy infrastructure. With regard to Sizewell C the Applicant will follow the progress of the Sizewell C New Nuclear Power Station proposals and continue to liaise with EDF Energy regarding potential interactions between the projects.

84. In addition to the above, EDF Energy and Galloper agreed that:

- All tug operations relating to anchor laying and barge manoeuvring carried out in water of depth less than twice the draft of the tugs being used by the undertaker [within the area shown in **Figure 17.3**] will be as follows;
  - For the area south of a line starting at the Dividing Line [as shown in **Figure 17.3**], operations shall only be undertaken within periods of flood tide and +/- 1 hour adjoining slack high and slack low water periods.
  - For the area north of the Dividing Line [as shown in **Figure 17.3**], operations shall only be undertaken within periods of ebb tide and +/- 1 hour adjoining slack high and slack low water periods.

85. The East Anglia ONE North offshore cable corridor is to the south of the dividing line referred to above and partially overlaps with the EDF Energy shallow water restriction area (see ***Figure 17.3***). As described in ***Chapter 6 Project Description*** the HDD exit point would be to the south of the Coralline Crag which completely overlaps the area of the Sizewell B Shallow Water Restriction area that is within the offshore cable corridor (see ***Figure 17.3***) and therefore cable installation works would be largely outside of the area detailed in the Galloper protective provisions. This is detailed further in ***Chapter 4 Site Selection and Assessment of Alternatives.***

86. If required, relocation of the WaveRider buoy would be for a short period, with the buoy being moved a short distance outside of the East Anglia ONE North offshore cable corridor, it is therefore not anticipated to have an impact EDF Energy or Sizewell infrastructure.

87. With regard to indirect impact, there is potential for East Anglia ONE North construction activity to occur within the southern part of the EDF Energy shallow water restriction area identified in the EDF Energy / GWFL protective provisions. A consideration of these impacts on EDF Energy infrastructure as a result of suspended sediment generated during cable installation works, is fully assessed and presented in ***Chapter 7 Marine Geology, Oceanography***

and Physical Processes. The magnitude of impact is considered to be negligible, and therefore of **minor adverse significance.**

17.6.2 Potential Impacts during Operation

17.6.2.1 Impact 1: Impacts on sub-sea cables

88. During the operation phase, there is potential for maintenance activities to cause damage to sub-sea cables at crossings and where windfarm infrastructure is installed in close proximity to existing assets. Maintenance activities may include cable repair work which could entail the use of jack-up vessels and the deployment of anchors. It is expected that any such activity would be subject to the same principles and agreements as established during the construction phase (see construction impact 1, ***section 17.6.1.1***).

89. Due to the potential for damage to telecommunications and power distribution cables to result in loss of communications or power, respectively, the sensitivity of the receptor is high. However, the likelihood of damage to existing cables during such maintenance work is small due to the implementation of cable crossing and proximity agreements; therefore the magnitude of the impact is deemed to be negligible. Therefore, an impact of **minor adverse** significance if predicted.

17.6.2.2 Impact 2: Impacts on EDF Energy infrastructure

90. During operation, maintenance may be required on the export cables. As discussed in ***section 17.6.1.2***, the East Anglia ONE North offshore cable corridor is 550m from EDF Energy intake infrastructure, which is beyond the buffer distance agreed between EDF Energy and GWFL. All O&M activity, including vessel anchoring will therefore be at least 550m from EDF Energy's infrastructure and therefore there would be no pathway for direct impacts upon infrastructure

91. As per construction, there is the potential for indirect effects on EDF Energy infrastructure as a result of increased SSC levels created during maintenance operations. Blocking of the outfall and intakes has the potential to cause disruption and shut down the power stations and therefore, the sensitivity of the receptor is high. Maintenance activities on the export cable and associated vessel use, particularly in the near shore area i.e. that closest to the existing or planned EDF Energy intake infrastructure, has greatest potential to result in indirect effects through a temporary increase in SSC but the length of export cable within the vicinity of EDF Energy infrastructure is small considering the overall length of the export cable corridor.

92. A consideration of these impacts on EDF Energy infrastructure as a result of suspended sediment generated during O&M activities is fully assessed and presented in ***Chapter 7 Marine Geology, Oceanography and Physical Processes***. However, taking account of the incorporation of embedded

mitigation (as outlined in ***section 17.6.1.2***), the distance of maintenance activities from existing or planned EDF Energy intake infrastructure, the likely low frequency of export cable maintenance operations in the nearshore area and the likely low increase in SSC from this activity, the magnitude of impact is considered to be negligible, and therefore the overall effect deemed to be of **minor adverse** significance.

17.6.3 Potential Impacts during Decommissioning

93. Impacts upon infrastructure and other users during decommissioning are anticipated to be similar to those discussed during construction of the project, with an incremental reduction of impact as the proposed East Anglia ONE North project infrastructure is removed. Decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would most likely involve the accessible installed components. Offshore, this is likely to include all the wind turbine components, part of the foundations (those above sea bed level), cutting ends of all array cables, platform link cables and offshore export cables, leaving buried cables and scour protection *in situ*. This section provides an overview of the potential impacts.

17.6.3.1 Impact 1: Impacts on sub-sea cables

94. To minimise environmental impacts, the export, platform link and inter array cables would be disconnected and left *in situ*. Wind turbine and offshore platform foundations above sea bed level would be removed from the East Anglia ONE North site, but these would have been located to avoid any impact upon cables during construction. Therefore, there would be **no change** upon other cables.

17.6.3.2 Impact 2: Impacts on EDF Energy infrastructure

95. As with impact 1 above, ***section 17.6.3.1***, all efforts will be taken to minimise any impact on the EDF Energy infrastructure. Export cables are likely to be left *in situ* and there would therefore be no pathway for impact and therefore **no change** to the EDF Energy infrastructure.

17.7 Cumulative Impacts

96. The potential impacts of the proposed East Anglia ONE North project on infrastructure and other users has been assessed to be non-significant or able to be fully mitigated through consultation with the relevant parties (i.e. through the development of crossing and proximity agreements or similar) for construction, operation and decommissioning phases. All other parties (i.e. another windfarm operator) that interact with the same receptor will also need to demonstrate no impact (i.e. through avoidance) or agree mitigation with the operators. Therefore, no project will have a direct impact on another user, and by extension it is considered that there will be no pathways for cumulative impact.

17.8 Transboundary Impacts

97. As previously discussed, transboundary impacts are considered for international assets within the footprint of the East Anglia ONE North offshore development area. Transboundary assets that interact with the offshore development area are Concerto 1N and 1S (operational), Atlantic Crossing 1, Ulysses 2, Benacre - Zandvoort 2, Benacre-Zandvoort 1, Lowestoft-Zandvoort Lowestoft-Scheveningen 1 and Lowestoft-Scheveningen 2 (all out of service) telecommunications cables and Bacton–Zeebrugge gas pipeline. Impacts to these cables have been considered alongside impacts to all cables within ***sections 17.6.1.1, 17.6.2.1*** and ***17.6.3.1***.

17.9 Inter-Relationships

98. ***Table 17.13*** illustrates the inter-relationship between impacts discussed in this chapter and those discussed in other chapters.

Table 17.13 Chapter Topic Inter-Relationships

Topic and description	Related Chapter	Where addressed in this Chapter
Impacts on sub-sea cables	***Chapter 14 Shipping and Navigation***	***Sections 17.6.1.1, 17.6.2.1*** *and* ***17.6.3.1***
Impacts on EDF Energy infrastructure	***Chapter 7 Marine Geology, Oceanography and Physical Processes***	***Sections 17.6.1.2, 17.6.2.2*** *and* ***17.6.3.2***

17.10 Interactions

99. There is no potential for interactions between impacts on the different Infrastructure and Other Users described in this chapter as these are all separate, non-related receptors.

17.11 Summary

100. ***Table 17.14*** summarises the predicted impacts on infrastructure and other users during the construction, operation and decommissioning of the proposed East Anglia ONE North project.

Table 17.14 Potential Impacts Identified for infrastructure and other users

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Examples of Potential Mitigation Measure	Residual Impact
Construction					
Impacts on sub-sea cables	Sub-sea cables	High	Negligible	Crossing or proximity agreements to be agreed	**Minor adverse**
Impacts on EDF Energy infrastructure	Cooling infrastructure	High	Negligible	Offshore cable corridor routeing to avoid direct / minimise indirect impact	**Minor adverse**
Operation					
Impacts on sub-sea cables	Sub-sea cables	High	Negligible	Crossing or proximity agreements to be agreed	**Minor adverse**
Impacts on EDF Energy infrastructure	Cooling infrastructure	High	Negligible	Offshore cable corridor routeing to avoid direct / minimise indirect impact	**Minor adverse**
Decommissioning					
Impacts on sub-sea cables	Sub-sea cables	Negligible	No change	None proposed.	**No change**
Impacts on EDF Energy infrastructure	Cooling infrastructure	Negligible	No change	None	**No change**

17.12 References

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