East Anglia TWO Offshore Windfarm

Chapter 17

Infrastructure and Other Users

Preliminary Environmental Information
Volume 1
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Glossary of Acronyms

AoS	Area of Search
BBL	Balgzand Bacton Line
BEIS	Department for Business, Energy and Industrial Strategy
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
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESCA	European Subsea Cables Association
HSE	Health and Safety Executive
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
RYA	Royal Yachting Association
SoS	Secretary of State
SPR	ScottishPower Renewables
SSC	Suspended Sediment Concentration
UXO	Unexploded Ordinance

Glossary of Terminology

Applicant	East Anglia TWO Limited.
Development area	The area comprising the Indicative Onshore Development Area and the Offshore Development Area
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one offshore 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 TWO 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.
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 cable between offshore electrical platforms and landfall jointing bay.
Offshore development area	The East Anglia TWO 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.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Construction, operation and maintenance platform	A fixed structure required for construction, operation and maintenance personnel and activities.
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 Preliminary Environmental Information (PEI) Report describes existing infrastructure and other human activities (with a marine component) occurring within the East Anglia TWO offshore development area. Other human activities beyond the East Anglia TWO 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 TWO 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 TWO Scoping Report (ScottishPower Renewables (SPR) 2017). Feedback received through this process has been considered in preparing incorporated into the PEIR where appropriate and this chapter will be updated following the next stage of consultation for the final assessment submitted with the Development Consent Order (DCO) application.

6. ***Table 17.1*** provides a summary of those consultation responses that have been received to date which are relevant to infrastructure and other users. Consultation specific to ***Commercial Fisheries and Shipping and Navigation*** is provided in ***Chapter 13*** and ***Chapter 14***, respectively.

Table 17.1 Consultation Responses

Consultee	Date / Document	Comment	Response / where addressed in the PEI
EDF Energy	08/11/2017	Meeting to discuss offshore cable corridor with EDF Energy. EDF Energy provided comments on potential concerns relating to impacts on the Coralline Crag formation and sediment intake.	***Section 17.6*** assesses potential impacts on EDF infrastructure. Information also provided on how comments were considered in the development of the offshore cable corridor in ***Chapter 4 Site Selection.***
The Crown Estate	01/12/2017 Draft AfL Application	Initial draft of the East Anglia TWO export cable corridor sent to The Crown Estate for review. The Crown Estate responded with comments (01/12/2017) in relation to potentially important aggregate areas and seabed sterilisation with adjacent East Anglia ONE cable corridor.	Comments provided by The Crown Estate were incorporated into the development of the offshore cable corridor. Details on this are provided in ***Chapter 4 Site Selection and Assessment of Alternatives*** and discussed in ***section 17.6.***
The Planning Inspectorate	20/12/2017 Scoping Response	The inspectorate does not agree that cumulative impacts can be scoped out due to insufficient justification including an absence of detail of proposed mitigation measures.	Addressed in ***section 17.7***
The Planning Inspectorate	20/12/2017 Scoping Response	The Inspectorate agrees that transboundary impacts be scoped out on the basis that an assessment of potential transboundary impacts will be provided in the 'cables assessment'. Cross-reference must be made within the telecommunications aspect chapter to the cables assessment report.	Impacts to transboundary assets (such as Concerto Seg N and Seg S are assessed alongside other assets within ***section 17.6.*** Addressed in ***section 17.8***
The Planning Inspectorate	20/12/2017 Scoping Response	The Scoping Report anticipates indirect impacts on the infrastructure assets of third parties, e.g. EDF Energy. The PEI should assess impacts including indirect ones to other existing infrastructure assets. A clear methodology should be presented in the PEI to explain how the assessment has been carried out.	Addressed in ***section 17.6***
The Planning Inspectorate	20/12/2017 Scoping Response	The Scoping Report states that the assessment will be based on existing data and information gathered through consultation. The precise nature of this data has not been described. The PEI	Addressed in ***section 17.4.2***

Consultee	Date / Document	Comment	Response / where addressed in the PEI
		should include a detailed description of the information used to inform the assessment at each stage of the assessment process.	
The Planning Inspectorate	20/12/2017 Scoping Response	Reference is made to consulting developers, operators and marine users in the 'vicinity' of the Proposed Development. The PEI should clearly set out the study area, which should be based on a zone of influence model to ensure that all potential impacts are assessed.	Addressed in ***section 17.3.1***
Galloper Wind Farm Ltd. (GWFL)	19/12/2017 Scoping Response	To protect GWF assets, GWFL requires the following constraints to be built into both projects; SPR to maintain a minimum 50m separation between EA2 cables and the GWFL and Gabbard cables at the landfall where the cables are buried due to thermal constraints; GWFL requires 10m either side of the GWF onshore cables for access for maintenance and repair; GWFL requests that technical as built information is made available and delivered indicating cable design, trench design, GPS co-ordinates of assets, and nomenclature etc. GWFL will reciprocate and provide this information when available for the Galloper assets.	Discussions of crossing agreements have commenced and will continue throughout application, examination and post consent. A crossing agreement will be sought from GWFL. Further work has been undertaken since Scoping to refine the landfall location. These changes now ensure that the GWFL cables are only crossed once (see ***Chapter 4 Site Selection and Alternatives***)
GWFL	19/12/2017 Scoping Response	The scoping proposals show cables will cross offshore. However, the location of the NGET substation is not named, and could potentially be in or around Leiston in the vicinity of GWFL assets. GWFL requests that the cable routes associated with both projects are designed such that the need to cross GWFL cables twice is absolutely avoided.	
GWFL	19/12/2017 Scoping Response	The position of any beach or sea anchors should also be considered in relation to the proximity of the GWFL cables. GWFL must be consulted on any beach or sea anchor that is placed within 300m of the GWF export cable.	

Consultee	Date / Document	Comment	Response / where addressed in the PEI
GWFL	19/12/2017 Scoping Response	There is one AoS for a shared offshore cable export route to EA1N and EA2. The figure shows that the EA cables will cross the Galloper cables within 10km of the shore. GWFL expects a formal cable crossing agreement between GWFL and applicable projects to be in place in advance of the DCO application being submitted. GWFL would welcome early consultation including the review of method statements in relation to this.	
Interoute	14/02/2018	Consultation with Interoute in relation to crossing and proximity agreements in relation to the Concerto Seg-S. Interoute provided information on the location and installation of the Concerto Seg-S cable to help inform the East Anglia TWO export cable development process.	Proximity and crossing agreements are currently being drafted for agreement with Interoute.

7. 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).

8. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs). PIDs were held throughout Suffolk in November 2017, over six days in March 2018 and in June / July 2018 with further events planned in 2019 to promote the proposed East Anglia ONE North project. A series of stakeholder engagement events were also undertaken in October 2018 as part of consultation phase 3.5. These events were held to inform the public of potential changes to the onshore substation location. This consultation aims to ensure that community concerns are well understood and that site specific issues can be taken into account, where practicable. Consultation phases are explained further in ***Chapter 5 EIA Methodology***. Full details of the proposed East Anglia TWO project consultation process will be presented in the Consultation Report, which will be submitted as part of the DCO application.

17.3 Scope

17.3.1 Study Area

9. Marine activities that have the potential to overlap, be influenced by or influence the proposed East Anglia TWO 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

10. The design of the proposed East Anglia TWO 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.

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

12. 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 17.2***.

Table 17.2 Realistic Worst Case Scenarios

Impact	Parameter / Activity	Rationale
Construction		
Impact 1: Impacts on sub-sea cables	Up to 75 wind turbines, 1 met mast, up to 435km of cable and up to 85 cable crossings. Seabed 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 seabed and therefore, a risk to existing subsea cables.

Impact	Parameter / Activity	Rationale
Impact 2: Impacts on EDF Energy Sizewell Infrastructure	Installation of the offshore export cables in proximity to EDF Energy infrastructure in the nearshore	The nearest point of the offshore cable corridor is 550m from EDF Energy infrastructure.
	Removal of the Sizewell WaveRider buoy 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.	

17.3.3 Embedded Mitigation

13. 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).

14. The offshore development area has been sited to avoid existing pipelines, telecommunication and transmission cables where possible. The East Anglia TWO 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.

15. Cooling water outfall and intake infrastructure for EDF Energy's Sizewell B nuclear power station are in the nearshore near the proposed East Anglia TWO project landfall (***Figure 17.5***). There are also intake and outfall structures planned for EDF Energy's Sizewell C new nuclear power station. The offshore cable corridor was routed so that there is a large buffer between the corridor and outfall and intake structures (see ***Chapter 4 Site Selection and Alternatives and Chapter 7 Marine Geology, Oceanography and Physical Processes***).

16. In addition, there is an important seabed 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***).

17. 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 17.4***. 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 17.4***) 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 TWO offshore cable corridor southern 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 the area of high potential aggregate resource identified within the East Marine Plan (HM Government 2014) is approximately 92km^2 (1.7% of AGG3 area).

18. The Crown Estate also indentified a former licenced aggregate area within the offshore cable corridor southern route. The offshore cable corridor southern route was therefore routed to avoid this area as far as practically possible (see ***Chapter 4 Site Selection and Assessment of Alternatives***) however, it was not possible to avoid the area entirely and there is an overlap of 0.6km^2 which represents 5.6% of the total area of the withdrawn licence area as shown in ***Figure 17.4***. As the majority of sea bed off the East Anglia coast is identified as being of potential importance for aggregates (HM Government 2014), this loss represents a very small proportion of the wider resource in the southern North Sea region (the high potential aggregate resource area covers 5409km^2).

17.3.4 Monitoring

19. No monitoring is relevant to this assessment.

17.4 Assessment Methodology

17.4.1 Guidance

20. 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).

21. The specific assessment requirements for Infrastructure and Other Users, as detailed in the NPS EN-3, are summarised in ***Table 17.3.***

Table 17.3 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 TWO 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 Planning Inspectorate).'	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 17.1.*

22. 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 17.4*** and ***Table 17.5***, respectively. These are considered throughout the chapter.

Table 17.4 Relevant Recommendations of the ICPC

Title	Details
ICPC Recommendation No. 13. Proximity of Wind Farm Developments & 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 & Submarine	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

Title	Details
Cables	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 17.5 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 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,	Provides recommendations on liaison with other seabed users / stakeholders (i.e. non-fishermen) prior to and during cable

Title	Details
Issue 7, March 2016	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.

23. 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 30th Round general guidance (DECC, 2017).
- 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

24. The data sources used to inform the Infrastructure and Other Users baseline are listed in ***Table 17.6***.

Table 17.6 Data Sources Features

Data	Year	Coverage	Confidence	Notes
Offshore Cables	2017	UK	High	http://www.marinefind.co.uk/
Windfarms	2018	UK & EU	High	4C offshore: http://www.4coffshore.com/windfarms/windfarms.aspx?windfarmId=UK36
Oil and gas infrastructure	2018	UK	High	Oil and Gas Authority: https://ogauthority.maps.arcgis.com
Aggregate sites	2018	UK	High	The Crown Estate: https://www.thecrownestate.co.uk/energy-minerals-and-infrastructure/downloads/marine-aggregate-downloads/
Disposal sites	2018	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

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

26. 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

27. 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 17.7***.

Table 17.7 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.

Sensitivity/Value	Definition
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

28. 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 17.8***.

Table 17.8 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

29. 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 17.9*** will be used.

30. 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 17.9 Impact Significance Matrix

Sensitivity	Negative Magnitude				Beneficial Magnitude			
	High	Medium	Low	Negligible	Negligible	Low	Medium	High
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*

31. 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 17.10.***

Table 17.10 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.

32. 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 proposed required there will should be an assessment of the post-mitigation residual impact. 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

33. In the Scoping Report (Royal HaskoningDHV 2017) it was proposed to scope out cumulative impacts, however the Planning Inspectorate disagreed as they

stated that more information was required (see ***Table 17.1***). Further detail on potential cumulative impacts is provided in ***section 17.7***.

17.4.5 Transboundary Impact Assessment

34. Where infrastructure originates in another member state this has been noted in the assessment for that type of infrastructure, but a separate transboundary assessment has not been undertaken. Transboundary assets that interact with the East Anglia TWO offshore development area are Concerto (active) and Hermes (not in use) telecommunications cables. 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 TWO offshore development area.

17.5 Existing Environment

35. The characterisation of the existing environment is undertaken using data sources listed in ***Table 17.6*** plus other relevant literature.

36. 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). ***Table 17.11*** 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 17.11 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
Carbon capture and Natural Gas Storage	None
Oil & Gas Infrastructure	None
Oil & Gas License Blocks	None

17.5.1 UK Southern North Sea Windfarms

37. 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 41 planned or existing offshore wind developments within the southern North Sea.

38. Offshore windfarm developments in the vicinity of the proposed East Anglia TWO 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 TWO windfarm site is the 336MW Galloper Wind Farm situated 7km to the south-west. ***Table 17.12*** shows the distances to other offshore windfarm developments within the southern North Sea.

Table 17.12 UK Offshore Windfarm Projects within 100km of the East Anglia TWO Windfarm Site

Offshore Windfarm	Status	Developer	Windfarm Distance from EA2 (km)
Galloper	Fully commissioned	Galloper Wind Farm Limited	7
East Anglia ONE North	Pre-planning Application	ScottishPower Renewables	10
East Anglia ONE	Under construction	ScottishPower Renewables	11
Greater Gabbard	Fully commissioned	SSE Renewables	13
Scroby Sands	Fully commissioned	E.ON UK Renewables	41
East Anglia THREE	Consented	ScottishPower Renewables	45
Norfolk Vanguard	Application submitted	Vattenfall	56
London Array 1	Fully commissioned	Ørsted A/S	58
Gunfleet Sands II	Fully commissioned	Ørsted A/S	67
Gunfleet Sands I	Fully commissioned	Ørsted A/S	70
Norfolk Boreas	Pre-planning Application	Vattenfall	73
Thanet	Fully commissioned	Vattenfall	74
Gunfleet Sands Demo	Fully commissioned	Ørsted A/S	75

Offshore Windfarm	Status	Developer	Windfarm Distance from EA2 (km)
Kentish Flats	Fully commissioned	Vattenfall	96
Kentish Flats Extension	Fully commissioned	Vattenfall	96

39. Interference with other windfarms from the proposed East Anglia TWO 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.

40. 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 impacts on these receptors.

41. As the East Anglia TWO 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 ONE and East Anglia THREE export cables pass through the East Anglia TWO windfarm site. The East Anglia TWO 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 TWO project are considered together with impacts on other cables (see ***section 17.5.4***).

42. Given that 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

43. The closest international windfarm developments are Borssele 1 and 2, Borssele 3 and 4 (Netherlands) and Mermaid (Belgium) which are situated approximately 40km south-east of the East Anglia TWO 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

44. There is no surface or subsurface infrastructure in the East Anglia TWO windfarm site. Within 50km of the East Anglia TWO offshore development area there are ten wells, with the closest being 1km away. However, these wells are of 'plugged' or 'abandoned' status and will 'never be used or re-entered again' (Oil and Gas Authority 2018).

45. There are no pipelines located within the East Anglia TWO offshore development area. Two gas pipelines cross the former East Anglia Zone, the Balgzand-Bacton Line (BBL) gas pipeline running east – west, 48km north of the East Anglia TWO windfarm site, and the Bacton-Zeebrugge interconnector running northwest to southeast, 9km northeast of the East Anglia TWO offshore development area.

46. No licensed blocks for oil and gas overlap the East Anglia TWO offshore development area.

47. Given that there are no overlaps between the East Anglia TWO offshore development area and oil and gas activities, there is no pathway for impact and these are not considered further.

17.5.4 Sub-Sea Cables

48. The southern North Sea has a significant number of cables, primarily telecommunication connections between the UK and continental Europe (see ***Figure 17.2***). ***Table 17.13*** presents all subsea cables that pass through the East Anglia TWO offshore development area.

Table 17.13 Summary of Offshore Cables Which Intersect the Offshore Development Area

Asset Name	Asset Type	Operator	General Trajectory (approximate)	Interaction
Concerto 1 North	Telecommunications cable (operational)	Interoute	East to West	Windfarm site and offshore cable corridor
Concerto 1 South	Telecommunications cable (operational)	Interoute	West to East	Offshore cable corridor
Hermes North	Telecommunications cable (out of service)	Global Telesystems	West to East	Windfarm site and offshore cable corridor

Asset Name	Asset Type	Operator	General Trajectory (approximate)	Interaction
Atlantic Crossing 1	Telecommunications cable (out of service)	Global Crossing	West to East	Windfarm site
Greater Gabbard export cable route	Three transmission cables (operational)	Greater Gabbard OFTO Plc	North to South	Offshore cable corridor
Galloper export cable route	Two transmission cables (operational)	Galloper Wind Farm Limited	North to South	Offshore cable corridor
East Anglia ONE export cable route	Two transmission cables (in construction)	East Anglia ONE Limited	East to West	Windfarm site and offshore cable corridor
East Anglia THREE export cable route	Three transmission cables (in planning)	East Anglia THREE Limited	East to West	Windfarm site and offshore cable corridor

49. As part of their construction works, GWFL were granted a licence to remove a section of the Atlantic Crossing cable as it was no longer active. It is understood that GWFL have completed removal of the section of the Atlantic Crossing cable and that this cable is no longer active, however the Marine Management Organsiation (MMO) is currently waiting for confirmation that GWFL have completed activities. The Applicant has consulted with the owners of Atlantic Crossing (Global Crossing). As the Atlantic Crossing cable is out of service, it is anticipated that cable sections would be removed rather than crossed thus allowing East Anglia TWO offshore export cables to be buried. However, if cutting the Atlantic Crossing cables is not possible there is the potential for up to 55 cable crossings within the East Anglia TWO windfarm site (i.e. East Anglia TWO cables crossing with Atlantic Crossing and the East Anglia ONE and East Anglia THREE offshore export cables).

50. The worst case for total number of cable crossings are as follows:

- Export cable: 30 crossings;
- Platform link cables: 30 crossings; and
- Inter-array cables: 25 crossings.

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

17.5.5 Marine Aggregates

52. There are no licenced aggregate dredging areas within the offshore development area as shown in ***Figure 17.3***. The closest dredging area is licence area 430 (Southwold Aggregates Area) which lies 3km west of the East Anglia TWO windfarm site (3.4km to the south of the offshore cable corridor northern route and 3.6km to the north of the southern route). This licence area is operated jointly by Cemex and Tarmac Marine Limited.

53. 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 17.4***. The high potential aggregate resource area covers 5409km^2. As discussed in ***section 17.3.3.*** East Anglia TWO 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 1.7% of the potential resource area (see ***Chapter 4 Site Selection Assessment of Alternatives section 4.3.3.1.2***). he offshore cable corridor southern route was also amended to avoid a former licenced aggregate area (see ***Figure 17.4***) as far as practically possible (see ***section 17.3.3***). Therefore, the impact on high potential resource is not assessed further.

54. 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.

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

17.5.6 Dumping and Disposal Sites

56. The East Anglia TWO windfarm site overlaps the East Anglia THREE disposal site (HU212) (***Figure 17.3***). HU212 will be used to dispose of sea bed sediment dredged during the construction of East Anglia THREE. A new disposal site will be applied for to enable disposal of sediment during the construction of the East Anglia TWO windfarm and installation of the offshore cables.

57. Site NS111 (North Sea Dredge Test) (***Figure 17.3***) is closed and is known to have received 13,500 tonnes of sediment in 1998.

58. Other disposal sites in the vicinity of the offshore cable corridor are shown on ***Figure 17.3*** and include the following:

- Site TH026, designated for tracers[1], the site is closed and not for waste disposal, records indicate that it has never been used;
- Site TH057, Galloper Windfarm, is open for the disposal of pre-sweep material and drill arisings during construction.

59. Offshore surveys have been undertaken within the East Anglia TWO 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***.

60. Given that all disposal sites which overlap with the East Anglia TWO offshore development area will be closed at the time of the proposed East Anglia TWO project's construction (as East Anglia THREE will be built prior to the proposed East Anglia TWO 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

61. No Military practice and exercise areas (PEXAs) overlap with the East Anglia TWO offshore development area. The nearest PEXA sites are located 5km south (North Galloper – X5121) and 9km south-west (Outer Gabbard - X5117) of the East Anglia TWO windfarm site. There are no areas designated as submarine exercise areas or live firing areas in the vicinity of the East Anglia TWO offshore development area.

62. There are currently two MOD identified explosives dumping grounds 3km west 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 MMO. There are no areas for MOD submarine or live firing excercises within the offshore development area or its vicinity.

63. 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

64. 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

[1] 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).

closest point) as it approaches landfall (***Figure 17.5***). 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***).

65. There is a WaveRider buoy and guard buoy within the offshore cable corridor near shore. The WaveRider is used for monitoring coastal conditions for Sizewell A and Sizewell B.

17.5.9 Anticipated Trends in Future Baseline Conditions

66. 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.

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

68. 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

69. This section outlines the potential impacts during the lifecycle of the proposed East Anglia TWO project and their significance, using the methodology described in ***section 17.4.3*** and in ***Chapter 5 EIA Methodology***. They relate with those impacts listed in ***Table 17.2*** 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

70. It is anticipated that the proposed East Anglia TWO project would require up to 85 cable crossings in total. Construction activities, such as cable and foundation installation, vessel anchoring and debris clearing operations, in proximity to other cables and at cable crossings, have the potential to damage other sub-sea cables. 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.

71. In order to prevent impacts, the Applicant will enter into proximity and cable crossing agreements with other operators. These agreements will determine how cable crossings are made and how close construction activities can be to the existing cables. Agreements will also contain detailed requirements for the crossing and specific mitigation requirements for each crossing.

72. 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;
- Separation distances;
- Material used for protecting the crossing;
- Method of installation; and
- Methods for maintenance.

73. 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

74. As discussed in ***sections 17.3.3*** *and* ***17.5.8*** the East Anglia TWO offshore cable corridor has been 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. 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.

75. 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 Sizewell intakes reduces the risk of effect of suspended sediment being entrained (see ***Chapter 7 Marine Geology, Oceanography and Physical Processes***).

76. The WaveRider buoy which provides metocean data for EDF Energy and Cefas is located within the East Anglia TWO 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 but outside of the East Anglia TWO offshore cable corridor.

77. EDF Energy and GWFL agreed protective provisions for the construction, operation and decommissioning of Galloper export cables as part of their DCO[2]. 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.*

78. During the development of the East Anglia TWO 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 17.5.***

79. 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 (550m)

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

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 EDF Energy infrastructure.

80. 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 17.5**] will be as follows;*
  - *For the area south of a line starting at the Dividing Line [as shown in **Figure 17.5**], 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 17.5**], operations shall only be undertaken within periods of ebb tide and +/- 1 hour adjoining slack high and slack low water periods.*

81. The East Anglia TWO offshore cable corridor is to the south of the dividing line referred to above, and overlaps with the EDF Energy shallow water restriction area. Cable installation works would therefore be largely outside of the area detailed in the Galloper protective provisions particularly as the HDD exit point is routed to the south of the Coralline Crag formation and is outside of the shallow water restriction area. This is detailed further in ***Chapter 4 Site Selection and Assessment of Alternatives***.

82. 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 TWO offshore cable corridor, it is therefore not anticipated to have an impact EDF Energy or Sizewell infrastructure.

83. With regard to indirect impact, there is potential for East Anglia TWO 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***. With the incorporation of embedded and agreed mitigation measures, 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

84. 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***).

85. 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

86. During operation, maintenance may be required on the export cables. As discussed in ***section 17.6.1.2***, the East Anglia TWO 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

87. 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 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.

88. 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 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

89. 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 TWO 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

90. 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 TWO 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

91. 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

92. The potential impacts of the proposed East Anglia TWO 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

93. As previously discussed, transboundary impacts are considered for international assets within the footprint of the East Anglia TWO offshore development area, (i.e. the Concerto and Hermes telecommunications cables).

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

94. ***Table 17.14*** illustrates the inter-relationship between impacts discussed in this chapter and those discussed in other chapters.

Table 17.14 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

95. 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

96. ***Table 17.15*** summarises the predicted impacts on infrastructure and other users during the construction, operation and decommissioning of the proposed East Anglia TWO project.

Table 17.15 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**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Examples of Potential Mitigation Measure	Residual Impact
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**

17.12References

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