

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Environmental Statement Volume 2

Chapter 11: Infrastructure and Other Users

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Vattenfall Wind Power Ltd
Thanet Extension Offshore Wind Farm
Volume 2
Chapter 11: Infrastructure and Other Users
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11 INFRASTRUCTURE AND OTHER USERS

11.1 Introduction

11.1.1 This chapter has been prepared by GoBe Consultants Ltd and assesses the potential effects on Infrastructure and Other Users associated with the Thanet Extension Offshore Wind Farm (Thanet Extension). This chapter should be read in conjunction with the project description in Volume 2, Chapter 1: Project Description Offshore (Document Ref: 6.2.1). The following sections of this chapter include:

- A summary of relevant legislation and planning policy;
- A description of the methodology for the assessment, including details of the study area and the approach to the assessment of effects;
- A summary of consultation with stakeholders;
- A review of the baseline (existing) conditions;
- Details of the measures proposed as part of the project to avoid or reduce environmental effects, including mitigation and design measures proposed as part of the project (embedded mitigation);
- An assessment of the likely effects for the construction, Operations and Maintenance (O&M) and decommissioning phases of the project, taking into account the measures proposed;
- Identification of any further mitigation measures or monitoring required in relation to likely significant effects; and
- Assessment of any cumulative effects with other proposed developments.

11.1.2 This chapter of the Environmental Statement (ES) presents the findings to date of the Environmental Impact Assessment (EIA) for the potential impacts of Thanet Extension on infrastructure and other users. Specifically, this chapter considers the potential impacts of Thanet Extension seaward of Mean High Water Springs (MHWS) during its construction, Operation and Maintenance (O&M) and decommissioning phases.

11.1.3 Throughout this chapter, 'Infrastructure and Other Users' is used as a specific term to include the following types of activity within the infrastructure and other users study area:

- Other Offshore Wind Farms (OWFs);
- Cables and pipelines; and
- Disposal sites.

11.1.4 Unexploded Ordnance (UXO) is considered a risk to the project (at all stages of development) rather than an environmental risk. However, UXO up to 130 kg will be assessed within the appropriate ES Chapters. Commercial Fisheries (Volume 2, Chapter 9 (Document Ref: 6.2.9)), Shipping and Navigation (Volume 2, Chapter 10 (Document Ref: 6.2.10)), and Tourism and Recreation interests (Volume 3, Chapter 4 (Document Ref: 6.3.4)) are considered separately. Aviation and Radar receptors are considered in Volume 2, Chapter 12 (Document Ref: 6.2.12).

11.1.5 The primary purpose of the ES is to support the Development Consent Order (DCO) application for Thanet Extension under the Planning Act 2008. This ES constitutes the Environmental Information for Thanet Extension and sets out the findings of the EIA to date to support the applications consultation activities required under the Planning Act 2008. The EIA was finalised following completion of pre-application consultation and the ES will accompany the application to the Planning Inspectorate (PINS) for development consent.

11.2 Statutory and policy context

11.2.1 This section identifies legislation and national and local policy of particular relevance to Infrastructure and Other Users. The Planning Act 2008, the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and the Environment Act (1995) are considered along with the legislation relevant to Infrastructure and Other Users.

11.2.2 In addition to the above, the following relevant legislation has been considered:

- Convention on the International Regulations for Preventing Collisions at Sea 1972;
- The Marine and Coastal Access Act 2009; and
- The Merchant Shipping and Fishing Vessels (Control of Noise at Work) Regulations 2007.

11.2.3 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to infrastructure and other users, is contained in the Overarching National Policy Statement (NPS) for Energy (NPS EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (NPS EN-3; DECC, 2011b).

11.2.4 NPS EN-3 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 11.1.

Table 11.1: Summary of NPS EN-3 provisions relevant to infrastructure and other users

Policy/legislation	Key provisions	Section where provision addressed
NPS EN-3 Paragraph 2.6.179	Applicants should undertake an assessment of the potential effect of the proposed development on existing or permitted offshore infrastructure or activities.	This document includes an assessment of the potential effects of the proposed development on marine infrastructure and other users of the marine environment. See section 0 <i>et seq.</i>
NPS EN-3 Paragraphs 2.6.180 – 2.6.181	Applicants should establish stakeholder engagement with interested parties in the offshore sector in the development phase of the proposed OWF, with an aim to resolve as many issues as possible prior to the submission of an application. Such stakeholder engagement should continue throughout the life of the development.	Consultation with potentially affected stakeholders has been carried out from the early stages of the project and continues through the pre-application consultation process. Details of consultation are presented in Table 11.3.
NPS EN-3 Paragraph 2.6.184	Applicants should ensure site selection and site design of the proposed OWF has been made with a view to avoiding or minimising disruption or economic loss or adverse effect on safety to other offshore industries.	The proposed development has been designed to avoid or minimise effects on infrastructure and other users of the marine environment. Embedded mitigation is described in Table 11.12. See also Volume 1, Chapter 4: Site Selection and Alternatives (Document Ref: 6.1.4).

11.2.5 NPS EN-3 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 11.2.

Table 11.2: Summary of NPS EN-3 policy on decision making relevant to infrastructure and other users

Policy/legislation	Key provisions	Section where provision addressed
NPS EN-3 Paragraph 2.6.183	Where a wind farm potentially affects other offshore infrastructure or activity, a pragmatic approach should be employed by the Secretary of State (SoS). The SoS should expect the applicant to minimise negative impacts and reduce risks to as low as reasonably practicable.	The Thanet Extension impact assessment describes the steps that Vattenfall Wind Power Ltd (VWPL) has taken to avoid or reduce the impacts of the development (Table 11.12).
NPS- EN-3 Paragraph 2.6.184	The SoS should be satisfied that site selection and site design of the wind farm has been made with a view to avoiding or minimising disruption or economic loss or any adverse effects on safety to other offshore industries. The SoS should not consent applications, which pose unacceptable risks to safety after mitigation measures have been considered.	Thanet Extension has been sited to minimise conflicts with marine infrastructure and other users, where possible. In cases where conflict has been highlighted in early consultation, VWPL has, where appropriate and feasible, proposed mitigation measures to reduce or negate impacts (Table 11.12). See also Volume 1, Chapter 4: Site Selection and Alternatives (Document Ref: 6.1.4).
NPS EN-3 Paragraph 2.6.186	Where schemes have been carefully designed and the necessary consultation has been undertaken at an early stage, mitigation measures may be found that can negate or reduce effects on other offshore infrastructure or operations to a level sufficient to enable the SoS to grant consent.	
NPS EN-3 Paragraph 2.6.187	[In relation to mitigation] detailed discussions between the applicant and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application. As such, appropriate mitigation should be included in any application and ideally agreed between relevant parties.	
NPS EN-3 Paragraph 2.6.188	In some circumstances, the SoS may wish to consider the potential to use requirements involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.	

11.3 Consultation and Scoping

- 11.3.1 As part of the EIA process, a number of consultations were undertaken with various statutory and non-statutory authorities. A formal Scoping Opinion (PINS, 2017) was received following the submission of the Scoping Report (VWPL, 2016) as well as comments received from S42 consultation.
- 11.3.2 Table 11.3 summarises the key issues raised during consultation specific to infrastructure and other users, together with how these issues have been considered in the production of this ES.

Table 11.3: Summary of consultation undertaken during the Scoping Opinion and the S42 PEIR Consultation Phase relating to infrastructure and other users

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
Scoping Opinion (Paragraph 3.116)	The SoS does not consider that effects during construction, O&M or decommissioning of the proposed development upon the TOWF zone, London Array and Kentish Flats (and its extension) can be scoped out. The proximity of the proposed development and the fact that O&M activities in support of these take place from Ramsgate suggest that effects may occur.	The impact of Thanet Extension on other OWFs is considered in the impact assessment in construction, O&M and decommissioning phases (see paragraph 11.10.3 <i>et seq.</i>).
Scoping Opinion (Paragraph 3.117)	The SoS does agree that interference with oil and gas operations and aggregate dredging activities can be scoped out of the assessment on the basis that there are no such relevant operations identified (and in the case of oil and gas operations, future activity in the area is not likely).	Interference with oil and gas operations and aggregate dredging have been scoped out of the assessment and are therefore not included in this chapter.
Scoping Opinion (Paragraph 3.118)	The SoS would expect the Nemo Interconnector to be specifically considered as part of the ES alongside the other 'in-service' cables that are described.	The Nemo Interconnector is included as part of the baseline as an existing asset in the assessment alongside other cables (Table 11.8).
	The SoS agrees that effects on subsea cables during O&M of the proposed development can be scoped out on the basis that standard industry techniques would be followed for maintenance and/ or replacement to ensure	Effects on subsea cables during the O&M phase of Thanet Extension have been scoped out on this basis,

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	that other operators' cables and pipelines are not impacted.	and are therefore not included in this chapter.
Scoping Opinion (Paragraph 3.121)	Given the proximity to existing disposal sites as identified on Figure 2.13 of the Scoping Report, it is not agreed that direct and indirect impacts on these sites can be scoped out of further assessment during construction, O&M and decommissioning of the proposed development.	Potential effects on disposal sites are discussed in the assessment section of this ES (paragraph 11.10.25 <i>et seq.</i> and paragraph 11.11.8 <i>et seq.</i>).
Scoping Opinion (Paragraph 3.122)	The SoS does not agree that impacts on MoD activities can be scoped out at this stage.	Impacts to MoD activities are assessed in Volume 3, Chapter 11: Aviation and Radar (Document Ref: 6.3.11).
Scoping Opinion (Paragraph 3.123)	Initiation of UXO during all phases of the development can be scoped out of further assessment as detailed geophysical survey, investigations would identify abandoned UXO, and this is a health and safety risk, which will be carefully mitigated rather than being a specific environmental impact.	Clearance of UXO is not assessed in this chapter. UXO clearance is assessed up to 130 kg in relevant ES chapters.
Scoping Opinion (Paragraph 3.124)	The SoS does not agree that an assessment of cumulative effects can be scoped out entirely for the infrastructure and other users assessment.	An assessment of the potential cumulative effects of Thanet Extension on Infrastructure and Other Users is included in the assessment (section 11.13).

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
S42 Consultation Nemo Link Ltd 21/12/17	The proposed method of this offshore crossing will need to be assessed and the impacts on the Nemo Link Project’s subsea cables will need to be fully understood. At present, there is insufficient information from the Project to allow this assessment to take place.	Details of the proposed cable crossing scenarios can be found in Volume 2, Chapter 1: Offshore Project Description (Document Ref: 6.2.1). A detailed methodology will be provided to Nemo Link Ltd once the final cable route and crossing location is known, post-consent.
S42 Consultation Natural England 12/01/2018	We query whether oil and gas pipelines have been considered? Maps of the cumulative projects would also be helpful to include here.	Oil and gas activities were scoped out due to lack of presence in the area (Table 11.11). Other infrastructure is shown in Figure 11.1, Figure 11.2 and Figure 11.3.
S42 Consultation MMO 11/01/2018	Further clarity is required on the intention to include UXO removal/detonation within the ES. Volume 2, Chapter 11 table 11.3 Summary of consultation relating to infrastructure and other users (line 6) states “UXO clearance would be subject to a separate marine licence post-consent.” However, UXO removal is referred to as preparatory works (Volume 2, Chapter 1: Project Description para 1.4.57)	UXO clearance impact was not assessed in the PEIR but assessments of UXO up to 130 kg are included in the ES in relevant chapters (11.7.13).
S42 Consultation KWT 12/01/2018	We note that only offshore wind farms have been considered in the cumulative impact assessment. To capture the true nature of cumulative impacts, a broad range of activities must be considered such as UXO clearance, geophysical surveys, aggregate extraction and dredging, navigation and shipping operations (presence/numbers and collision risk), commercial fishing, cables and pipelines and coastal developments e.g. ports and harbours.	The cumulative effects assessment undertaken in each of the technical chapters considers the full suite of relevant industries as appropriate. The list of projects considered is as submitted to the relevant EIA Evidence Plan Technical Review Group, of which KWT were a member at the time of consultation.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
S42 Consultation The Coal Authority	I have checked the site location plan against the information held by the Coal Authority and whilst the southern area of the proposed wind farm (proposed offshore export cable corridor) falls within the coalfield area, I can confirm that the area does not contain any recorded risks from past coal mining activity and there are no surface coal resources present. On this basis we have no specific comments to make.	Noted
S42 Consultation BritNed	Regarding the letter from Vattenfall dated 22nd November 2017. From the information that I have received and the info from their web site I believe that they are constructing / constructed approximately 3 miles from our cable and therefore do not present any issues from their works. The only point of note that I would make is that they refer to London Array as the “nearest” utility at 11km, therefore my only request to Vattenfall is that they modify their documentation to reference us in the utilities section.	Comment has been addressed.

11.4 Scope and methodology

- 11.4.1 The assessment considers the potential interaction of Thanet Extension with current or planned operations and infrastructure of other marine users. Other users receptors scoped into the assessment are presented in Figure 11.1 to Figure 11.3, alongside the proposed development. The scope of the assessment has been defined through a process of consultation with the operators of existing marine infrastructure, and Geographical Information Systems (GIS) mapping of current operations and existing features.
- 11.4.2 The desk-based assessment and consultation identified issues for OWFs, cables and pipelines (although no pipelines have been identified), and disposal sites, which have been included within the scope of this assessment. There were also no outfalls or coastal linear infrastructure identified within the infrastructure and other users study area.

11.4.3 The study area in relation to other marine users varies in scale depending on the particular receptor. For example, as the position of existing offshore cables and pipelines are well known, the infrastructure and other users study area can be reduced to those exact locations. For each receptor described in this chapter, the spatial variability has been considered and an appropriate baseline description of that receptor's study area is provided.

11.4.4 The study area includes the Thanet Extension array area as well as the more linear Offshore Export Cable Corridor (OECC) beyond the array boundary, up to and including the intertidal zone at Pegwell Bay (landfall), defined as ending at MHWS. The offshore export cables will connect the array to the landfall at the cable transition joint bays.

11.5 Assessment criteria and assignment of significance

11.5.1 This assessment considers the potential impacts associated with the construction, O&M and decommissioning of Thanet Extension and the subsequent effects on the activities and infrastructure of other marine users. This assessment is based on publicly available data and consultation, which is summarised in section 11.3 (Consultation and Scoping) of this chapter.

11.5.2 The impact assessment for infrastructure and other users has been carried out in accordance with the approach described in Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3), drawn from the requirements of the Infrastructure Planning (EIA) Regulations 2017.

11.5.3 Information about the project and the project activities for all stages of the project cycle (construction, O&M and decommissioning) have been combined with information about the environmental baseline to identify the potential interactions between the project and the environment. These potential interactions are known as potential impacts. The potential impacts are then assessed to give a level of significance of effect upon the receiving environment/ receptors.

11.5.4 The outcome of the assessment is to determine the significance of these effects against predetermined criteria.

11.5.5 The magnitude of potential impacts is defined by a series of factors including the spatial extent of any potential interaction, the likelihood, duration, frequency and reversibility of a potential impact. The definitions of the levels of magnitude used in the assessment are as shown in Table 11.4.

Table 11.4: Magnitude of Impact

Magnitude	Definition
High	Total loss of ability to carry on activities. Impact is of extended temporal or physical extent and of long-term duration (i.e. total life of project) and/ or frequency of repetition is continuous and/ or effect is not reversible.
Medium	Loss or alteration to significant portions of key components of current activity leading to a reduction in the level of activity that may be undertaken and/ or physical extent of impact is moderate and/ or medium-term duration (i.e. operational period) and/ or frequency of repetition is medium to continuous and/ or effect is not reversible for the project phase.
Low	Very slight change from baseline condition and/ or physical extent of impact is negligible and/ or short-term duration (i.e. construction period) and/ or frequency of repetition is negligible to continuous and/ or effect is reversible.
Negligible	No change from baseline conditions.

11.5.6 The sensitivities of infrastructure and other user receptors are defined by both their potential vulnerability to an impact from the proposed development, their recoverability, and the value or importance of the receptor. The definition of terms relating to the sensitivity of infrastructure and other user receptors is detailed in Table 11.5.

Table 11.5: Sensitivity/ importance of the environment

Receptor sensitivity/ importance	Description/ reason
High	Receptor is of high value or importance, with critical importance to the local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long-term or not possible.
Medium	Receptor is of medium value or importance, with reasonable contribution to the value of the local, regional or national economy. Receptor is moderately vulnerable to impacts that may arise from the project and has moderate to high levels of recoverability.
Low	Receptor is of minor value or importance with small levels of contribution to the value of the local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the project and/ or has high recoverability.
Negligible	Receptor is of very low value or importance, with negligible contribution to the value of the local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the project and/ or has high recoverability.

11.5.7 The matrix used for the assessment of significance is shown in Table 11.6. The magnitude of the impact is correlated against the sensitivity of the receptor to provide a level of significance.

11.5.8 For the purposes of this assessment any effect that is moderate or major, and shaded in Table 11.6, is considered to be significant in EIA terms. Any effect that is minor or below, and not shaded, is considered not significant.

Table 11.6: Significance of potential effects

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

Note: Shaded cells are defined as significant effects in respect of the EIA

11.6 Uncertainty and technical difficulties encountered

11.6.1 Charts have been prepared to inform the impact assessment only and are prepared with the best available data at the time. However, the data and charts used are considered appropriate and sufficient for the purposes of the assessment.

11.7 Existing environment

11.7.1 The study area in relation to infrastructure and other users varies in scale depending on the particular receptor, as explained in paragraph 11.4.3 *et seq.*

11.7.2 Information on infrastructure and other users within the study area was collected through a detailed desktop review of existing studies and datasets, through consultation, and through the use of GIS.

Offshore wind farms

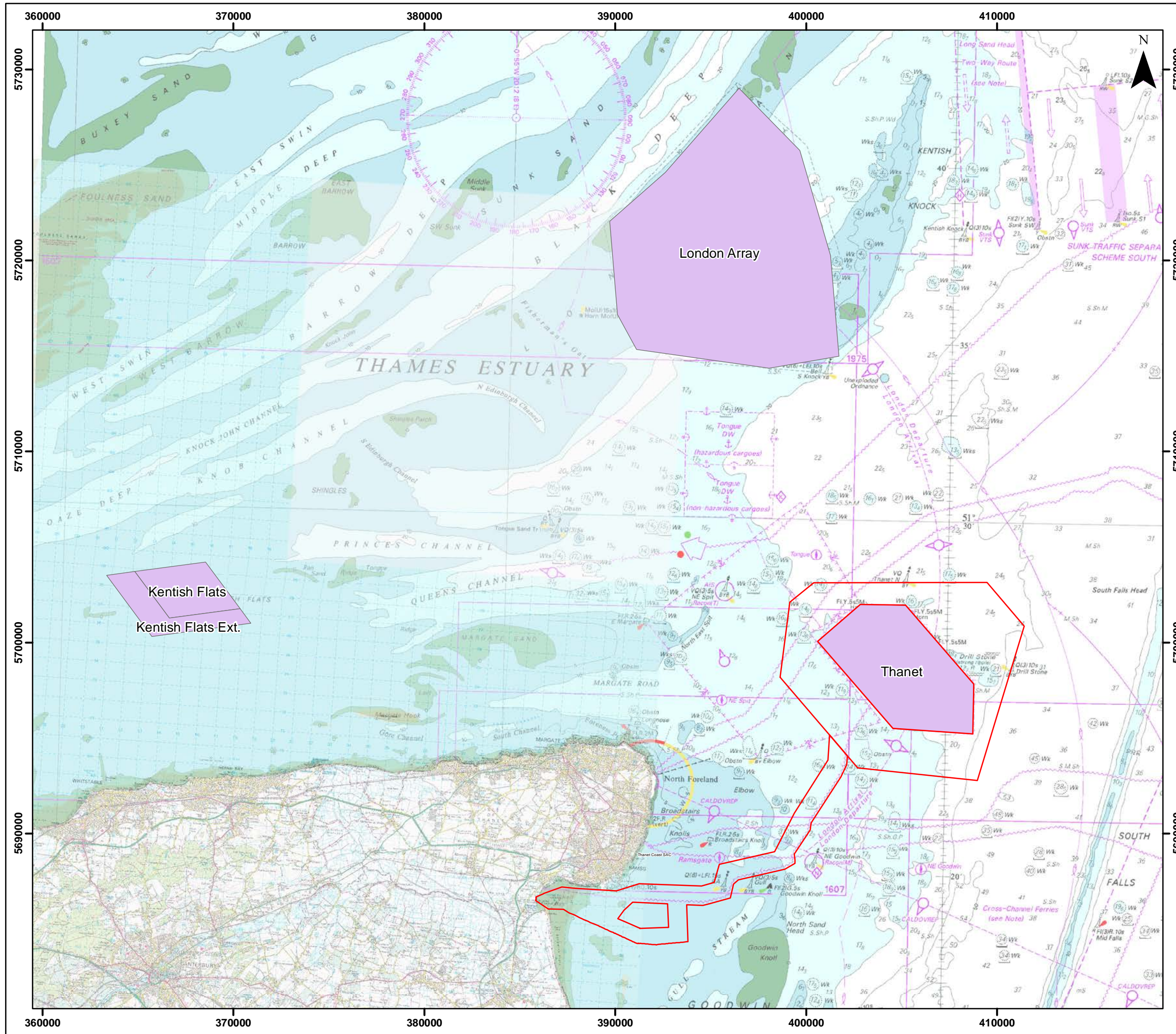
11.7.3 This section provides an overview of OWF activity within the vicinity of Thanet Extension, specifically those identified in the Scoping Opinion and Consultation (Table 11.3). OWFs are shown in Figure 11.1, and are described in Table 11.7.

11.7.4 The closest consented OWF (other than the existing Thanet Offshore Wind Farm (TOWF)) is London Array (11 km from the array area and 19 km from the OECC). As agreed through consultation and scoping (Table 11.3), the existing TOWF (located entirely within the proposed Thanet Extension boundary), Kentish Flats (27 km from the array area and 21 km from the OECC) and Kentish Flats Extension (KFE) (26 km from the array area and 21 km from the OECC) are also considered in this assessment. These projects are scoped into the assessment because of the use of the Port of Ramsgate for O&M activities. Other OWF projects such as Greater Gabbard (34 km from the array area and 45 km from the OECC) and The Gunfleet Sands projects (36 km from the array area and 43 km from the OECC) are scoped out of further assessment as their O&M activities operate out of other ports and harbours.

11.7.5 There are a number of other OWFs under construction across the southern North Sea. The closest of these is Galloper OWF (34 km from the array area and 45 km from the OECC). Planned and proposed wind farms are considered in the cumulative effects assessment (section 11.13).

Table 11.7: Offshore wind farms located within the infrastructure and other users study area

Offshore Wind Farm	Distance from array area (km)	Distance from OECC (km)
TOWF	0	3
London Array	11	19
Kentish Flats	27	21
KFE	26	21

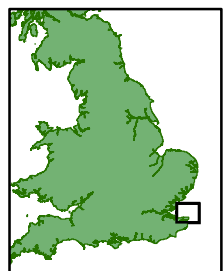


THANET EXTENSION OFFSHORE WIND FARM

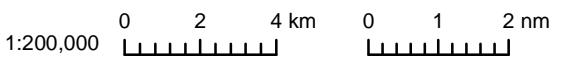
Figure 11.1
Other Offshore Wind Farms within the Infrastructure and Other Users Study Area.

- Legend**
- Offshore Red Line Boundary
 - Other Offshore Wind Farms

Datum: ETRS 1989
Projection: UTM31N



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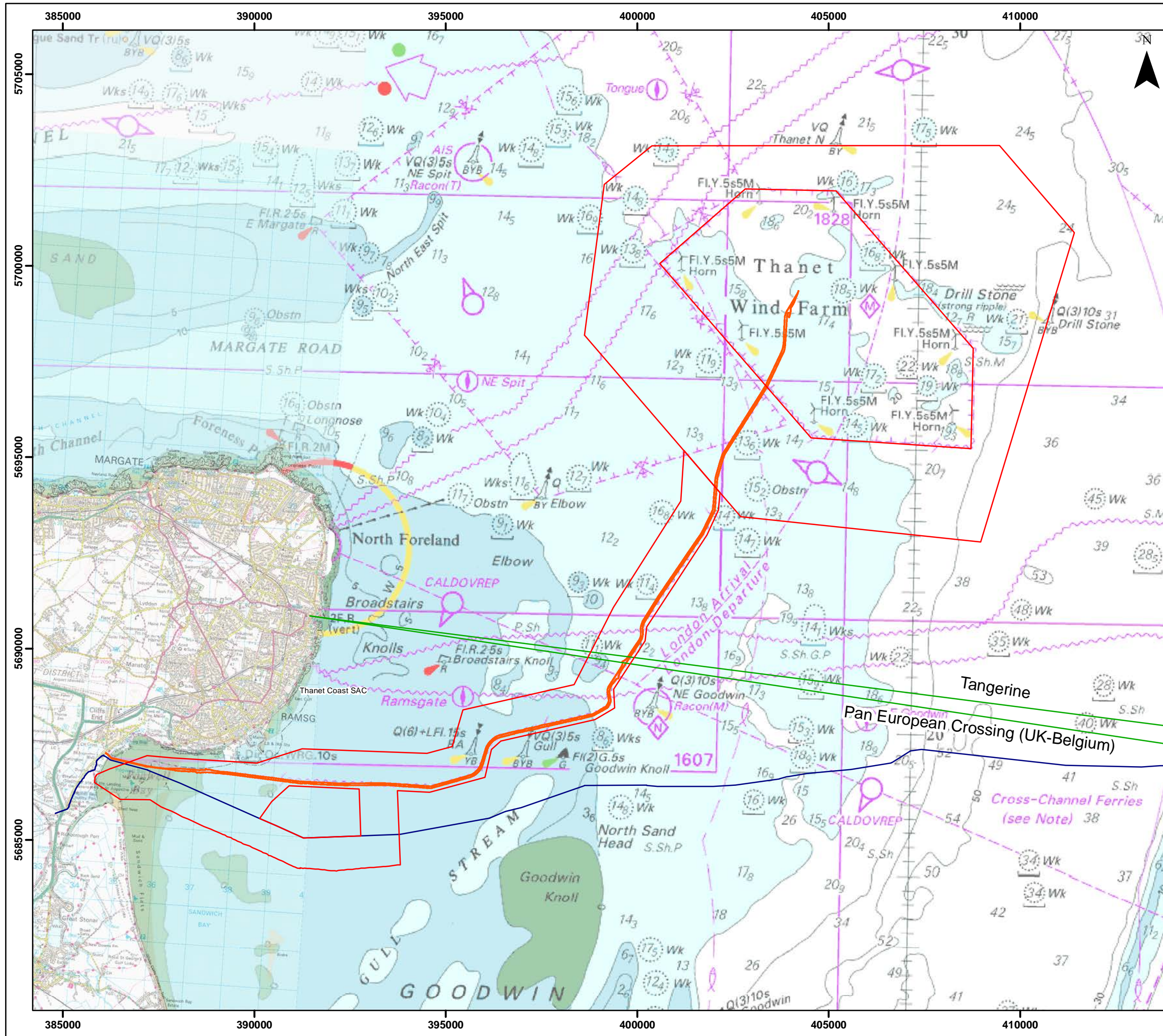
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Cables and pipelines

- 11.7.6 This section provides an overview of cables within the infrastructure and other users study area for cable and pipeline operators. Cables and pipelines are shown in Figure 11.2, and described in Table 11.8.
- 11.7.7 Thanet Extension is in close proximity to the existing TOWF cables, which almost entirely overlap with the Thanet Extension boundary.
- 11.7.8 The Thanet Extension OECC crosses two existing telecommunications cables: Tangerine and the Pan-European Crossing, which are located 3 and 4 km from the array area, respectively.
- 11.7.9 As agreed through Scoping, the Nemo Interconnector is to be included as an ‘in-service’ project, rather than in the cumulative effects assessment (Table 11.3). The Thanet Extension offshore export cable will come within 1 km of the Nemo Interconnector and may cross it if the southern export cable route is chosen.
- 11.7.10 The next nearest cable outside of the 1 km study area is the BritNed Power cable, between Britain and the Netherlands. This passes approximately 4.8 km from the array area.
- 11.7.11 No pipelines have been identified within the vicinity of Thanet Extension.

Table 11.8: Cables and pipelines identified within the infrastructure and other users study area

Cable	Cable type	Distance from array area (km)	Distance from OECC (km)
TOWF cables	Electrical	0	0
Tangerine	Telecommunications	3	0
Pan-European Crossing	Telecommunications	4	0
Nemo Interconnector	Electrical	5	0



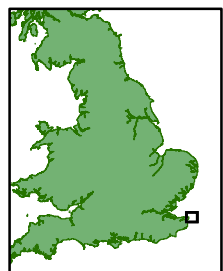
THANET EXTENSION OFFSHORE WIND FARM

Figure 11.2
Subsea Cables within the Infrastructure and Other Users Study Area.

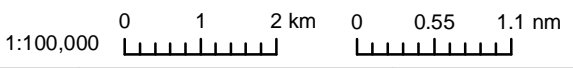
Legend

- Offshore Red Line Boundary
- Telecommunications Cables
- TOWF Cables
- Nemo Cable

Datum: ETRS 1989
Projection: UTM31N



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Disposal sites

11.7.12 This section provides an overview of disposal sites within the infrastructure and other users study area for disposal sites. Only marine sediment dredged from dock sites and navigation channels, and small amounts of fish waste are permitted to be disposed of at sea, with industrial waste banned since 1992 and sewage sludge since 1998 (Cefas, 2009). In 2007, the UK granted 101 permits for the disposal of dredged material and no permits for other types of waste (DECC, 2011c). Disposal sites are shown in Figure 11.3. The disposal sites within the 12 km study area are described in Table 11.9:

11.7.13 The presence of munitions on the UK continental shelf (UKCS) is a historical legacy presenting a risk to users of the marine environment (DECC, 2011c). Between 2004 and 2008, the UK reported 703 munitions encounters, with the highest density of encounters reported in the southern North Sea between the UK and the Netherlands, and with no clear relationship between the locations of known munitions dumpsites and the encounters (DECC, 2011c). An UXO survey will be required as part of pre-construction works for the Thanet Extension array area and offshore export cable corridor which will be used to determine any ad-hoc ordnance disposal.

11.7.14 The process of clearing any discovered UXOs will entail a temporary exclusion zone for other vessels. Full details of the potential impacts caused by UXO detonation can be found in Volume 2, Chapter 6: Fish and Shellfish Ecology (Document Ref: 6.2.6), Volume 2, Chapter 7: Marine Mammals (Document Ref: 6.2.7) and the Draft MMMP – UXO (Document Ref: 8.12).

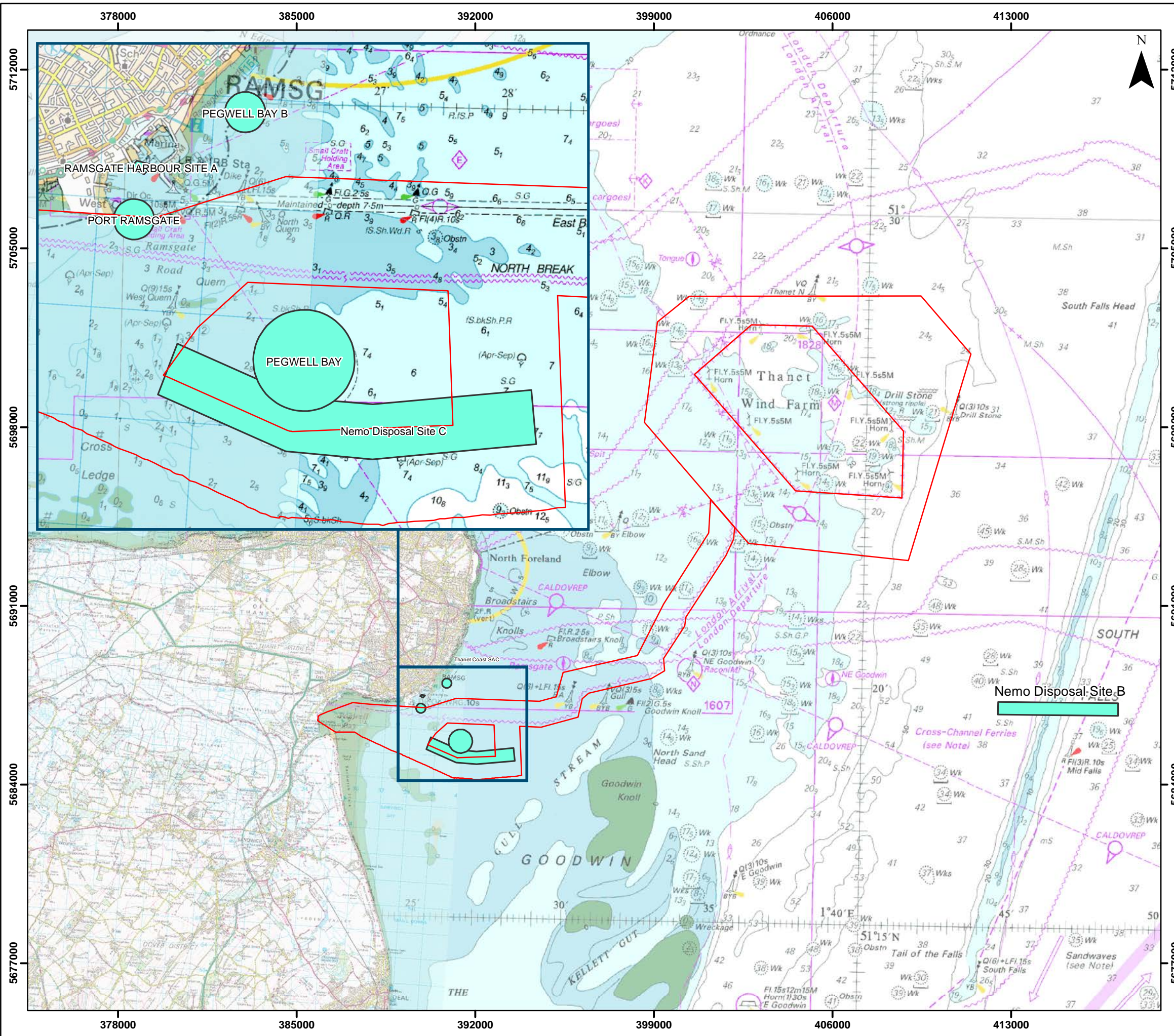
Table 11.9: Disposal sites identified within the infrastructure and other users study area

Disposal site	Distance from array area (km)	Distance from OECC (km)
Nemo disposal site B	7	12
Nemo disposal site C	12	0
Pegwell Bay disposal site A	13	0
Pegwell Bay disposal site B	12	0
Ramsgate Harbour site A	13	0
Ramsgate Harbour site B	14	0

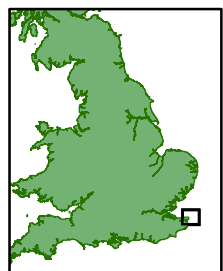
THANET EXTENSION OFFSHORE WIND FARM

Figure 11.3
Disposal Sites within the Infrastructure and Other Users Study Area.

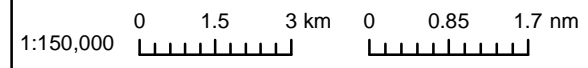
- Legend**
- Offshore Red Line Boundary
 - Disposal Sites



Datum: ETRS 1989
Projection: UTM31N



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Drg No	TEOW_ES_Disposal_Fig_11.3	Figure 11.3
Rev	0.1 Date 22/05/2018	
By	DP Layout N/A	

11.8 Key parameters for assessment

- 11.8.1 The Thanet Extension project infrastructure is described in Volume 2, Chapter 1: Project Description Offshore of this ES (Document Ref: 6.2.1). As discussed in Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3), a maximum development envelope based on the Rochdale envelope principle has been developed for the project EIA. Table 11.10 describes the maximum design scenario for each potential effect on infrastructure and other users upon which this assessment has been based.
- 11.8.2 The maximum design scenarios set out in Table 11.10 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in Volume 2, Chapter 1: Project Description Offshore (Document Ref: 6.2.1). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope to that assessed here be taken forward in the final design scheme.
- 11.8.3 On the basis of the baseline environment and the project description outlined in Volume 2, Chapter 1: Project Description Offshore (Document Ref: 6.2.1), a number of impacts are proposed to be scoped out of the assessment for Infrastructure and Other Users. These impacts are outlined, together with a justification for scoping them out, in Table 11.11.

Table 11.10: Design envelope scenario assessed

Potential effect	Maximum design scenario assessed	Justification
Construction		
Disturbance to the O&M activities of other OWFs due to the use of the Port of Ramsgate	<p>A total of 1,160 vessel movements are expected in the construction phase of Thanet Extension.</p> <p>500 m safety zones applied around offshore wind turbines and the offshore substation (if required) under construction.</p> <p>Advisory safety distances of 500 m will be recommended around vessels undertaking construction activities.</p> <p>A maximum construction phase of 28 months.</p>	The maximum number of vessels and vessel movements over the longest duration that could interfere with activities of O&M vessels associated with other OWFs.
Disturbance to existing cables and pipelines during construction	<p>500 m safety zones applied around offshore wind turbines and the offshore substation under construction.</p> <p>Advisory safety distances of 500 m will be recommended around vessels undertaking construction activities.</p> <p>Pre-sweeping, using a trailed suction hopper dredger, of a 0.48 km² area of the export cable route.</p> <p>Installation of up to 36 foundations (34 wind turbines, one met mast and one OSS).</p> <p>Installation of up to 64 km of inter-array cabling by ploughing (10 m disturbance corridor). 30,600 m² from cable barge anchor placement associated with inter-array cable installation.</p> <p>Installation of up to four export cables to a total of 120 km in total by ploughing, to a maximum depth of 3m.</p> <p>34,560 m² from cable barge anchor placement associated with export cable laying.</p> <p>Direct damage and disturbance of 39,329 m² for up to 34 turbines, one met mast and one offshore substation (assuming six 'legs' per vessel and two jack-up operations per turbine/substation).</p> <p>Offshore construction activities are expected to take place over a maximum of 28 months.</p>	The maximum amount of infrastructure and associated safety zones and advisory safety distances leading to the crossing of the greatest number of existing cables and the greatest area potentially affected, over the maximum construction period.
Restriction of access to existing cables and pipelines during construction	As above.	As above.
Increased burial of existing cables and pipelines as a result of increased sediment deposition	<p>Temporary increases in suspended sediment concentrations and associated sediment deposition as a result of:</p> <p>Foundations:</p> <p>The installation of 30 quadropod suction caisson foundations (28 turbine foundations, one met mast and one OSS), and associated seabed preparation works, resulting in 288,000 m³ of sediment dredged and deposited at the surface;</p> <p>Cable installation:</p> <p>Installation of 64 km of inter-array cable by jetting, to a maximum depth of 3 m resulting in 96,000 m³ of sediment being displaced (v-shaped trench width of 1 m and 100% of sediment in the trench being liquidised);</p>	<p>The maximum adverse scenario for foundation installation is jacket foundations for 12 MW turbines, which would comprise 3.5 m pin-piles (compared to 3 m pin-piles for the 8 or 10 MW turbines). The increased diameter of the pin-piles would result in the largest spoil volume compared to the smaller volume by more numerous smaller pin-piles.</p> <p>Of the methods proposed for cable installation, jetting results in the greatest volume of sediment dispersed as it is assumed that 100% of the sediment is liquidised, whereas for any other method, less sediment would be suspended.</p>

Potential effect	Maximum design scenario assessed	Justification
	Installation of 120 km of export cable by jetting, to a depth of 3 m resulting in 1,740,000 m ³ of sediment being displaced (v-shaped trench, width of 10 m and 100% of sediment being liquidised); Pre-sweeping, using a suction dredger, of 1,440,000 m ³ of the export cable route with all sediment disposed of in the water column along the cable route.	Predicted increases in suspended sediment and sediment deposition assumes the greatest number and length of cables and the greatest cable depth.
Impacts to disposal sites from increased sediment deposition	As above.	As above
Restriction of use of disposal sites during construction	As per 'Temporary disturbance, or restriction of access, to existing cables and pipelines during construction'.	The maximum amount of infrastructure and associated safety zones and advisory safety distances leading to the crossing of the greatest number of existing cables and the greatest area potentially affected.
O&M		
Disturbance to the O&M activities of other OWFs due to the use of the Port of Ramsgate	A total of five O&M vessels operating out of Ramsgate Harbour. A maximum of 307 vessel movements per year of operation.	The maximum number of vessels and vessel movements that could interfere with activities of O&M vessels associated with other offshore wind farms.
Restriction of use of disposal sites during operation and maintenance activities	As above.	As above.
Decommissioning		
Impacts from decommissioning are expected to be similar to those listed above for construction, if project infrastructure is removed from the seabed at the end of the development's operational life. If it is deemed closer to the time of decommissioning that removal of certain parts of the development (e.g. cables) would have a greater environmental impact than leaving <i>in situ</i> , it may be preferable to leave those parts <i>in situ</i> . In this case, the impacts would be similar to those described for the operational phase.		
Cumulative effects		
Cumulative effects are assessed in Section 11.13.		

Table 11.11: Potential impacts scoped out of the assessment for Infrastructure and Other Users

Potential impact scoped out	Development stage	Justification
Interference with oil and gas operations	All stages	No relevant operations identified and future activity in the area is not likely (Table 11.3).
Interference with aggregate dredging activities	All stages	No relevant operations identified (Table 11.3).
Impacts to subsea cables	O&M	Standard industry techniques would be followed for maintenance and/ or replacement to ensure other operators' cables are not impacted (Table 11.3).
Initiation of UXO	All stages	Further geophysical surveys and investigation would identify abandoned UXO. This impact is considered a health and safety risk, which will be carefully mitigated rather than being a specific environmental impact with reference to infrastructure and other users (Table 11.3).

11.9 Embedded mitigation

- 11.9.1 Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to other marine users are listed in Table 11.12.
- 11.9.2 . General mitigation measures, which would apply to all parts of the offshore works, are set out first. These measures are considered standard industry practice for this type of development. For further details, refer to Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3). Thereafter mitigation measures that would apply specifically to infrastructure and other users associated within the development boundary, are described separately.
- 11.9.3 In the event further mitigation is to be proposed which cannot be embedded into the project, this has been included as proposed additional mitigation. The residual significance of effect is then assessed.

Table 11.12: Embedded mitigation relating to Infrastructure and Other Users

Parameter	Mitigation measures embedded into the project design
General	
Other vessels	Promulgation of information including regular Notices to Mariners (NtMs), navigational aids and marine charting updates will be utilised.
Construction	
Safety zones	It is the intention of VWPL to apply for a standard 500 m safety zone around each of the wind turbines and OSS whilst construction activities are ongoing. Safety zones of 50 m may be sought for incomplete structures where construction activity may be temporarily paused (and therefore the 500 m safety zone has lapsed). Guard vessels in operation to ensure other users do not enter safety zones.
Advisory safety distances	500 m advisory safety distances will be recommended around vessels undertaking construction activities. Guard vessels in operation to ensure other users do not enter safety zones.
Subsea cables	Cable crossings will be designed in line with best practice and will ensure suitable protection is proffered to both the existing asset(s) and the proposed project.
Subsea cables	Standard industry techniques will be used to ensure no operational impacts to other subsea cables during operation. A cable burial risk assessment will set out appropriate installation methods.
Other vessels	One or more guard vessels will be present and maintain a position close to maintenance vessels. Guard vessels will monitor tracks of passing vessels and any potential interaction with construction vessels.
O&M	
Advisory safety distances	500 m advisory safety distances will be recommended around vessels undertaking major maintenance activities. Guard vessels in operation to ensure other users do not enter safety zones.
Decommissioning	
Other vessels	Prior to the expiry of any consent granted for Thanet Extension, consultation with BEIS (Department for Business, Energy and Industrial Strategy) and any other relevant bodies would be carried out to determine appropriate safety buffers to be maintained around decommissioning vessels.

11.10 Environmental assessment: construction phase

- 11.10.1 This section provides an environmental assessment of the potential effects to infrastructure and other users in the construction phase of Thanet Extension. The effects arising from the construction of Thanet Extension are listed in Table 11.10 along with the design envelope parameters against which each construction phase impact has been assessed.
- 11.10.2 A description of the significance of effects upon infrastructure and other user receptors caused by each identified impact is given below.

Impacts on the O&M activities of other OWFs due to the use of the Port of Ramsgate

- 11.10.3 The construction activities of Thanet Extension have the potential to have an impact on the O&M activities of other OWFs in the area. The construction of Thanet Extension will have minimal impacts in terms of disruption to passing traffic (Volume 2, Chapter 10: Shipping and Navigation (Document Ref: 6.2.10)), however the maintenance vessels for the other OWFs identified are operated out of Ramsgate Harbour and will pass close to or through the Thanet Extension boundary.
- 11.10.4 A maximum of 48 vessels will be present on site at any one time (29 average) with a total of 1,160 vessel movements throughout the construction phase (25 months). The larger installation vessels (such as jack-up vessels), transport barges and cable laying vessels are likely to transit directly to the site from their homeports, or from construction ports (turbine, cable, foundation etc.). The vessels likely to operate out of Ramsgate harbour are likely to be the smaller vessels, such as Crew Transfer Vessels (CTVs).
- 11.10.5 The impact is considered to be localised, intermittent and reversible. The magnitude of the impact is therefore considered to be Negligible.
- 11.10.6 The O&M of other offshore wind assets in the area is vital for their continued operation, however there are established mechanisms and mitigation (such as the issuing of NtMs). The receptor is considered to be of low vulnerability, high recoverability and of high value. The sensitivity is therefore considered to be Medium.
- 11.10.7 Overall, it is predicted that the sensitivity of the receptor is Medium and the magnitude of the impact is Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Disturbance to existing cables and pipelines during construction

- 11.10.8 The Thanet Extension cables will cross two telecommunications cables, and will be within 500 m of the existing TOWF cables and the Nemo Interconnector (which may also be crossed). The TOWF cables also pass through the array area.

- 11.10.9 The construction of Thanet Extension represents a risk to existing cables through the deployment of jack-up vessels, anchor placement, cable pre-sweeping and cable installation itself.
- 11.10.10 The pre-construction survey will include geophysical and magnetometer surveys that will be able to identify existing assets, including out of service cables, which may be in a different position to their charted location because of past use of outdated locating techniques. Micrositing will be carried out as required in order to avoid, and maintain a safe distance from, existing cables.
- 11.10.11 Crossing agreements will include the ability of a cable operator to access their infrastructure during the construction of Thanet Extension as far as practicable, though exclusion will be required as identified in Table 11.10. The crossing agreements would ensure close communication and planning between both parties to ensure disruption of activities is minimised, and that risks are reduced to acceptable levels. The magnitude of potential impacts to cable crossings can therefore be considered negligible. A number of potential methodologies for cable crossings are under consideration, including rock dumping, concrete mattressing, and steel or concrete bridging. The final crossing design will be determined post-consent, in conjunction with the asset owner.
- 11.10.12 The impact is predicted to be of local spatial extent, short-term duration, intermittent and reversible. The magnitude therefore, is considered to be Negligible.
- 11.10.13 Disturbance to existing cables has the potential to damage, reduce efficiency, de-bury, or even cause failure of those assets. The operators of active cables are deemed to be of medium vulnerability, medium recoverability, and high value. The sensitivity of the receptor is therefore deemed to be High.
- 11.10.14 Overall, it is predicted that the sensitivity of the receptor is considered to be High and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Restriction of access to existing cables and pipelines during construction

- 11.10.15 As stated previously the Thanet Extension cables will cross two telecommunications cables, and will be within 500 m of the existing TOWF cables and the Nemo Interconnector (which may also be crossed). The TOWF cables also pass through the array area.
- 11.10.16 There is the potential that repair or maintenance works are required to existing cables in the vicinity of Thanet Extension construction works (including pre-construction activities, and construction safety zones), and at the same time as construction works are occurring. The likelihood of this happening is extremely low, and embedded mitigation measures (Table 11.12) will substantially reduce the magnitude of this risk.
- 11.10.17 The impact is predicted to be of local spatial extent, short-term duration, intermittent and reversible. The magnitude is therefore considered to be Negligible.

11.10.18 Restriction of access to an active cable for inspection and maintenance activities could be critical to the operation of that cable. Pipeline and cable crossings are common across the UK Continental Shelf (UKCS), and there are established mechanisms for controlling the level of impact to both parties. The operators of active cables are deemed to be of medium vulnerability, medium recoverability, and high value. However, due to the very low likelihood of spatial and temporal overlap of repair works with the construction of Thanet Extension, and the embedded mitigation in place, the sensitivity of the receptor is therefore considered to be Medium.

11.10.19 Overall, it is predicted that the sensitivity of the receptor is Medium, and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Increased burial of existing cables and pipelines as a result of increased sediment deposition

11.10.20 During construction, there is the possibility of increased burial of existing cables from the deposition of sediment suspended during construction and installation of Thanet Extension. The scenario that represents the worst-case is the use of jetting tools (including mass flow excavators) which are assumed to result in 100% of the material within the cable trench being liquidised and dispersed in the lower water column, as well as the drilling of up to 50% of foundations with the drill arisings being deposited at the surface.

11.10.21 The likely increases in Suspended Sediment Concentration (SSC) and associated sediment deposition are described in detail in paragraphs 11.10.25 *et seq.*

11.10.22 The magnitude of the maximum potential increase in sediment deposition resulting from construction activities is within the natural range of the region and the impact will be short-term, intermittent, of localised extent and reversible. Sufficient distance between the installed Thanet Extension cable and existing cables will be left such that any changes in bed height above other cable locations will be immeasurable in practice. The magnitude of the impact is therefore considered to be Negligible.

11.10.23 Increased burial could impede access to an active cable for inspection and maintenance activities that could be critical to the operation of that cable. Pipeline and cable crossings are common across the UK Continental Shelf (UKCS), and there are established mechanisms for controlling the level of impact to both parties. The operators of active cables are deemed to be of medium vulnerability, medium recoverability, and high value. The sensitivity of the receptor is therefore considered to be High.

11.10.24 Overall, it is predicted that the sensitivity of the receptor is High and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Impacts to disposal sites from increased sediment deposition

11.10.25 Construction activities have the potential to cause changes to seabed composition and bathymetry due to potential increases in suspended sediment and associated sediment deposition. This has the potential to have impacts on marine disposal sites by increasing the seabed level within disposal sites. The scenario that represents the worst-case is the use of jetting tools (including mass flow excavators) which are assumed to result in 100% of the material within the cable trench being liquidised and dispersed in the lower water column, as well as the drilling of up to 50% of foundations with the drill arisings being deposited at the surface.

11.10.26 The Thanet Extension offshore cable route overlaps with two disposal sites (Nemo disposal site C and Ramsgate Harbour site B, and comes within less than 1 km of three others (Pegwell A and B, Ramsgate Harbour A).

11.10.27 The resulting initial SSC is dependent on the rate of release and the height at which the displaced sediment is initially dispersed. Some of these details are not presently available for Thanet Extension and some details can only ever be assumed in any case. Typically, the initial SSC at the point of release will be very high (in the order of hundreds of thousands of mg/l for all sediment types). The initial plume will act under gravity to sink down through the water column (dynamic phase). Coarser sediments in the plume will settle relatively quickly (0.05 - 0.5 m/s) and so may return to the seabed within a matter of seconds to minutes after being suspended. The downstream extent of the plume is therefore limited to the distance that the plume can be advected by ambient current speeds in that short time. In the passive plume phase, finer sediments may persist in the water column for longer (hours to days) and so can be advected over greater distances by ambient currents. SSC will reduce to near background levels with time due to natural dispersion and deposition. The maximum extent of this plume will initially be limited to the tidal excursion distance, although low level effects can be advected further by longer-term residual currents, although SSC is likely to be below background levels by this point.

11.10.28 Across much of the array area and offshore export cable corridor, the seabed sediment comprises coarse sand and gravel (Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (Document Ref: 6.2.2)). As such, dredging/ trenching/ jetting of this material is not expected to create persistent plumes, as the coarse material would quickly settle to the seabed. However, the disturbance of the finer grained sediments has the potential to give rise to more persistent plumes that settle out of suspension over a wider area than for coarse-grained sediments. Monthly averaged satellite imagery of surface suspended particulate matter suggests that, levels are generally greater than 10 mg/l, increasing through the winter period to 30 – 80 mg/l and occasionally reaching up to 100 mg/l. At the seabed, localised increases of up to several hundred mg/l are anticipated during storm events.

11.10.29 It has been predicted for drilling operations for monopile foundations (Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (Document Ref: 6.2.2)) that sand sized material could remain in suspension for approximately 15 minutes and therefore may be transported up to approximately 0.5 km. Assuming that 50% of turbine locations require drilling, as well as one monopile OSS and one monopile met mast, the maximum total volume that could theoretically be released from drilling is 20,782 m³, resulting in an average bed elevation of 0.3 mm over the array area (equivalent to an average increase of 5 cm over an area equal to 0.6% of the array area). In practice, this change would comprise a series of discrete deposits (smaller overlapping and non-overlapping deposits), distributed throughout parts of the array area. Individual deposits are likely to be relatively thicker on average than the example value of 5 cm, with a correspondingly smaller area of effect.

11.10.30 For suction caisson foundations, some seabed preparation may be required prior to their installation. Assuming 28, 12 MW turbines, one met mast and one OSS, the maximum total dredge spoil could be up to 288,000 m³, resulting in a seabed elevation of 5 cm over approximately 13.3% of the array area. As above, in practice, this would result in a series of discrete deposits distributed at locations around the array area, that are thicker than the example of 5 cm, but covering a smaller area.

11.10.31 The impact of cable installation operations mainly relates to a localised and temporary re-suspension and settling of sediments. The exact nature of the disturbance will be determined by the sediment conditions, the length of installed cable, burial depth and burial method. The maximum adverse scenario for cable installation involves jetting into a V-shaped trench measuring 3 m wide and 3 m deep (although this may be up to 5 m in very localised areas where soft sediment is present). Due to the expected low height of release/ injection, the effect of coarser sands and gravels on SSC and deposition will be spatially limited to up to approximately 20 m for gravels and up to a few hundred metres for sands. Finer material may be advected over a few thousand metres, but to near background concentrations (tens of mg/l). The volumes of material being displaced and deposited locally are relatively limited (up to 7.5 m³ per metre of cable assuming a maximum depth of 5 m in soft sediments, although this is likely to be much less, where cable burial is limited to 3 m). The distance to which this volume of material may be spread to an increase in bed level of 5 cm is 150 m from the cable. However, it is expected that the extent (and so area) of deposition will be smaller for sands and gravels (leading to a greater thickness of tens of centimetres to a few metres), and that fine material will be distributed more widely, becoming so dispersed that it is unlikely to settle in a measurable thickness.

11.10.32 There is sufficient distance between the array area and disposal sites that any increases in bed level will be immeasurable in practice. However, the closest disposal sites overlap with the Thanet Extension OECC and therefore may be more affected by sediment deposited from cable installation activities. It is expected that increases in bed level may be up to 5 cm within 150 m of the cable. The magnitude of the maximum potential increase in sediment deposition resulting from construction activities is within the natural range in the region and the impact will be short-term, intermittent and reversible. The magnitude of the impact is therefore considered to be Negligible.

11.10.33 Increases in bed level at disposal sites could be critical to their use, essentially adding to the volume of material disposed within them (however considering the magnitude of impact this is unlikely). Disposal sites and their users are deemed to be of low vulnerability, medium recoverability, and medium value. The sensitivity of the receptor is therefore considered to be Medium.

11.10.34 Overall, it is predicted that the sensitivity of the receptor is considered to be Medium and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Restriction of use of disposal sites during construction

11.10.35 The Thanet Extension offshore cable route study area encompasses five disposal sites (Nemo disposal site C, Pegwell Bay A, Pegwell Bay B, Ramsgate Harbour site A and Ramsgate Harbour site B). Because of this, there is the potential for direct impacts restricting the use of these disposal sites while cable installation works are taking place for Thanet Extension.

11.10.36 The impact is predicted to be of local spatial extent, short-term duration, intermittent and reversible. The magnitude is therefore considered to be Negligible.

11.10.37 Disposal sites and their users are deemed to be of low vulnerability, medium recoverability, and medium value. The sensitivity of the receptor is therefore considered to be Medium.

11.10.38 Overall, it is predicted that the sensitivity of the receptor is considered to be Medium and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

11.11 Environmental assessment: O&M phase

11.11.1 The impacts of the O&M phase of Thanet Extension have been assessed on infrastructure and other users in the study area. The effects arising from the operation of Thanet Extension are listed in Table 11.10 along with the design envelope parameters against which each operation phase impact has been assessed.

11.11.2 A description of the significance of effects upon infrastructure and other users receptors caused by each identified impact is given below.

Impacts on the O&M activities of other OWFs due to the use of the Port of Ramsgate

- 11.11.3 The O&M activities of Thanet Extension have the potential to have an impact on the O&M activities of other OWFs in the area. The operation of Thanet Extension will have minimal impacts in terms of disruption to passing traffic (Volume 2, Chapter 10: Shipping and Navigation (Document Ref: 6.2.10)), however the maintenance vessels for the other OWFs identified are operated out of Ramsgate Harbour and will pass close to or through the Thanet Extension boundary.
- 11.11.4 A total of five O&M vessels will be required during the operation phase, with a maximum of 307 vessel movements a year. However, as identified in paragraph 11.10.3 *et seq.*, the vessels operating from Ramsgate Harbour are expected to be small vessels (e.g. CTVs), rather than the larger O&M vessels and lift vessels that will likely travel directly to the site from their home ports.
- 11.11.5 The impact is considered to be long-term (throughout the operation phase), of local extent, intermittent and irreversible (throughout the operational life of the project). When considering the low number of vessels and the low number of vessel movements per year, the magnitude of the impact is considered to be Negligible.
- 11.11.6 The O&M of other offshore wind assets in the area is vital for their continued operation, however there are established mechanisms and mitigation (such as the issuing of NtMs). The receptor is considered to be of low vulnerability, high recoverability and of high value. The sensitivity is therefore considered to be Medium.
- 11.11.7 Overall, it is predicted that the sensitivity of the receptor is Medium and the magnitude of the impact is Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Restriction of use of disposal sites during O&M activities

- 11.11.8 As described in paragraph 11.10.26 *et seq.*, the Thanet Extension OECC will cross two disposal sites, and pass close to three others. Maintenance of the Thanet Extension cables (including advisory safety distances associated with maintenance) may restrict access to and use of these disposal sites. Loss of access associated with occurrence of maintenance activities is considered to be limited in extent and infrequent.
- 11.11.9 The impact is predicted to be of local spatial extent, short-term duration, intermittent and reversible. The magnitude is therefore considered to be Negligible.
- 11.11.10 Disposal sites and their users are deemed to be of low vulnerability, medium recoverability, and medium value. The sensitivity of the receptor is therefore considered to be Medium.
- 11.11.11 Overall, it is predicted that the sensitivity of the receptor is considered to be Medium and the magnitude is considered to be Negligible. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

11.12 Environmental assessment: decommissioning phase

- 11.12.1 Impacts from decommissioning are expected to be similar to those listed for construction, if project infrastructure is removed from the seabed at the end of the development's operational life. The nature and scale of impacts arising from decommissioning are expected to be of similar or reduced magnitude to those generated during the construction phase. Certain activities, such as piling, would not be required.
- 11.12.2 If it is deemed closer to the time of decommissioning that removal of certain parts of the development (e.g. cables) would have a greater environmental impact than leaving *in situ*, it may be preferable to leave those parts *in situ*. In this case, the impacts would be similar to those described for the operational phase. If certain parts of the development were left *in situ*, effects dependent on the operation of the wind farm, such as maintenance, would not occur.
- 11.12.3 To date, no commercial OWF has been decommissioned in UK waters. It is anticipated that any future programme of decommissioning would be developed in close consultation with the relevant statutory marine and nature conservation bodies. This would enable the guidance and best practice at the time to be applied to minimise any potential impacts.

11.13 Environmental assessment: cumulative effects

- 11.13.1 Cumulative effects refer to effects upon receptors arising from the Thanet Extension when considered alongside other proposed developments and activities and any other *reasonably foreseeable project(s)* proposals. In this context the term *projects* is considered to refer to any project with comparable effects and is not limited to offshore wind projects.
- 11.13.2 The approach to cumulative assessment for the Thanet Extension takes into account the Cumulative Impact Assessment Guidelines issued by RenewableUK in June 2013 (Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3)).
- 11.13.3 Since the Nemo Interconnector was considered as part of the baseline (Table 11.8), it is not considered in the cumulative effects assessment. The disposal sites identified in Figure 11.3 were also considered as part of the baseline and are therefore not included in the cumulative effects assessment.
- 11.13.4 The cumulative impacts on other users, such as commercial fisheries, shipping and navigation is assessed in their relevant chapters of the ES.
- 11.13.5 The proposed tier structure that is intended to ensure that there is a clear understanding of the level of confidence in the cumulative assessments provided in the Thanet Extension ES is described in Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3).

11.13.6 No specific projects have been scoped into this cumulative impact assessment.

11.14 Inter-relationships

11.14.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. Volume 2, Chapter 14: Inter-relationships (Document Ref: 6.2.14) provides a description of the likely inter-related effects associated with Thanet Extension; however, no inter-related effects are expected for infrastructure and other users.

11.15 Mitigation

11.15.1 Given the generally low level of significance ascribed to the predicted impacts on infrastructure and other users as a result of the construction, O&M and decommissioning of Thanet Extension, it is concluded that no specific mitigation is required. Embedded mitigation is defined in Table 11.12.

11.16 Transboundary statement

11.16.1 No transboundary effects are predicted to result from the construction, O&M and decommissioning of Thanet Extension.

11.17 Summary of effects

11.17.1 This chapter has investigated the potential effects on infrastructure and other user receptors arising from Thanet Extension. The range of potential effects and associated effects considered has been informed by consultation and scoping responses, as well as reference to existing guidance. The impacts considered include those brought about directly (e.g. by the presence of infrastructure on the seabed), as well as indirectly. Potential impacts considered in this chapter are listed below in Table 11.13.

11.17.2 Cumulative impacts were also considered and an assessment was carried out looking at the potential for interaction impacts as a result of the combined activities of Thanet Extension and other activities in the study area. These include the construction of other OWFs, subsea cables and disposal activities.

11.17.3 These potential impacts have been investigated using a combination of methods including analytical techniques, the existing evidence base and numerical modelling. In accordance with the requirements of the Rochdale Envelope approach to EIA, the worst-case characteristics of the proposed development have been considered thereby providing a highly conservative assessment.

11.17.4 Even adopting the conservative assessment approach described above, it has been found that for all of the infrastructure and other user receptors included in this assessment, the level of effect significance is negligible to minor adverse (Table 11.13). The potential effects to infrastructure and other users are therefore not significant in EIA terms.

11.17.5 Table 11.13 presents a summary of the effects of the proposed development during the construction, O&M and decommissioning phases on infrastructure and other users at the Thanet Extension site.

Table 11.13: Summary of predicted impacts of the Thanet Extension Offshore Wind Farm

Description of impact	Impact	Possible mitigation measures	Residual impact
Construction			
Disturbance to the O&M activities of other OWFs due to the use of the Port of Ramsgate	Minor adverse	N/A	Minor adverse
Disturbance to existing cables and pipelines during construction	Minor adverse	N/A	Minor adverse
Restriction of access to existing cables and pipelines during construction	Minor adverse	N/A	Minor adverse
Increased burial of existing cables and pipelines as a result of increased sediment deposition	Minor adverse	N/A	Minor adverse
Impacts to disposal sites from increased sediment deposition	Minor adverse	N/A	Minor adverse
Restriction of use of disposal sites during construction	Minor adverse	N/A	Minor adverse
O&M			
Disturbance to the O&M activities of other OWFs due to the use of the Port of Ramsgate	Minor adverse	N/A	Minor adverse
Restriction of use of disposal sites during O&M activities	Minor adverse	N/A	Minor adverse
Decommissioning			
Impacts from decommissioning are expected to be similar to those listed for construction, if project infrastructure is removed from the seabed at the end of the development’s operational life. If it is deemed closer to the time of decommissioning that removal of certain parts of the development (e.g. cables) would have a greater environmental impact than leaving <i>in situ</i> , it may be preferable to leave those parts <i>in situ</i> . In this case, the impacts for decommissioning would be similar to those described for the operational phase, except where effects are dependent on the operation of the wind farm.			
Cumulative effects			
No projects identified	N/A	N/A	N/A

11.18 References

- Department for Energy and Climate Change (DECC) (2011b) National Policy Statement for Renewable Energy Infrastructure (EN-3), Presented to Parliament pursuant to Section 5(9) of The Planning Act 2008, July 2011, London: The Stationery Office. https://whitehall-admin.production.alpha.gov.co.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf [Accessed: 07/2017]
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- Royal Haskoning (2016) Scoping Report. Thanet Extension Offshore Wind Farm Environmental Impact Assessment Report to Inform Scoping. <https://infrastructure.planninginspectorate.gov.uk/projects/south-east/thanet-extension-offshore-wind-farm/> [Accessed: 07/2017]
- The Planning Inspectorate (2017) Scoping Opinion. Proposed Thanet Extension Offshore Wind Farm. <https://infrastructure.planninginspectorate.gov.uk/projects/south-east/thanet-extension-offshore-wind-farm/> [Accessed: 07/2017]