

**Vattenfall Wind Power Ltd**

**Thanet Extension Offshore Wind Farm  
Environmental Statement  
Non-Technical Summary**

June 2018, Revision A

Document Reference: 6.7.1



Vattenfall Wind Power Ltd  
Thanet Extension Offshore Wind Farm  
Non-Technical Summary  
June 2018

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Drafted By:	GoBe Consultants Ltd
Approved By:	Helen Jameson
Date of Approval	June 2018
Revision	

Vattenfall Wind Power Ltd  
First Floor  
1 Tudor Street  
London  
EC4Y 0AH  
T +44 207 451 1150  
[www.vattenfall.co.uk](http://www.vattenfall.co.uk)



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**Table 1: List of abbreviations used in this document**

Abbreviation	Definition
AEZ	Archaeological Exclusion Zone
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEIS	Department for Business, Energy and Industrial Strategy
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CRM	Collision Risk Modelling
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DECC	Department for Energy and Climate Change (now BEIS)

Abbreviation	Definition
EA	Environment Agency
ECOW	Ecological Clerk of Works
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
ES	Environmental Statement
EU	European Union
GIS	Geographical Information Systems
GVA	Gross Value Added
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drill
HGV	Heavy Goods Vehicle
HSC	Historic Seascape Character
HRA	Habitats Regulations Assessment

Abbreviation	Definition
HVAC	High Voltage Alternating Current
KFE	Kentish Flats Extension
kV	Kilovolt
KWT	Kent Wildlife Trust
LAT	Lowest Astronomical Tide
LCA	Landscape Character Area
LVIA	Landscape and Visual Impact Assessment
MCZ	Marine Conservation Zone
MLWS	Mean Low Water Springs
MW	Megawatt
NCA	National Character Area
NGET	National Grid Electricity Transmission
nm	Nautical Mile
NNR	National Nature Reserve

Abbreviation	Definition
NPAS	National Police Air Service
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
O&M	Operations and Maintenance
OECC	Offshore Export Cable Corridor
ONS	Office for National Statistics
ORPAD	Offshore Renewable Protocol for Archaeological Discoveries
OSS	Offshore Substation
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
PID	Public Information Day

Abbreviation	Definition
PINS	The Planning Inspectorate
PRoW	Public Right of Way
rMCZ	Recommended Marine Conservation Zone
SAC	Special Area of Conservation
SAR	Search and Rescue
SCA	Seascape Character Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPM	Suspended Particulate Matter
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate

Abbreviation	Definition
TJB	Transition Joint Bay
TOWF	Thanet Offshore Wind Farm
VWPL	Vattenfall Wind Power Ltd
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

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## NON-TECHNICAL SUMMARY

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### 1 Introduction

#### *The Non-Technical Summary*

- 1 This document is a Non-Technical Summary (NTS) of the Environmental Statement (ES). The NTS provides summary details of the Thanet Extension Offshore Wind Farm (hereafter referred to as 'Thanet Extension'), as well as a description of the existing environment in and around Thanet Extension. The NTS also presents a summary of the main findings of the Environmental Impact Assessment (EIA) undertaken for Thanet Extension.
- 2 The application has been submitted to the Planning Inspectorate (PINS) with the prescribed forms and documents required by the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.
- 3 The NTS is intended to act as a stand-alone document that will provide an overview of the environmental effects of the proposed development using non-technical language. For more detailed information, the full ES should be referred to, which is referenced throughout this NTS.

### *Introduction to Thanet Extension Offshore Wind Farm*

- 4 Vattenfall Wind Power Ltd (VWPL) is proposing the development of Thanet Extension following a review of VWPL's offshore wind strategy in 2014. If successful, the project would be located approximately 8 km offshore (at its closest point), in proximity to the operational Thanet Offshore Wind Farm (TOWF). It would have a maximum capacity of 340 MW, generated by up to 34 Wind Turbine Generators (WTGs). Electricity generated would be transported to the shore by offshore export cables installed within the proposed Offshore Export Cable Corridor (OECC) between the WTG array and the landfall, then through underground cables installed within the proposed onshore cable corridor to an onshore substation.
- 5 Thanet Extension comprises of offshore generating stations (WTGs) with an overall capacity of greater than 100 MW and therefore classifies as a Nationally Significant Infrastructure Project (NSIP), as defined by Section 15(3) of the Planning Act 2008. As such, there is a requirement to submit an application for a Development Consent Order (DCO) to PINS.

### *Purpose of the Environmental Statement*

- 6 The purpose of the ES is to provide the environmental information which has been assembled to date in order to carry out an assessment of the potential environmental effects of Thanet Extension, to enable the examining authority as well as other key stakeholders to understand these effects.

- 7 As well as this, the ES describes the baseline environmental conditions established through desktop study and site-specific surveys and details the methodology used within the EIA process.
- 8 Potential mitigation measures are put forward that could prevent, reduce or offset potentially adverse environmental effects identified, and provides an outline of the main project alternatives considered, with an overview of the main reasons for the site selection.

#### ***Vattenfall Wind Power Ltd***

- 9 VWPL is a subsidiary of Vattenfall AB, a Swedish state-owned utility and one of Europe’s largest generators of electricity and also one of the largest players in the global offshore wind sector. It is Vattenfall’s ambition to be at the forefront of the low-carbon energy transition, and the company is committed to significant growth in wind energy, both onshore and offshore. Vattenfall has invested nearly £3 billion in the UK in onshore and Offshore Wind Farms (OWFs) since 2008, and it is the company’s ambition that the UK will continue to be a growth market for Vattenfall.
- 10 VWPL has world leading experience in offshore wind, as owner of Kentish Flats, Kentish Flats Extension, Ormonde and Thanet (TOWF) OWFs, which are currently operational in the UK. The VWPL owned European Offshore Wind Deployment Centre off the Coast of Aberdeen, received a Final Investment Decision in July 2016 and is currently under construction. VWPL has started developing plans for the northern half of the former East Anglia

Round 3 zone, which is split into two proposed offshore wind projects. Vattenfall is preparing to submit a DCO application for Norfolk Vanguard in Summer 2018, and Norfolk Boreas has received a Scoping Opinion from PINS.

#### ***Project overview***

- 11 The existing TOWF, located 11 km off the Kent coast, has been operational since 2010 when Thanet Offshore Wind Limited was acquired by the Vattenfall group prior to construction in 2008. In 2009, The Crown Estate (TCE) offered VWPL the right to extend Kentish Flats OWF and TOWF, however only Kentish Flats was taken forward at that point. In 2014, following a review of VWPLs offshore wind strategy, the option of extending TOWF was revisited.



**Figure 1: The existing TOWF**

- 12 In early 2015, VWPL undertook feasibility studies and constraints mapping using existing data and site knowledge, in order to gauge whether the project was likely to be economically viable, technically feasible, and environmentally acceptable. In late 2015, following a favourable outcome to these early analyses, VWPL took the decision to proceed with early development activity for Thanet Extension, including offshore site characterisation surveys, progressing a National Grid connection, cable routeing work and the initiation of informal engagement with key stakeholders to gain their feedback on early design.
  - 13 On 4<sup>th</sup> January 2017, VWPL submitted a scoping report for Thanet Extension to PINS under the Planning Act 2008. The Secretary of State's (SoS) formal Scoping Opinion was received on the 14<sup>th</sup> February 2017 (PINS, 2017).
  - 14 On the 27<sup>th</sup> November 2017, VWPL published the Preliminary Environmental Information Report (PEIR) for the project. This suite of documents was in the format of a draft ES and provided statutory and non-statutory consultees with details of the EIA undertaken up to that point.
  - 15 The proposed development will have a total capacity of up to 340 megawatts (MW), and will include offshore and onshore infrastructure, including up to 34 WTGs. The offshore array area (the area in which the WTGs are located) will be approximately 70 km<sup>2</sup> in area, located approximately 8 km north-east of the Isle of Thanet, surrounding the existing TOWF. The OECC (the route in which the electricity cables will be located) extends from the south-western boundary of the array area in a south-westerly direction towards Pegwell Bay on the Kent Coast, and will be approximately 20 km in length.
  - 16 The electricity generated offshore will be transmitted via buried High Voltage Alternating Current (HVAC) cables. From the landfall location at Pegwell Bay, buried onshore cables will connect the wind farm to an onshore substation at Richborough Port, which will in turn connect to the National Grid via Richborough Energy Park. The onshore cable corridor will be approximately 2.5 km in length.
- Consultation**
- 17 Pre-application consultation with prescribed bodies, local authorities, landowners and those who may be directly affected by the proposals, and the local community is a statutory requirement under Sections 42 and 47 of the Planning Act for promoters of a DCO application.
  - 18 Early informal consultation with statutory and non-statutory stakeholders in relation to Thanet Extension began at an early stage following VWPL's decision to progress with the EIA.
  - 19 The Department for Communities and Local Government (DCLG) 2015 guidance on pre-application consultation advises that applicants should provide sufficient information in the PEIR to enable consultees to develop an informed view of the project. The

PEIR was presented as a draft ES and as such contained extensive information on the EIA undertaken at that stage.

- 20 Statutory and non-statutory consultees were afforded the opportunity under Sections 42 and 47 of the Planning Act to provide responses to the PEIR, with the deadline for responses being the 12<sup>th</sup> January 2018. Since then, comments received have been considered, resulting in refinements to project design, as well as the undertaking of further assessment and mitigation measures.
- 21 The PEIR was produced in part to support the duty to consult under Sections 42 and 47 of the Planning Act. In terms of community consultation, VWPL also produced a Statement of Community Consultation (SoCC), which set out the plan for consulting local communities on the proposed development. Community consultation has been conducted in line with this SoCC. The PEIR was made available at all Public Information Days (PIDS) which were held at specific intervals during the EIA process, allowing ongoing engagement with the public and local groups. In addition to this, information was circulated through media advertising (including social media), press releases, posters, newsletters and regular updates to the project website. A dedicated local liaison officer was on hand throughout the project development to provide information to, and to respond to queries from, local communities.
- 22 Since the end of the statutory consultation period, non-statutory consultation with key groups and stakeholders has continued. The

consultation process is detailed, including summaries of responses and an explanation of how VWPL has had due regard to those responses, in the Consultation Report (Document Ref: 5.1) which accompanies the application.

### *Next Steps*

- 23 The submission of the ES and application for a DCO marks the end of the pre-application period under the Planning Act. Upon receipt of the application, PINS will have 28 days to decide whether or not to accept the application. If accepted, the pre-examination phase will begin, and the public will be able to share its views on the project. This will last for a period in the order of three months, before the PINS examination process begins.
- 24 PINS then has six months to examine the application and a further three months to make a recommendation to the SoS. In the event that a DCO is granted, the design and development of the project will continue to be progressed as the project moves further towards construction.

## 2 Policy and Legislation

25 This section of the NTS summarises the consents framework and the key legislation and policies that have been considered during the development of Thanet Extension, alongside the EIA process. A full description of policy and legislation is described within the ES (Volume 1, Chapter 2: Policy and Legislation (Document Ref: 6.1.2)).

### *Renewable Energy Policy and the Role of Renewable Sources of Energy*

26 In October 2014, further to the targets to be achieved by 2020 agreed in 2008 (the 20-20-20 targets), the Council of the European Union (EU) agreed on a policy framework for climate and energy in the period from 2020 – 2030. The targets to be achieved by 2030 include:

- A 40% cut in greenhouse gas emissions compared to 1990 levels;
- At least a 27% share of renewable energy consumption; and
- At least a 27% improvement in energy efficiency.

27 In order to meet these targets, the European Commission published a proposal for a revised Renewable Energy Directive on the 30<sup>th</sup> November 2016, which addressed the points in the Renewable Energy Directive’s evaluation conducted between

2014 and 2016, stakeholder consultations, and expert independent studies commissioned by the European Commission. The proposed revised Renewable Energy Directive seeks to build on the success of the Renewable Energy Directive.

28 A range of UK government strategies and measures have defined the overarching need for renewable energy generation, including key documents such as:

- The National Renewable Energy Action Plan for the UK (DECC, 2010);
- The UK Renewable Energy Strategy (RES; DECC, 2009a);
- The UK Low Carbon Transition Plan (DECC, 2009b);
- The Renewable Energy Roadmap (DECC, 2013); and
- The UK Carbon Plan (DECC, 2011).

29 The central objective of UK government energy policy is to ensure the security of energy supply, whilst responding to the challenge of climate change by reducing carbon emissions. To meet these objectives, more renewable energy infrastructure is required, with an increased emphasis on generation from renewable and low-carbon sources.

30 In terms of planning, the UK’s commitment to renewable energy generation has been captured in the publication of National Policy

Statements (NPSs). The NPSs of relevance to the proposed development, all designated in July 2011, include:

- EN-1: Overarching NPS for Energy;
- EN-3: Renewable Energy Infrastructure; and
- EN-5: Electricity Networks Infrastructure.

### ***Consents Framework and Environmental Impact Assessment***

- 31 The Planning Act 2008 (as amended) sets out a comprehensive statutory framework for the principal consents required to construct, operate, and decommission NSIPs, together with any related associated infrastructure. Thanet Extension is defined as an NSIP, as it will be an offshore generating station with a capacity greater than 100 MW.
- 32 Permission to build and operate an NSIP is given in a DCO, granted by the SoS for Business, Energy and Industrial Strategy (BEIS) in accordance with the policy framework provided in the NPSs. The application will cover all offshore and onshore works and the draft DCO will be submitted with the application for Development Consent.
- 33 The legislative framework for EIA is provided by European Directive 2011/92/EU (the EIA Directive), which codified the earlier European Directives 85/337/EEC, 97/11/EC and 2009/31/EC. The EIA Directive requires that EIA to be undertaken

in support of an application for development consent for certain types of project. For projects which require development consent under the Planning Act 2008, the requirements of the EIA Directive have been transposed into UK legislation by the Infrastructure Planning Regulations 2017 (the EIA Regulations). In the case of Thanet Extension, the EIA Regulations 2009 are also of relevance.

- 34 Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment was brought into force on 15<sup>th</sup> May 2014. Directive 2014/52/EU was to be implemented over three years with a deadline of 16<sup>th</sup> May 2017. Article 3(2) of Directive 2014/52/EU provides transitional measures for projects for which an Environmental Statement was submitted or where a Scoping Opinion has been sought before 16<sup>th</sup> May 2017. In such cases, the provisions of the 2011 Directive will apply. Therefore, as the scoping report for Thanet Extension was submitted in January 2017, Directive 2011/92/EU would be applicable. Thanet Extension have decided that as the updated Regulations have come into force, Thanet Extension have, where applicable, incorporated the new requirements from the regulations within the EIA work that led to the preparation of the Thanet Extension ES and previously, the PEIR.
- 35 In line with Schedule 2 of the EIA Regulations, an EIA is required for installations for the harnessing of wind power for energy production likely to have significant effects on the environment. A

full EIA has therefore been undertaken for Thanet Extension, including the production of an ES.

36 The EIA process can be broadly summarised as consisting of three main elements that take place prior to the submission of the DCO application:

- **Scoping:** Project promoters can request a formal Scoping Opinion from PINS on behalf of the SoS;
- **Consultation:** The project promotor is required to conduct pre-application consultation in accordance with The Planning Act 2008 and associated guidance and regulations, which includes the proposed consultation activities; and
- **ES Preparation:** The ES is prepared taking into account the responses to the consultation process. An additional consultation process also takes place where consultation responses on the PER are invited. The ES is then prepared taking these comments into account.

### 3 Environmental Impact Assessment Methodology

37 This section presents an outline of the EIA methodology that has been employed for Thanet Extension in the preparation of the ES. The EIA for Thanet Extension describes the potential effects on the environment arising from the construction, Operation and Maintenance (O&M), and decommissioning of the project. If significant effects are predicted, it identifies mitigation to reduce the significance of these effects (where practicable). A full description of the EIA methodology used is described within the ES (Volume 1, Chapter 3: EIA Methodology (Document Ref: 6.1.3)).

#### *Scoping*

38 Scoping is the process of identifying the issues to be addressed during the EIA process. VWPL submitted a scoping report for Thanet Extension in January 2017 to PINS. This document sets out details of the proposed scope of environmental assessments to be undertaken for the proposed development. The formal Scoping Opinion was received in February 2017 and highlighted a number of areas that consultees wished to see addressed within the EIA. These responses, together with other consultation responses provided throughout the EIA process, have been taken into account in identifying the scope for the EIA. The scope has also been informed by the nature, size and location of the proposed development

#### *The PEIR*

39 The PEIR provided an early assessment of predicted environmental impacts, using the data available at the time. The PEIR provided sufficient information for consultation with the public, statutory and non-statutory consultees and provides information on the predicted impacts arising from the construction, O&M and decommissioning of the development and the assessment methodologies to be used within the ES.

40 The presentation in the PEIR of the methodology used allowed for consultees to comment on the methodology and for agreement to be gained on the final approach taken in the ES.

41 The potential environmental effects of Thanet Extension were assessed for each relevant topic area (as agreed during the scoping phase), by comparing the baseline environment with the expected conditions that will prevail if the development goes ahead. The baseline environment is determined through desk studies and surveys and has been agreed through the Scoping Report, through an Evidence Plan process, and other formal consultation processes.

#### *The ES*

42 The ES provides an updated assessment of the predicted environmental effects, taking into account comments and responses received during the statutory consultation period, as

well as additional consultation undertaken through formal and informal channels outside of the statutory consultation period.

43 The ES presents the outcomes of the EIA, specifically, it:

- Provides statutory and non-statutory consultees with sufficient technical information to understand the proposed development and its options;
- Presents the existing environmental baseline information, established from desktop studies, offshore and onshore surveys and consultation;
- Describes the methodology used within the EIA process;
- Presents the potential environmental impacts arising from Thanet Extension, based upon the baseline information and data gathered and the analysis and impact assessments completed to date;
- Indicates any difficulties encountered during the compilation of the environmental information, including the acknowledgement of any data gaps or deficiencies and confidence in the information gathered;
- Puts forward potential mitigation measures that could prevent, minimise, reduce or offset potential negative

environmental impacts identified during the EIA process undertaken to date;

- Provides consideration and analysis of the project alternatives for Thanet Extension and an indication of the project selection made by VWPL;
- Provides the basis for draft mitigation and management plans which accompany the DCO application; and
- Provides additional information from the discussions about the proposed project with statutory and non-statutory stakeholders, including the final description of the project to be taken forward in the DCO application as well as the provisions and requirements to be included within the DCO and Marine Licences.

44 As in the PEIR, the potential environmental effects of Thanet Extension have been assessed for each relevant topic area, by comparing the baseline environment with the expected conditions that will prevail if the development goes ahead. The baseline environment has been determined through desk studies and surveys and has been agreed through the Scoping Report, through an Evidence Plan process, and other formal consultation processes.

*Approach to EIA*

45 The assessment of each topic forms a separate chapter within the ES. Each chapter addresses:

- Policy and statutory context;
- Consultation responses related to that topic;
- The scope and methodology of the assessment;
- A description of the relevant existing environment;
- Key parameters for assessment, based on the project design that defines the maximum worst-case scenario, known as the ‘Rochdale Envelope’ or ‘design envelope’;
- Identification of embedded mitigation that has already been adopted as part of the project design;
- An assessment of potential environmental effects related to that topic;
- Identification of residual impacts (taking into account embedded and further mitigation);
- Identification of cumulative, transboundary and inter-related effects; and

- Identification of any requirements for further monitoring.

*Existing Environment*

46 The description of the existing environment describes the baseline condition which the assessments have been based upon, forming the basis of the evidence-based approach. The baseline conditions of the site and study area forms the basis of each assessment, enabling the likely significant effects of the project to be identified. The description of the existing environment draws on site-specific data collected for the purposes of the assessment, as well as information and data from sufficiently similar investigations to inform the understanding of the baseline and/ or impact assessments. As Thanet Extension surrounds the existing TOWF, extensive data from the EIA, baseline and monitoring for TOWF are available which provide both raw data and modelling that can be used to inform the assessments for Thanet Extension. Where possible, appropriate and agreed with the relevant stakeholders, VWPL have used this existing data to aid in the EIA process.

*Embedded Mitigation*

47 The EIA process is an integral and ongoing part of the project appraisal and design process. During the EIA, the likely significant effects have been considered and these issues have been taken into account within the ongoing design process. The EIA has therefore been used as a means of informing and improving the project design. The project assessed within the ES consequently includes a range of measures that have been designed to reduce

or prevent significant adverse effects from occurring. The assessment has therefore taken these ‘embedded’ mitigation measures into account as they form part of the project itself.

*Assessment of Potential Effects*

48 The ES sets out an assessment of the likely effects during all phases of the project life-cycle (construction, O&M, and decommissioning) based on the likely magnitude of the predicted impacts, and the sensitivity of the receptor(s). The magnitude of impact takes into account its spatial extent, duration, frequency and severity, and can be designated as ‘high’, ‘medium’, ‘low’ or ‘negligible’. Impacts are also identified as ‘adverse’ (negative), or ‘beneficial’ (positive). The sensitivity of a receptor is also assessed as ‘high’, ‘medium’, ‘low’ or ‘negligible’. The assigning of these criteria to impacts and receptors are based on current understanding, expert knowledge and guidance, which are defined and presented within the ES chapters.

49 Once the magnitude and sensitivity have been assessed, these are combined in a matrix to give the significance of the effect (Table 2). Effects of ‘moderate’ or ‘major’ are deemed to be ‘significant’ in EIA terms, whereas effects of ‘minor’ or ‘negligible’ are deemed to be ‘not significant’ in EIA terms.

**Table 2: Significance of potential effects matrix**

		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

*Cumulative, Transboundary and Inter-related Effects*

50 The EIA Regulations require a consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area. Cumulative effects are assessed and reported within each topic chapter of the ES.

51 A consideration of transboundary effects is given in each topic chapter. Transboundary effects are those that may have an impact on the environment in other European Economic Area (EEA) states.

52 There is also a requirement to consider inter-relationships between topics and across multiple development phases that may lead to environmental effects. For example, changes in traffic flows may lead to changes in noise emissions or air quality, or changes in noise levels during the construction and O&M phases may interact to produce an impact of greater significance than when considered in isolation. Inter-related effects are in many cases an inherent part of individual topic assessments, and a consideration of inter-relationships is given in each ES chapter. An overall project assessment is also included as a separate chapter that considers the potential for inter-related effects occur.

#### 4 Site Selection and Alternatives

53 This section summarises the site selection process and approach undertaken for Thanet Extension to identify the various elements of the site and the alternatives (both onshore and offshore) which have been considered as the project has been developed.

54 The approach taken for the development of Thanet Extension has been based on early engagement with a range of stakeholders, together with a range of electrical, engineering, environmental, and socio-economic appraisals. Stakeholder engagement has been a key aspect of the project design, with each phase of consultation

undertaken being designed to provide opportunities for stakeholders to review and provide information in order to influence the relevant project design decisions that have been taken to date in the process of the project development.

55 The stages of site selection and consideration of alternatives are set out below in chronological order from inception to the point of application (Stages 1 - 7). A full description of the site selection process is described within the ES (Volume 1, Chapter 4: Site Selection and Alternatives (Document Ref: 6.1.4)).

#### *Stage 1 – Identification of the Array Area*

56 Further to the Government's confirmed policy in support of offshore wind, there is a need to identify the best sites around the UK for a rapid increase in offshore wind deployment to occur and for renewable energy targets to be met. Given the presence of TOWF, the region is identified as a good site for wind resource, as identified by the operational output of TOWF.

57 Following an initial consideration of environmental parameters and constraints, an area of search was determined as a preliminary offshore boundary to delineate the location of offshore WTGs. The initial boundary was identified through an analysis of engineering, environmental, economic and consenting risks and subject to further feasibility studies for key areas of concern, including offshore ornithology and seascape, landscape and visual impacts.

- 58 In parallel with this, existing environmental ‘hard constraints’ were considered, based on spatial data and an understanding of the likely constraints. The initial feasibility study considered an extension surrounding TOWF with a longer extension to the north-west on the basis of wind resource availability.
- 59 Following more detailed feasibility studies including shipping and navigation, offshore ornithology, and seascape, landscape and visual impacts, the conclusion of the Stage 1 assessment was therefore to revise the proposed boundary, reducing the north-westerly and south-westerly spread of the proposed development.

### ***Stage 2 – Identification of Grid Connection Location and High-level Landfall Appraisal***

- 60 The connection of energy generating stations (such as OWF projects) to the National Grid is managed through a controlled process by National Grid Energy Transmission Ltd (NGET). Initial proposals were made to make a grid connection at Richborough Energy Park, which is the site of both the existing TOWF grid connection, and that of the Richborough Connection National Grid Works. Since Thanet Extension is located adjacent to (surrounding) TOWF, making a grid connection at the same location as TOWF is both practical and logical, given the previous work in determining a suitable and consentable grid connection.
- 61 Following on from the NGET offer, an initial desk-based assessment of potential landfall options on the Thanet Coast was

undertaken. This assessment looked into several constraints, including the avoidance of residential property, the avoidance of steep gradients and banked verges, and the avoidance of standing water. Further engineering feasibility studies considered aspects such as construction space, ground conditions and access. The result was that an offshore cable route area of interest was delineated alongside the wind farm boundary, incorporating options for cable routeing and landfall at three locations along the Kent coast.

### ***Stage 3 – Identification of Project for Scoping, and Phase 1.A Consultation***

- 62 During Stage 3 of the route design work, existing infrastructure such as railways, roads, the port, recreational areas and built-up areas were considered in an initial search area. The initial search area encompassed two main areas: north-east Kent (Thanet District) and the area between Pegwell Bay and Sandwich (south Thanet District/ north Dover district). This search area for the landfall extended in total from Kingsgate Bay in the north to the town of Deal in the south. Following an initial appraisal, seven options were brought forward for consideration.
- 63 Following a grid connection application, further onshore cable routeing work, site walkover and input from electrical design and construction specialists, it was determined that the preferred option for offshore routeing would be to follow the existing TOWF cable route to the north, thereby minimising the need to cross the TOWF export cables or the UK-Belgium interconnector cable

(Nemo Link), and make landfall in Pegwell Bay. This approach also aligned with the experiences gained via the existing Thanet OWF project, and the rationale for site selection employed during the definition of the Thanet OWF which resulted in the positive determination of that project.

- 64 Due to the potential for space constraints onshore at Pegwell Bay, namely uncertainty on the available space within Sandwich Road, combined with intertidal constraints including the Nemo link cable and existing Thanet OWF cables a second option was maintained for landfall at Sandwich Bay during the scoping phase. Consultation was therefore conducted on these two options during the scoping phase.

#### ***Stage 4 – Refinement of Project for Phase 1.B Community Consultation Events with EIA Preparation***

- 65 Following the scoping phase, further consideration was given to the consideration of the scoping opinions and a detailed appraisal was undertaken of the Pegwell Bay option and Sandwich Bay option. It was concluded that on balance, the Pegwell Bay option performed better, and had a reduced level of uncertainty with regard to the likely success of mitigation measures when compared to the Sandwich Bay option. Based on the appraisal of the offshore and onshore constraints associated with the two options, it was clear that whilst it may be technically feasible to connect the Thanet Extension array to the Richborough substation via either option, the Pegwell Bay option offered considerably less risk from a technical, consenting and commercial perspective.

#### ***Stage 5 – Refinement of Project for PEIR; Section 42 and Section 47 Consultation (Phase 2 Consultation)***

- 66 During Stage 5, the OECC was expanded to include the option to cross other offshore infrastructure, such as the existing TOWF cables, the TOWF replacement cables, and the Nemo Interconnector cable further offshore.
- 67 For the onshore cable route, following an initial engineering workshop reviewing high level constraints, a series of five routes were identified. Following an appraisal of these options and the change of the substation location from the Richborough Energy Park to the Richborough Port, four were discounted. The remaining option was therefore taken forward for further consultation with the EIA Evidence Plan panel. It was re-iterated that the crossing of the Nemo Interconnector and transit to the west of Nemo or Sandwich Road would represent a preferred option when compared to trenching through the Stonelees Nature Reserve. This consultation corresponded with initial results from the Sandwich Road constraints analysis being made available, which suggested that whilst not optimal from an engineering feasibility perspective, a transit in the southern section of Sandwich Road would be feasible.
- 68 Following consultation with KWT and the initial results of feasibility studies, it was concluded that subject to final technical constraints analysis, both options were feasible. VWPL therefore made the decision at this stage to take two onshore export cable routes to formal consultation as part of the PEIR.

***Stage 6 – Receipt of Responses to the PEIR***

- 69 Consultation materials, in the form of the PEIR, were sent to all registered consultees for Thanet Extension and, consistent with previous consultations, stakeholders were given 42 days from the 27<sup>th</sup> November 2017 to the 12<sup>th</sup> January 2018 to comment on the consultation materials.
- 70 VWPL then reviewed the responses and appropriate revisions to the project design and environmental studies were implemented. These are described in detail within individual ES chapters and in the Consultation Report (Document Ref: 5.1).
- 71 A key event during this phase was the withdrawal of the Thanet Cable Replacement (TCR) project, which resulted in a reappraisal of options within Pegwell Bay. The key consultation responses of relevance comprised the request to avoid the installation of project infrastructure within the managed approach to Ramsgate Harbour and the avoidance of cable installation within the Thanet Coast MCZ. A reduction to the offshore Red Line Boundary was also made, eliminating the western corner in response to shipping and navigation consultee concerns
- 72 Since the end of the statutory consultation process, the design of the seawall extension has been amended to remove the larger of the two seawall extensions as proposed within the PEIR to reduce the extent of saltmarsh loss and prevent any fragmentation of the saltmarsh.

- 73 The option of crossing Nemo Interconnector and associated installation of cable along Sandwich Road was removed due to the negative impacts on the Pegwell Country Park from the installation of a berm alongside the Nemo Link. As a result, landfall options have been amended to include below-ground installation techniques such as trenching and HDD within the historic landfill of Pegwell Bay Country Park are being explored. The practicality of this option is dependent on Site Investigations to confirm whether excavation within the Pegwell Bay Country Park is feasible. This option will also reduce the interaction with the saltmarsh and seawall.
- 74 Although none of the changes resulting from the responses received were considered material, VWPL provided stakeholders with further information highlighting the changes.

***Stage 7 – Further Consultation on the Updated Red Line Boundary (Onshore and Offshore)***

- 75 Whilst the changes described above generally resulted in reductions to the Red Line Boundary, VWPL submitted the updated boundary for further consideration by stakeholders. Targeted Section 42 consultation was also undertaken with landowners where the Red Line Boundary was widened at certain locations.

***Stage 8 – The Application***

- 76 Thanet Extension has continued to develop and refine the project as it has progressed from submission of the PEIR to the final application for a DCO. This process will continue as the project moves forward towards construction.
- 77 Thanet Extension is currently at Stage 8 in the site selection process (DCO application). Up to this point, Thanet Extension has engaged with a range of stakeholders with regard to the progress of the project and emerging project design matters, including outside of the statutory consultation stage, with the aim of keeping key stakeholders informed about project design and the selection process.
- 78 The final route as presented in the ES has been refined as a result of multi-disciplinary workshops, discussions and decision making across the entire route, in order to balance a wide range of environmental, technical, economic and social effects. Decisions made by the multi-disciplinary team in response to consultee comments and feedback, detailed technical, commercial and environmental studies have directly informed the preferred route alignment and selection of the landfall location and HDD option.

## 5 Project Description

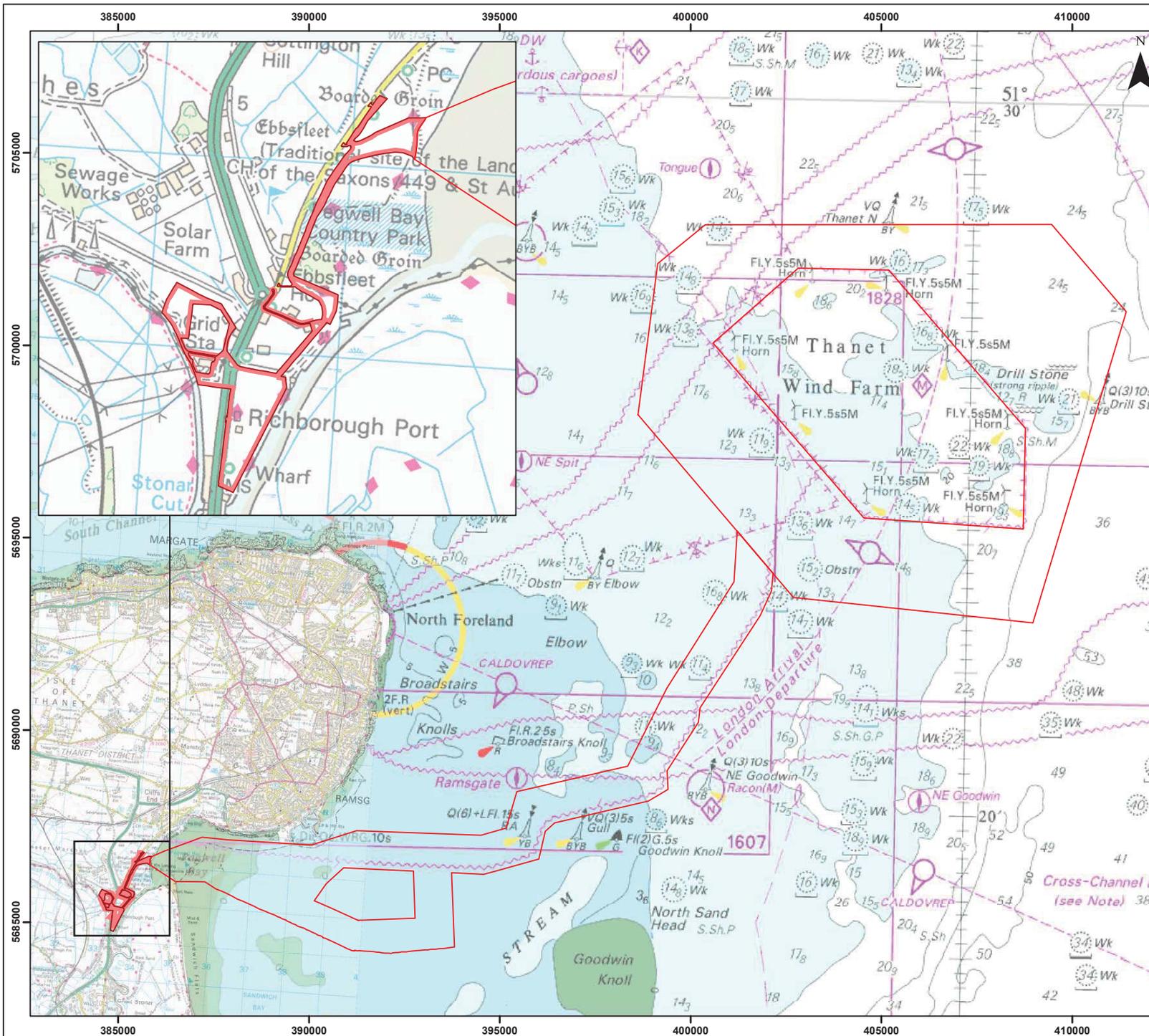
79 This section of the NTS provides an outline description of the potential design of both the onshore and offshore project infrastructure, as well as the activities associated with the construction, O&M and decommissioning of Thanet Extension. The full indicative project description is set out in Volume 2, Chapter 1: Project Description (Offshore) (Document Ref: 6.2.1), and Volume 3, Chapter 1: Project Description (Onshore) (Document Ref: 6.3.1), respectively.

80 VWPL is planning the development of Thanet Extension, located approximately 8 km off the Kent Coast, along with associated offshore and onshore infrastructure. The proposed development boundary encompasses:

- **The array area:** This is where the OWF will be located, which will include the WTGs, foundations, array cables, and offshore substation (OSS) (if required);
- **The OECC:** This is where the offshore export cables will be located; and
- **The onshore cable corridor:** this is where the Transition Joint Bays (TJBs), onshore cables and connection to the National Grid will be located;

- **The onshore substation:** the location of the Thanet Extension onshore substation.

81 At this stage in the development process, the project description is indicative and the 'envelope' has been designed to include sufficient flexibility to accommodate further project refinement during the detailed design phase. The ES, as summarised in this NTS, therefore sets out a series of options and parameters for which maximum values are shown. The maximum values constitute the realistic maximum design scenario in relation to Thanet Extension. A refined and detailed project description will be provided in the ES that will accompany the DCO application.



**Figure 2**  
 Thanet Extension Development Area

**Legend**  
 [Red outline] Offshore Red Line Boundary  
 [Red outline] Onshore Red Line Boundary

Datum: ETRS 1989  
 Projection: UTM31N

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 Ordnance Survey 0100031673

0	1	2 km	0.55	1.1 nm
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Drg No	Fig2_LocationMap			
Rev	0.1	Date	29/05/2018	
By	RM	Layout	N/A	

**Figure 2**

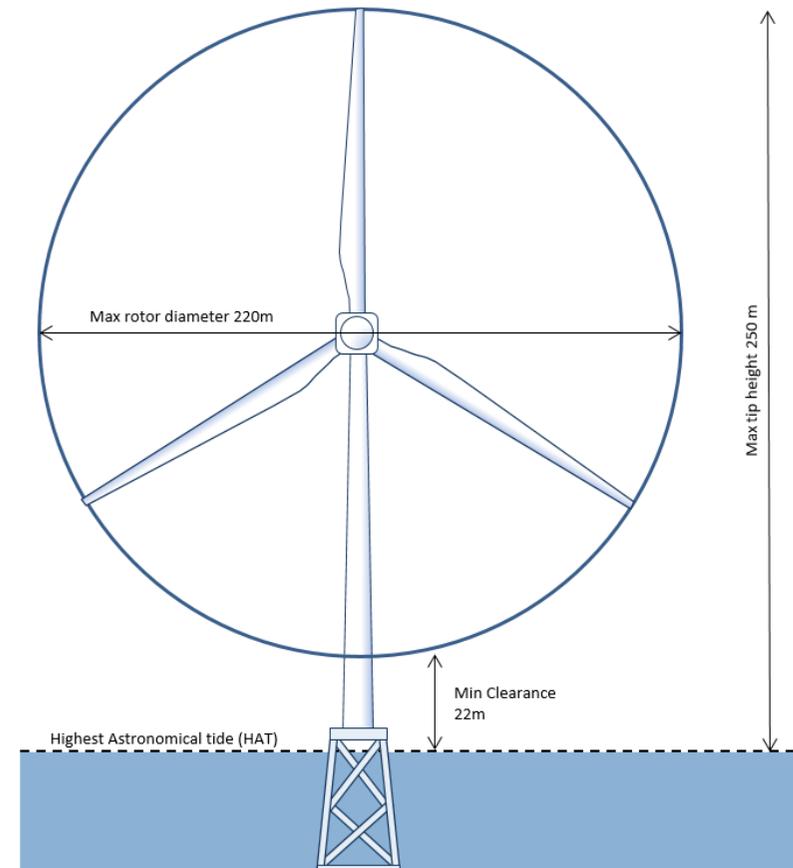
### Offshore

82 The offshore development will comprise of WTGs, and all infrastructure required to transmit the power generated to shore. Thanet Extension will have a maximum of 34 WTGs and associated foundations, which will generate up to 340 MW of power. The project will also have up to four offshore export cables and may include up to one OSS as part of the power transmission system. The key offshore components of Thanet Extension are likely to include:

- Offshore WTGs;
- OSS (if required);
- Foundations for WTGs and OSS (if required):
- Meteorological mast (if required);
- Subsea inter-array cables linking the individual WTGs;
- Subsea export cables from the wind farm to shore; and
- Scour protection around foundations and on cables (if required).

83 The number of WTGs used will depend on the individual capacity of the WTG chosen. In any case, the maximum number of WTGs used will be no more than 34 and will also be limited by the

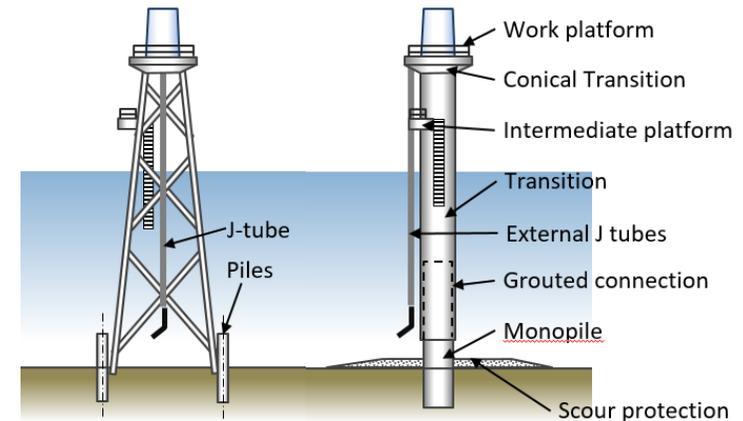
maximum generation capacity of 340 MW. The final choice of WTG would be consistent across the array (i.e. there would not be multiple sizes/ types used).



**Figure 3: Illustration of a WTG**

84 Foundation structures, needed to securely support the WTGs and OSS (if required) to the seabed, they will also provide safe access and working for O&M activities. A range of foundation types are being considered:

- **Monopile foundations:** Comprising a single hollow steel pile, which penetrates the seabed;
- **Piled jacket foundations:** Comprising a steel lattice, anchored to the seabed with smaller pin-piles. Jackets are likely to be quadropod (four-legged), although tripod (three-legged) jackets are also being considered.
- **Suction-caisson jacket foundations:** Comprising quadropod or tripod jackets (as outlined above), anchored to the seabed via suction-caissons, which penetrated the seabed and are sucked into the seabed by pumping water out of the interstitial space between the caisson and the seabed.



**Figure 4: Illustrations of piled jacket (left) and monopile (right) foundations**

- 85 The project could include one OSS (on a foundation as outlined as above, though a quadropod jacket is the most likely option). The substation would act as a collection point from a network of inter-array cables from WTGs and would then transmit electricity to shore via up to four export cables. For Thanet Extension, there is the possibility of transitioning straight to export cables without the need for an OSS; this will be determined during the detailed design stage.
- 86 One operational meteorological mast may be installed within the Thanet Extension site, which would not exceed the hub height of a WTG. The foundations under consideration would be the same

as for WTG foundations, although it would be smaller. The installation of a meteorological mast is not considered likely.

- 87 In terms of offshore cabling, the project would require inter-array cables to connect the WTGs to the OSS (if required) or transition to export cables, and up to four export cables to bring the power ashore. The total length of subsea cabling required is dependent on the detailed WTG layout, the requirement for an OSS, and the voltage of the cables selected. The offshore cables would be buried where possible and protected where burial is not feasible also limiting environmental impacts such as Electro-Magnetic Field (EMF) effects and navigational risk to other marine users.
- 88 The offshore cables will be buried using one, or a combination of methods including ploughing, jetting and cutting, whereby the seabed is opened, and the cable laid within the trench simultaneously using a tool towed behind an installation vessel. Alternatively, these operations may be achieved by burying the cable post-lay. The final choice of cable installation methods will be made in the detailed design phase and would be dependent on seabed conditions based on more detailed information collected post-consent.
- 89 Offshore construction is anticipated to take up to 28 months and would be operational for a period of up to 25 years (depending on the technology and maintenance options available this may allow for an extended operational lifetime). Decommissioning of the project once the operational life of the project is anticipated to be full removal of all project infrastructure, although some elements

may be cut at or below seabed level and left *in situ* if it is deemed more environmentally damaging to remove them closer to the time.

### **Onshore**

- 90 The onshore development will comprise all infrastructure required to transmit electricity from the landfall at Pegwell Bay to the National Grid connection at Richborough Energy Park. The key onshore components of Thanet Extension are likely to include:
- Up to four TJBs at landfall, where the offshore cables are joined to the onshore cables. There are three potential options for the landfall, which are described below;
  - Up to four onshore export cable circuits (up to 220 kV);
  - One onshore substation at Richborough Port; and
  - HDD infrastructure to connect the onshore substation to the National Grid connection at Richborough Energy Park (400 kV).
- 91 For the landfall, three options are being considered in relation to the location of the TJBs, due to constraints caused by a historic inert and household waste landfill site below the Pegwell Bay Country Park. Site Investigation works are planned to find out whether undergrounding of cables within the Country Park or HDD are feasible:

- **Option 1:** Location of the TJBs below ground (subject to site investigation works) within the Pegwell Bay Country Park, with cables installed by Horizontal Directional Drilling (HDD) underneath the sea wall to exit points at least 100 m seaward;
  - **Option 2:** Location of the TJBs within Pegwell Bay Country Park, up to 350 m from the coastline, with TJBs built above ground, with offshore cables built in an above-ground berm up to 1.2 m high; and
  - **Option 3:** Subject to a positive outcome of site investigation works of Pegwell Bay Country Park. TJBs would be installed below ground within the historic landfill site and buried with reinstatement of seawall to pre-construction condition.
- 92 Onwards of the Country Park, cables will be buried by open trenching, whereby 1 m wide trenches will be excavated with cables laid at the bottom, and the trenches backfilled with the excavated material. During cable installation, excavated soil would be removed and stored in temporary works areas or stored adjacent to the trench and backfilled immediately where possible. All necessary vegetation clearance would be undertaken in accordance with the requirements of the relevant stakeholders. Temporary access roads and construction compounds located along the cable route would be temporary, and land would be re-instated post-construction.
- 93 The need for cable installation using trenchless techniques has also been considered (such as HDD) to avoid features such as sensitive roads and underground services. The cable route is approximately 2.5 km in length.
- 94 The onshore substation is proposed to be constructed at Richborough Port, which would step-up the 66 kV to 220 kV rated generation to the 400 kV National Grid operating voltage for connection to the grid connection at Richborough Energy Park.
- 95 The substation would be located in a compound up to 215 x 160 m in area, with a maximum height of substation infrastructure of 14 m. the substation would include planting and landscaping to ensure that visibility of structures is minimised as far as possible.
- 96 The final section of the onshore cable route will be to connect the onshore substation to the National Grid connection at Richborough Energy Park. This will involve an HDD underneath the A256, with the final section of the cable being trenched.
- 97 The onshore construction is anticipated to start in 2020 and take up to 30 months to complete. It is important to note that this period will involve the construction and commissioning of multiple onshore components, and activities in a particular area may only last for a few months or involve electrical commissioning which will largely take place indoors.



Figure 5: Construction of an offshore WTG

## 6 Potential Offshore Effects

98 The EIA process has assessed the potential for the construction, O&M and decommissioning of Thanet Extension to create impacts upon the offshore environment, as characterised by the review and analysis of existing and site-specific data collected from surveys, peer reviewed literature, desk-based studies and modelling of specific parameters. This section provides a non-technical summary of the offshore assessments undertaken for Thanet Extension to date. Further information can be found within each of the topic-specific chapters found within Volume 2 of the ES.

### *Marine Geology, Oceanography and Physical Processes*

99 The assessment of potential effects on the marine physical environment considers the potential for changes in tides, currents, waves and sediment transport as a result of the proposed development during construction, O&M and decommissioning. The assessment describes the existing physical environment and is supported by existing data as well as site-specific surveys to assess the predicted effects. A full description of the marine physical processes assessment can be found within the ES (Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (Document Ref: 6.2.2)).

100 Thanet Extension lies within an area with a typical spring tidal range of 4.3 – 4.6 m. Depth average mean spring currents within the Thanet Extension array area are in the approximate range of

0.7 – 1.2 m/s. Tidal ellipses within the central and western sections of the array area are generally aligned north to south, with more of a north-east to south-west alignments within the eastern section. Towards the eastern sections of the OECC, tidal ellipses are aligned north to south, rotating to more of a north-east to south-west direction around North Foreland. This results in a generally southern orientated flood tide, with the ebb tide in a north to north-east direction. The predominant wind direction is south-westerly, accounting for approximately 20% of all winds. Waves are predominantly from the north-east due to the large fetch lengths in the North Sea, and from the south-west due to the prevailing winds in this direction.

- 101 Sediments within the array area generally consist of sand and gravel with variable contributions of silt and/ or clay. The OECC generally contains mixed sand and gravel, with increasing contributions of sand and clay in mid-sections, and further contributions of fine sand and clay in inshore and nearshore areas. Extensive areas of Cretaceous chalk are found at or close to the surface, although are overlain in places by Tertiary and Quaternary sediments, resulting in a variety of bedforms. Mobile deposits reach a thickness of up to 3 m where bedform features are present.
- 102 Water depths across the array area range between 11.5 and 45 m below Lowest Astronomical Tide (LAT), and up to 18 m in the OECC, generally shallowing from the north-east to south-west.

- 103 Suspended Sediment Concentration (SSC) generally increases with proximity to the coast and is highest within nearshore and inshore areas of the proposed development boundary. Thanet Extension is located in an area characterised by a high degree of spatial and temporally variability in SSC, influenced by fluvial inputs, coastal erosion and resuspension of seabed sediments from shallower areas. Mobile sand wave features are also present throughout the array area and OECC.
- 104 Thanet Extension overlaps with or is in close proximity to a number of sites designated for geomorphological features.
- 105 The impact assessment considers a range of features and processes that may be affected by the proposed development, such as changes to SSC, tidal and wave regimes, sandbanks, and coastal designated features. The impacts considered include changes to the marine physical environment brought about both directly (by the presence of infrastructure), as well as indirectly (through changes to physical processes). Embedded measures such as scour protection and cable armouring has been adopted in the project design to mitigate potential effects.
- 106 During construction, effects due to increases in SSC, sandwave clearance and seabed preparation, and impacts to sandbanks and designated coastal features were assessed as being of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 107 During O&M, the assessments concluded that effects due to changes to the tidal and wave regime, sediment transport

pathways, impacts due to seabed scour, development of turbid wakes, and impacts to designated coastal features would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 108 In the decommissioning phase, the assessment considered effects due to increases in SSC and impacts to coastal designated features, concluding that potential effects would be of a level of significance no greater than **Minor** adverse, which is not significant in EIA terms.
- 109 In terms of cumulative effects, the assessment considered additive effects in-combination with other activities such as cable burial and dredge and disposal sites and identified no significant cumulative impacts. No transboundary effects with regard to marine physical processes from Thanet Extension on the interests of other EEA states were predicted.

### *Marine Water and Sediment Quality*

- 110 The assessment of potential effects to marine water and sediment quality covers the marine and coastal areas within 13 km of the proposed development boundary, which is approximately equivalent to the maximum spring tidal excursion. The assessment considers the potential changes in marine water and sediment quality as a result of the proposed development during the construction, O&M and decommissioning phases of the proposed development, using existing data and site-specific survey data. A full description of the assessment can be found within the ES

(Volume 2, Chapter 3: Marine Water and Sediment Quality (Document Ref: 6.2.3)).

- 111 The OECC lies within the Kent North coastal waterbody and the Stour (Kent) transitional waterbody. The proposed development boundary is also within 2 km of three designated bathing waterbodies and a designated shellfish water.
- 112 The sediments throughout the array area and wider study area are generally highly heterogeneous, although site-specific surveys showed that sediments in the south-west are generally coarser, with finer, sandier sediments being found further offshore. To assess the sediment quality and presence of contaminants within the array area and OECC, two site-specific surveys have been undertaken. Sediment type is an important factor when considering the potential presence of contaminants; sediments with a finer particle size provide a higher surface area to volume ratio for adsorption of contaminants which may be released when sediment is disturbed. Sediments with larger particle sizes (e.g. sands) are not associated with anthropogenic contaminants.
- 113 Contaminant analysis revealed that metal concentrations in sediment samples were below the marine sediment quality guidelines within the array area, apart from arsenic, concentration levels of which were between Cefas Action Level 1 and 2, which is common place in the outer Thames Estuary and southern North Sea. None of the chemical contaminant samples taken from the mid-shore stations at Pegwell Bay showed metal, hydrocarbon or organic pollutants above Cefas Action Level 1. A disused hoverport

- is located to the north of the OECC; historical records indicate that this area may have been reclaimed using colliery shale waste materials.
- 114 In terms of SSC, monthly averaged satellite imagery of Suspended Particulate Matter (SPM) suggests that within Thanet Extension array area average (surface) SPM is generally greater than 10 mg/l, increasing markedly throughout winter months. SSC increases with proximity to the coast and are at their highest within inshore and nearshore areas of the OECC due to a combination of enhanced re-suspension from wave activity within shallow water and fluvial input of sediment.
- 115 The impact assessment considers the deterioration of water quality as a result of effects including increases in SSC, the release of sediment-bound contaminants and the accidental release of pollutants. Embedded mitigation measures such as scour and cable protection, and the production of a Project Environmental Management Plan (PEMP) have been incorporated into the project to mitigate against potential effects.
- 116 In the construction phase, the assessments concluded that potential effects as a result of deterioration in water quality due to resuspension of sediments, release of sediment-bound contaminants and the accidental release of pollutants would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms.
- 117 During the O&M phase, it was concluded that deterioration in water quality due to the resuspension of sediments, release of sediment-bound contaminants and accidental release of pollutants would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms.
- 118 During decommissioning, deterioration in water quality as a result of resuspension of sediments, release of contaminants from sediment-bound contaminants and accidental release of pollutants would be of **Minor** adverse significance, which is not significant in EIA terms.
- 119 The cumulative effects assessment considered effects on water and sediment quality from Thanet Extension in-combination with other projects and activities including cable installation and dredge and disposal sites and concluded that potential effects due to the release of contaminants from disturbed sediments would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms. The assessment concluded that there would be no transboundary effects in terms of marine water and sediment quality receptors.
- Offshore Ornithology*
- 120 The assessment of potential impacts to offshore ornithology is focused on individual bird species and colonies, rather than sites designated for birds. Only where likely significant effects on bird species are associated designated sites taken into account, with a full Habitats Regulations Assessment (HRA) submitted separately.

The offshore ornithology study area includes the operational TOWF array area, the proposed Thanet Extension array area with a 4 km buffer around it, as well as the OECC up to the Mean Low Water Springs (MLWS) mark. The assessment considers potential effects on offshore ornithology in the construction, O&M and decommissioning phases of the proposed development, using existing data, site-specific survey data as well as results from collision Risk Modelling (CRM). A full description of the assessment can be found within the ES (Volume 2, Chapter 4: Offshore Ornithology (Document Ref: 6.2.4)).

- 121 Both the southern North Sea and English Channel bioregions, through which the array area and OECC pass are not noted for large populations of breeding seabirds, however the area is the route that large numbers of birds take on their annual migration routes between breeding and wintering areas. There are also a number of breeding seabird colonies around the Kent coast.
- 122 Species included within the assessment are those recorded during site-specific surveys that are considered to be at potential risk from the proposed development due to being present in high abundances, being potentially sensitive to OWFs, or due to species-specific characteristics (such as flying at rotor swept heights). These species include red-throated diver, gannet, kittiwake, herring gull, great black-backed gull, lesser black-backed gull, razorbill and guillemot. The numbers and distribution of species identified within the array are presented in full within the offshore ornithology chapter. With regard to the consideration of

bird species within the OECC (where potential effects are more spatially and temporally limited compared to the array area), a different range of the most sensitive species were considered, including red-throated diver, common scoter, razorbill and guillemot



**Figure 6: A razorbill**

- 123 The impact assessment considers potential effects on offshore ornithology receptors as a result of the construction, O&M and decommissioning phases of the proposed development. The key issues for the assessment are: disturbance and/ or displacement of foraging seabirds; and collision of individual seabirds with

offshore infrastructure leading to injury or mortality. Embedded mitigation included a reduction in the size of the original project boundary, to prevent extending into the Outer Thames Estuary Special Protection Area (SPA), distancing Thanet Extension from this important European designated site.

- 124 During construction, the assessments concluded that potential effects as a result of direct disturbance and displacement, as well as indirect effects through impacts to habitats and prey species would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 125 In the O&M phase, the assessments concluded that potential effects due to direct disturbance and displacement, indirect effects through impacts to habitats and prey species, collision risk, and barrier effects would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 126 During decommissioning, the conclusions of the assessments were that potential effects due to direct disturbance and displacement, and indirect effects through impacts to habitats and prey species would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 127 In terms of cumulative effects, the assessment considered the combined effects of Thanet Extension together with other OWF and cable projects, and considered the cumulative effects of direct disturbance and displacement (in the construction and O&M phases), and the operational collision risk. Cumulative effects were

predicted to be of **Negligible** significance (not significant in EIA terms) for all species except red-throated diver, for which **Minor** to **Moderate** adverse effects were concluded as a result of direct disturbance and displacement in the O&M phase. However, when considering the contribution of Thanet Extension alone, the contribution to the overall cumulative effect is not significant and is not considered to be a material contribution to the total. The assessment of transboundary effects that cross political boundaries in the North Sea and English Channel concluded that there was no significant likelihood of seabird breeding colonies in other countries being subject to significant adverse effects as a result of Thanet Extension.

#### *Benthic Subtidal and Intertidal Ecology*

- 128 Benthic ecology refers to seabed habitats (including intertidal) and associated animals that live on and within the seabed together with the way these interact with each other and with the wider marine system. The assessment of potential impacts to benthic subtidal and intertidal ecological receptors considers the potential effects of Thanet Extension on the subtidal and intertidal benthic ecology as a result of the construction, O&M and decommissioning of the proposed development within the study area. The study area encompasses the array area and OECC, as well as a 12 km buffer of the offshore components of the proposed development boundary. The assessment draws on existing data where relevant, as well as site-specific benthic characterisation surveys undertaken for Thanet Extension, and an intertidal habitat survey.

A full description of the assessment can be found within the ES (Volume 2, Chapter 5: Benthic, Subtidal and Intertidal Ecology (Document Ref: 6.2.5)).

- 129 The area in which Thanet Extension is situated is primarily dominated by coarse sediments, and is broadly lacking in hard substrate, except where the substrate is exposed. The study area includes mobile sandwave features which are generally poor, characterised by robust species such as annelids and fast burrowing bivalves. Areas with coarser sediments are more stable and therefore more species rich, supporting species of brittlestars and sessile fauna such as ascidians and anemones. *Sabellaria spinulosa* reef features are known to exist throughout the area, however *S. spinulosa* does not always form biogenic reefs. Within the Thanet region, it is known for forming ephemeral reef features that have limited longevity when compared to other regions, although there appears to be a shift towards more established reef features associated with the existing TOWF project.
- 130 The site-specific subtidal surveys identified several biotypes and benthic communities including species of polychaetes, bivalves, echinoderms, burrowing anemones, crustaceans and gastropods. Full descriptions of biotypes can be found within the benthic chapter.
- 131 With regard to the intertidal area of the OECC, the landfall location within Pegwell Bay is characterised by rock platforms with sandmason worms (*Lanice conchilega*) and mussels (*Mytilus edulis*) at the top of the shore and extensive areas of sand/ muddy

sand flats characterised by *Lanice* spp., *Arenicola* beds, *M. balthica* and cockles, while *C. volutator* and a variety of polychaetes with fringing saltmarsh and muddier habitats are found further to the south around the Stour Estuary. Saltmarsh is a common feature at the top of the intertidal area to the west of the old hoverport, with the quality of the saltmarsh increasing to the south of the Stour, with patchier, less diverse assemblages being found to the north of the Stour.



**Figure 7: Chalk cliffs and saltmarsh bordering muddy sands at the northern edge of the intertidal**

- 132 The impact assessment considers the potential effects on benthic subtidal and intertidal ecology as a result of impacts including direct disturbance and temporary habitat loss, indirect effects from increases in SSC and sediment deposition, and effects due to the colonisation of seabed infrastructure. Embedded mitigation measures included definition of the proposed development boundary to minimise environmental impacts and the burial of cables where practicable. An Annex I Mitigation Plan will be developed, as well as a Saltmarsh Reinstatement Plan, and an Ecological Clerk of Works (ECoW) will oversee construction works to ensure effects described in the assessment are not exceeded.
- 133 In the construction phase, the assessment concluded that potential effects as a result of temporary habitat disturbance, temporary increases in SSC and sediment deposition, and noise impacts from foundation installation would be of **Minor** adverse significance, which is not significant in EIA terms.
- 134 During the O&M phase, it was concluded that potential effects due to long-term habitat loss/ change, colonisation of subsea infrastructure, disturbance due to maintenance activities, disturbance due to Electromagnetic Fields (EMF), and changes as a result of scour and changes to sediment regime would be of **Minor** adverse significance, which is not significant in EIA terms.
- 135 In the decommissioning phase, the assessment concluded that potential effects due to temporary disturbance, temporary increases in SSC and sediment deposition, loss of habitat due to removal of seabed infrastructure, and permanent habitat loss due

to infrastructure left *in situ* would be of **Minor** adverse significance, which is not significant in EIA terms.

- 136 With regard to cumulative effects, the assessment considered potential effects of Thanet Extension in-combination with other projects including cable installations and dredge and disposal activities. Potential cumulative effects were predicted to be of **Minor** adverse significance, which is not significant in EIA terms. The assessment also predicted that there would be no transboundary impacts to other states as a result of the construction, O&M or decommissioning of Thanet Extension.

#### *Fish and Shellfish Ecology*

- 137 The assessment of potential effects on fish and shellfish ecology considers the potential impacts as a result of the construction, O&M and decommissioning of Thanet Extension within the array area, the OECC and a wider study area which included a 12 km buffer of the offshore components of Thanet Extension. The assessment has drawn on existing data, such as monitoring of the existing TOWF and existing distribution data of spawning and nursery grounds, as well as site-specific survey data. The assessment has also drawn on results from noise modelling undertaken for assessing the impacts from underwater noise generated from piling during construction. A full description of the assessment can be found within the ES (Volume 2, Chapter 6: Fish and Shellfish Ecology (Document Ref: 6.2.6)).

- 138 A number of species were identified as being potentially present within the study area including cod, Dover sole, whiting, plaice, herring, common whelk and edible crab (a full description can be found within the fish and shellfish ecology chapter).
- 139 Fish and shellfish communities are similar between the array area and OECC, however there are differences in community composition and distribution. The site-specific surveys indicated that communities within the array area were typical of soft sediment or mixed sediment habitats, whilst those in the OECC were more typical of hard substrate communities, most notably towards the inshore end of the OECC. Fish communities reflected this gradient in seabed type with species such as pouting and the small-spotted catshark dominating areas of coarser ground and hard substrate in the east of the wind farm site and along the OECC and the thornback ray and Dover sole dominating communities in soft sediment locations. The greatest abundances of individuals were recorded in soft and mixed sediment habitats in the north and western extent of the array area.
- 140 In terms of spawning and nursery areas, the proposed development boundary overlaps with high intensity spawning grounds for sole and plaice, and low intensity spawning grounds for cod, sandeel, and lemon sole. The site overlaps with high intensity nursery grounds for herring, and low intensity nursery grounds for herring, thornback ray, cod, whiting, sandeel, mackerel, plaice and sole. Herring and sandeel are of particular relevance when considering impacts to spawning areas as they are demersal spawners, laying their eggs in soft sediments. Further study suggests that the main important areas for herring spawning are located away from Thanet Extension. Spawning areas for sandeel off the east coast are large, extending from northern England down to the English Channel.
- 141 The impact assessment considers the potential effects on fish and shellfish ecology from impacts including direct damage and disturbance, increases in SSC and sediment deposition, noise due to piling, the release of pollutants, long-term habitat loss from the presence of seabed infrastructure, and EMF effects. Mitigation measures embedded into the project design include the use of soft-start piling, pollution control measures such as the following of a PEMP, and the burial of cables where practicable to reduce effects from EMFs.
- 142 During construction, potential effects from direct damage and disturbance, temporary increases in SSC and sediment deposition, release of sediment-bound contaminants, and underwater noise and vibration were concluded to be of **Minor** adverse significance, which is not significant in EIA terms.
- 143 In the O&M phase, the assessment concluded that potential effects as a result of long-term habitat loss from the presence of seabed infrastructure, increased presence of hard substrate and structural complexity, operational underwater noise, EMFs, disturbance from maintenance activities, indirect disturbance from the accidental release of pollutants, and displacement of

fishing pressure would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 144 In terms of decommissioning activities, the assessment concluded that potential effects would be of no greater significance than for the construction phase, if project infrastructure is completely removed during decommissioning. If it is deemed closer to the time of decommissioning that removal would result in greater environmental impacts than leaving certain components *in situ*, then leaving *in situ* may be preferable, in which case potential effects would be of no greater significance than for the O&M phase (**Negligible** to **Minor** adverse, which is not significant in EIA terms).
- 145 The assessment considered cumulative effects of Thanet Extension in-combination with other OWFs, cable installations, and dredge and disposal areas. The assessment concluded that potential cumulative effects from habitat loss, increases in SSC and sediment deposition, underwater noise and vibration, long-term habitat loss and EMFs would be of **Minor** adverse significance, which is not significant in EIA terms. It was also concluded that there would be no transboundary effects on other EEA states as a result of the proposed development.

### **Marine Mammals**

- 146 The assessment of potential effects on marine mammal ecology describes the potential impacts on marine mammal species that may arise from the construction, O&M and decommissioning of

the offshore components of Thanet Extension. It considers effects within the marine mammal study area, which varies depending on individual species ecology and behaviour. The study area covers the existing TOWF, the Thanet Extension array area and OECC, as well as an appropriate extended area, considering the scale of movement and population structure for each marine mammal species; for example, the study area for harbour porpoise includes the entire North Sea. The marine mammal assessment has been based on existing data and site-specific surveys, as well as including underwater noise modelling to assess impacts associated with construction piling. A full description of the assessment can be found within the ES (Volume 2, Chapter 7: Marine Mammals (Document Ref: 6.2.7)).

- 147 A number of marine mammal species were identified as being potentially present within the marine mammal study area, however based on the data obtained for the baseline characterisation study and the site-specific surveys for Thanet Extension, the only species taken forward for assessment were harbour porpoise, harbour seal and grey seal. It was agreed that dolphin species and minke whale would be scoped out of the impact assessment due to limited evidence of their presence in the Thanet Extension area.



**Figure 8: A group of harbour porpoise**

- 148 The impact assessment considers the potential effects on marine mammals as a result of impacts including underwater noise, vessel interactions, disturbance and seal haul-out sites, changes in water quality, and the loss of prey resources due to changes in benthic habitats and the fish and shellfish community. Mitigation measures embedded into the project design include a marine mammal mitigation protocol, codes of practice for construction vessels, soft-start piling, and pollution prevention measures including the production of a PEMP.
- 149 During the construction phase, the assessment concluded that potential effects due to underwater noise, vessel interactions,

disturbance at seal haul-outs, impacts to prey species, and changes to water quality would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 150 In the O&M phase, it was concluded that potential effects due to operational noise, vessel interactions, vessel noise and indirect impacts on prey species would be of **Minor** adverse to **Minor** beneficial significance, which is not significant in EIA terms.
- 151 During decommissioning, effects would be similar to or less than those occurring in the construction phase. Therefore, the assessment concluded that potential effects due to underwater noise, vessel interactions, changes to water quality, and indirect impacts on prey species would be of **Negligible** to **Minor** adverse significance.
- 152 In terms of cumulative effects, the assessment considered effects from Thanet Extension together with other OWF projects and cable installations and concluded that potential effects would be of **Negligible** to **Minor** adverse significance (not significant in EIA terms) for all species except harbour porpoise, for which effects would be of **Moderate** adverse significance, which is significant in EIA terms. However, it was assessed that the contribution of Thanet Extension to this significant impact would be minimal, and that the impact would remain significant even in the absence of Thanet Extension.
- 153 It was concluded that it would not be possible to apply any project-specific mitigation that would decrease this effect to below

moderate significance. With regard to transboundary effects, the assessment concluded that impacts from Thanet Extension would be localised and of negligible to minor significance, and transboundary effects were not considered further. The potential for significant effects on European designated sites in other EEA states is specifically addressed within the HRA.

### *Offshore Designated Sites*

- 154 The assessment of potential effects on offshore designated sites considers the potential impacts to offshore sites during the construction, O&M and decommissioning phases of the offshore components of Thanet Extension. The study area for the offshore designated sites assessment is strongly influenced by the study areas defined within other relevant chapters, depending on the relevant conservation interests of each site. The assessment has been based on existing data using Geographical Information Systems (GIS). A full description of the assessment can be found within the ES (Volume 2, Chapter 8: Offshore Designated Sites(Document Ref: 6.2.8)).
- 155 A number of designated sites were identified within the vicinity of the proposed development, including both coastal and offshore sites designated for a variety of conservation interests; a full description of these sites is contained within the offshore designated sites chapter. The sites identified within the assessment were the Thanet Coast Special Area of Conservation (SAC), the Sandwich Bay SAC, the southern North Sea candidate SAC, the Margate and Long Sands Site of Conservation Importance,

the Thanet Coast and Sandwich Bay SPA, the Outer Thames SPA, the Thanet Coast Marine Conservation Zone (MCZ), the Goodwin Sands recommended Marine Conservation Zone (rMCZ) the Sandwich Bay to Hacklinge Marshes Site of Special Scientific Interest (SSSI), and the Thanet Coast SSSI.

- 156 The impact assessment considers the potential effects to the identified sites as a result of a variety of impacts including increases in SSC and sediment deposition, underwater noise, disturbance from construction activities, and the colonisation of seabed infrastructure. Mitigation measures embedded into the project design are drawn from the relevant topic chapters and include site selection, the production of documents such as the Annex I Mitigation Plan, and soft-start piling.
- 157 During the construction phase, the assessment concluded that potential effects due to increases in SSC and sediment deposition, habitat loss, disturbance from construction activities, collision risk, and underwater noise would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms.
- 158 In the O&M phase, it was concluded that potential effects as a result of the colonisation of new material, disturbance, and collision risk would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms.
- 159 During decommissioning, it was concluded that removal activities of structures and cables would result in similar or lesser impacts to those identified during the construction phase, and therefore

would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 160 In terms of cumulative and transboundary effects, the assessment considered the cumulative assessments within the relevant related chapters and summarised in the relevant sections of this NTS (benthic ecology, offshore ornithology and marine mammals).

### *Commercial Fisheries*

- 161 The assessment of potential effects to commercial fisheries considers impacts to commercial fishing activity, which is defined as the activity by licensed fishing vessels undertaken for the legitimate capture and sale of finfish and shellfish, as a result of the construction, O&M and decommissioning of the proposed development. The assessment was based on multiple data and information sources including UK MMO fisheries statistics, Vessel Monitoring Systems (VMS) data, as well as data from Belgian, Dutch and French institutions. A full description of the assessment can be found within the ES (Volume 2, Chapter 9: Commercial Fisheries (Document Ref: 6.2.9)).
- 162 Surveillance data showed that the majority of sightings of the local UK fishing fleet were close to shore and along the OECC, with less activity within the array area. Belgian vessels appeared to focus on grounds to the south and east of the proposed development boundary, with French vessels tending to be observed to the south. Dutch vessels remain to the east of the proposed

development boundary due to restrictions on activities to within the 12 nautical mile (nm) limit.

- 163 The main UK port for local vessels operating within and around the proposed development is Ramsgate, with a fleet of 22 vessels, most under 10 m in length. Other important ports in the area include Whitstable, Broadstairs and Margate. Several methods are employed throughout the year such as potting, trawling and drift netting, as well as seasonal static netting. The principle target fish species include Dover sole, bass, skate, cod, plaice, mullet, herring and cuttlefish, as well as shellfish including lobster, edible crab and whelk.
- 164 The impact assessment considers potential effects to commercial fisheries due to changes to fish and shellfish populations, safety issues, increases steaming times to fishing grounds, interference to static and mobile fishing gear, and displacement of fishing activity due to the presence of infrastructure. These potential impacts are considered in the context of different types of fishing activity (e.g. potting and beam trawling), and in the context of the country of origin. Mitigation measures embedded into the project design include liaison with commercial fisheries stakeholders, the burial of cables where practicable to prevent damage to fishing gear, regular WTG spacing and layout, and the following of a dropped objects procedure.
- 165 During construction, potential effects as a result of impacts to commercially exploited fish and shellfish populations, fishing vessel activity, safety issues, increased steaming times,

interference with fishing gear, displacement of fishing activity and obstacles on the seabed were concluded to be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 166 In the O&M phase, potential effects due to impacts to fishing activities, safety issues, interference with fishing gear, increased steaming times, and displacement of fishing activity were assessed as being of **Negligible** to **Minor** adverse significance for the majority of receptors, which is not significant in EIA terms. **Moderate** adverse effects were predicted on UK drift netters for some individuals.
- 167 In the decommissioning phase, potential effects were predicted as being of no greater significance than in the construction phase.
- 168 In terms of cumulative and transboundary effects, the assessment considers the effects of Thanet Extension in-combination with other plans and projects, including other OWFs, cable installations, oil and gas operation, as well as MCZs. Overall, cumulative effects were predicted to be of a significance level no greater than **Minor** adverse, which is not significant in EIA terms. The assessment of transboundary effects is an integral part of the assessment.

### *Shipping and Navigation*

- 169 The shipping and navigation effects assessment considered the potential impacts of the construction, O&M and decommissioning of Thanet Extension on shipping and navigation receptors within the study area, which includes the Thanet Extension array area,

OECC and a 5 nm buffer around the array area. The assessment of potential effects to shipping and navigation involves a Navigation Risk Assessment (NRA) process, which identifies hazards and the likelihood of those hazards occurring, to give a conceptual understanding of navigational risk to vessels including recreational craft, commercial traffic and fishing vessels. A full description of the assessment can be found within the ES (Volume 2, Chapter 10: Shipping and Navigation (Document Ref: 6.2.10)).

- 170 In terms of the existing environment, the existing TOWF WTGs are painted, marked and fitted with navigation lights. There are two pilotage boarding stations within 6 km of TOWF; North-East Spit and Tongue, and one nearby anchorage; Margate Roads. Based on vessel traffic data, preferred traffic routes are evident with a total of seven routes within 5 nm of TOWF, traffic in these lanes varies from 30 to 370 transits per month and are predominantly made up of commercial cargo vessels and tankers. Passenger vessels mainly transit landward of TOWF, with the exception of cruise vessels. Fishing vessels rarely transit along shipping routes and are often seen transiting directly through the existing TOWF area. Recreational vessels are generally found landward of TOWF with approximately ten transits per month recorded within 5 nm.
- 171 With regard to Marine Accident Investigation Branch incidents, a total of 50 incidents were recorded between 2010 and 2015, with approximately half of these being mechanical failures. Two navigationally significant collisions occurred within 3 km of the TOWF boundary, both involving fishing vessels.

- 172 The impact assessment considers potential effects on shipping and navigation receptors due to changes to collision risk between vessels, contact risk between vessels and wind farm infrastructure, traffic routing, pilotage operations, fishing activity and recreational activities. Embedded mitigation includes appropriate lighting and marking, the promulgation of information to the relevant stakeholders, marking of wind farm infrastructure on navigational charts, and the alignment of navigation lights with the existing TOWF.



**Figure 9: Photograph of a WTG foundation illustrating the yellow foundation colouring and navigational markings**

- 173 In the construction phase, potential effects as a result of impacts on collision risk, contact risk, traffic routeing, pilotage operations, recreational and fishing activity were concluded, in Navigation Risk Assessment (NRA) terms to be of **Minor to Tolerable** significance in NRA terms, which is not significant in EIA terms.
- 174 During O&M, potential effects from impacts on collision risk, contact risk, vessel routeing, pilotage operations, recreational activities, fishing activities, navigational communication systems, Search and Rescue (SAR) operations, existing aids to navigation, vessel anchorages and impacts associated with subsea cables were concluded to be of **Minor to Tolerable** significance in NRA terms, which is not significant in EIA terms.
- 175 Effects during the decommissioning phase were assessed as being no greater than those during the construction phase.
- 176 In terms of cumulative effects, the assessment considered effects on shipping and navigation receptors from Thanet Extension alongside other proposed developments and activities including other OWFs, cables installations, and dredging and disposal sites. It was concluded that cumulative effects from increased vessel activity, impacts to vessel traffic routeing, and impacts associated with the cable route would be of **minor** significance, which is not significant in EIA terms. Whilst shipping is a multinational industry with vessels of many nationalities expected to transit Thanet Extension, vessels abide by international regulations, and local regulations when in port or within territorial waters. As such, transboundary effects are included within the assessment.

### *Infrastructure and Other Users*

- 177 The assessment considers potential effects to offshore infrastructure as a result of the construction, O&M and decommissioning of Thanet Extension, including other OWFs, cables and pipelines, and disposal sites. Oil and gas operations and aggregate dredging were agreed to be scoped out of the assessment, and recreational users are considered separately within the tourism and recreation assessment. The assessment draws on existing data and is based on a desk-based assessment using GIS. A full description of the assessment can be found within the ES (Volume 2, Chapter 11: Infrastructure and Other Users (Document Ref: 6.2.11)).
- 178 The closest OWF (other than the existing TOWF) is London Array, 11 km at its closest point from the proposed development boundary. Beyond this, Kentish Flats and the KFE were also considered in the assessment. In terms of cables and pipelines, the only assets to cross the proposed array area are the existing TOWF cables, whilst the OECC overlaps with two existing telecommunications cables (Tangerine and the Pan-European crossing), the Nemo Interconnector cable, as well as the existing TOWF cables. No pipelines were identified within the vicinity of the proposed development boundary. Six disposal sites were identified within 14 km of the proposed development boundary and were the Nemo disposal sites B and C, Pegwell Bay disposal sites A and B, and the Ramsgate Harbour sites A and B.

- 179 The assessment considered potential effects on infrastructure and other users receptors as a result of disturbance to O&M activities of other, disturbance to existing cables, restriction of access to cables and disposal sites, increased burial of existing cables, and increased sediment deposition within disposal sites. Embedded mitigation measures include the implementation of safety zones around construction activities, advisory safety distances, the establishment of cable crossing agreements with relevant cable operators, and the use of standard industry techniques to ensure no operational impacts to other subsea cables.
- 180 During the construction phase, it was concluded that potential effects as a result of disturbance to O&M activities of other OWFs and to existing cables, restriction of access to other users, increased burial of cables, and impacts to disposal sites from increased sediment deposition would be of **Minor** adverse significance, which is not significant in EIA terms.
- 181 During O&M, it was concluded that potential effects due to disturbance to O&M activities of other OWFs and the restriction of access to disposal sites during maintenance activities would be of **Minor** adverse significance, which is not significant in EIA terms.
- 182 In the decommissioning phase, it was concluded that potential effects would be of no greater significance than those in the construction phase if infrastructure were to be fully removed. In the event that some components (e.g. cables) were left *in situ*, then potential effects would be of no greater significance than in the O&M phase.

- 183 No specific projects were assessed in this cumulative impact assessment. The cumulative impacts on other users such as commercial fisheries, shipping and navigation is assessed in their relevant chapters of the ES. There are no transboundary effects predicted to occur as a result of Thanet Extension.

### *Seascape, Landscape and Visual*

- 184 The Seascape, Landscape and Visual Impact Assessment (SLVIA) considers the effects of the offshore components of Thanet Extension as a result of changes to the seascape/ landscape as an environmental resource in its own right, as well as on people's views and visual amenity. The assessment considers potential effects within a 45 km radius study area (the area that the tips of the WTGs are theoretically visible from) and uses a combination of landscape/ seascape character assessment, and computerised visual representations from a variety of sensitive viewpoints within the Zone of Theoretical Visibility (ZTV) through a site-specific survey to assess the potential effects. A full description of the assessment can be found within the ES (Volume 2, Chapter 12: Seascape, Landscape and Visual (Document Ref: 6.2.12)).
- 185 The existing seascape can be broadly defined by the Dover Strait Channel North Seascape Character Area (SCA) (01A), summarised as the deep-water shipping channel extending from the distinctive chalk headland of North Foreland to the White Cliffs of Dover. The SCA is defined by the broad, deep channel of the northern parts of the Dover Strait and is influenced by the busy dynamic seas regularly used by large commercial vessels and cross-channel

traffic between Dover and Calais. The existing TOWF forms a key characteristic of the existing seascape character in the northern part of the SCA. At night, the lights of shipping, flashing navigation devices and lighting of offshore WTGs have a key influence on the seascape. The offshore array area is also located 5 km from the Broadstairs Knolls and Ramsgate Roads inshore SCA (I2A), and 8.7 km from the Broadstairs to North Foreland inshore SCA (C1E) which covers the east-facing chalk cliffs of the Thanet Coast, affording long views across the North Sea and entrance to the Dover Strait. The seascape character to the south is defined by the inshore water of Pegwell Bay and Sandwich Bay, with shingle beaches, flat expanses of marshes and mudflats at low tide contrasted with high tide waters, as well as the Goodwin Sands, comprising distinctive large-scale sandbanks and shoals.

186 The landscape character is defined at a national level by the North Kent Plain National Character Area (NCA) to the north of the study area and the North Downs NCA to the south. The North Kent Plain NCA is an open, low and gently undulating productive agricultural area, characterised by arable use, and significant areas of ancient woodland. Where the area meets the sea, there is a diversity of coastal habitats, including chalk cliffs, soft cliffs, intertidal sand and mud, saltmarsh, sand dunes, shingle beaches, brackish lagoon and maritime grasslands. The area has a strong urban influence, including several coastal towns. Local Authorities have produced Landscape Character Assessments that subdivide NCAs into smaller Landscape Character Areas (LCAs). The landscape character of Thanet is defined by steep chalk cliffs and small sandy

bays, as well as extensive urban land. Otherwise, it is characterised by arable agricultural land with a general lack of trees and hedgerows. The landscape character of Dover within the SLVIA study area is defined by transition from low-lying coastal areas which rise gradually to the Kent downs.

187 The offshore array area is located outside any areas subject to international, national or regional landscape designated intended to protect landscape quality, however a number of landscape designations occur in the wider landscape of the study area, including the Kent Downs Area of Outstanding Natural Beauty (AONB), the South Foreland and Dover-Folkstone Heritage Coasts, as well as a number of registered parks and gardens and local landscape designations.

188 The existing views and visual amenity within the study area are currently influenced by several OWFs, in particular TOWF, London Array and Kentish Flats. The visual influence of these wind farms on the existing visual amenity, as well as an overview of visual receptors, is described within the SLVIA ES chapter.

189 Views of offshore wind farms can evoke a range of responses from the people who view them, with some describing them as 'intrusive', 'ugly' or 'imposing'. Others report positive visual effects of offshore wind farms, describing them as anything from 'grand' to 'inspiring' or even 'beautiful'. Although the SLVIA considers visual effects as a worst-case to be negative, it should be noted that equally, many find the visual effects to be beneficial.

- 190 The assessment considered potential effects on seascape, landscape and visual receptors as a result of impacts to seascape and landscape character, and to visual receptors as a result of the proposed development. A full description of these potential effects is described within the SLVIA ES chapter. Mitigation measures embedded into the project design include the development of project boundaries in order to avoid visually merging Thanet Extension with London Array, as to avoid the effect of visually separating the Thames Estuary and the North Sea beyond.
- 191 In the construction and decommissioning phases, seascape effects were predicted to be **non-significant**, with the exception of two Seascape Character Areas (SCAs) (Broadstairs Knolls and Ramgate Road SCA, and Margate Roads SCA). Landscape effects were predicted to be **non-significant**, with the exception of three Landscape Character Areas (LCAs) (Foreness Point and North Foreland LCA, Ramsgate and Broadstairs Cliffs LCA, and North Thanet Coast LCA). Visual effects were assessed as being **non-significant** for 17 of the 29 viewpoints assessed, with **significant** visual effects being predicted for the remaining 12.
- 192 During the O&M phase, seascape effects were predicted to be **non-significant**, with the exception of two Seascape Character Areas (SCAs) (Broadstairs Knolls and Ramsgate Road SCA, and Margate Roads SCA). Landscape effects were predicted to be **non-significant**, with the exception of three Landscape Character Areas (LCAs) (Foreness Point and North Foreland SCA, Ramsgate and

Broadstairs Cliffs LCA, and North Thanet Coast LCA). Visual effects of the Offshore WTG Array were assessed as being **non-significant** for 17 of the 29 viewpoints assessed, with **significant** visual effects being predicted for the remaining 12.

- 193 Cumulative effects are an inherent part of the SLVIA, and are therefore considered within the assessments for the construction, O&M and decommissioning phases of the development. No significant transboundary effects were predicted to arise.

#### *Offshore Archaeology and Cultural Heritage*

- 194 The assessment of potential effects on offshore archaeology and cultural heritage receptors considers the effects as a result of the construction, O&M and decommissioning of the offshore components of Thanet Extension. Data sources include existing data and maps, as well as site-specific data obtained through geophysical and geotechnical surveys. The offshore archaeology and cultural heritage baseline was assessed in relation to three themes: seabed prehistory, seabed features (including maritime and aviation sites), and Historic Seascape Character (HSC). A full description can be found within the ES (Volume 2, Chapter 13: Offshore Archaeology and Cultural Heritage (Document Ref: 6.2.13)).
- 195 The array area is situated at the southern end of the North Sea basin, with background geology dominated by Cretaceous chalk, overlain by tertiary sands and clays. The Pleistocene history of the southern North Sea is dominated by repeated glacial/ interglacial

cycles and associated rises and falls in relative sea level, resulting in large areas of the southern North Sea being periodically exposed as a terrestrial environment. The coast off of Kent and the English Channel did not directly experience glaciation, and there is potential for currently submerged palaeolandscape features to be well preserved, however the changing routes of river systems are likely to have reworked or removed Pleistocene deposits. Overlying these sediments is a sequence of Holocene deposits, comprising of underlying Pleistocene terrestrial sediments, and a second deposit of marine sediments. Archaeological evidence suggests considerable hominin activity in the area in general, with Kent having one of the largest concentrations of Lower Palaeolithic hand axes in Britain. The archaeological review of geophysical data of the OECC noted that the shallow geology of the OECC is considerably simpler than that of the array area and is not considered to be of prehistoric archaeological potential.

- 196 Within the array area, the geophysical survey identified a total of 148 anomalies of potential archaeological interest 14 of which have been classified as possible wrecks or wreck debris. Within the OECC, 1,058 anomalies of potential archaeological interest were identified, of which 16 are classified as possible wrecks, aircraft or wreck related debris. Seabed remains of wrecks and aviation losses are relatively easy to recognise from geophysical surveys and thus are likely to be largely avoided and preserved.



**Figure 10: 1943 wreck of a B-17G Flying Fortress, which ditched at Pegwell Bay after running out of fuel (wreck 1035)**

- 197 The HSC of the study area is considered to be of medium archaeological value, due to its important and prolonged maritime history and its continued use today. The nature of HSC is such that it reflects not only the past use of the sea by also the present, and as offshore renewables are already a component of the HSC of the area, it is anticipated that the overall HSC of the area will remain predominantly the same, and as such HSC has been excluded from the impact assessment.

- 198 There are no Schedules or Listed terrestrial sites within the intertidal zone of the study area.
- 199 The impact assessment considered effects as a result of permanent loss or disturbance of known or potential shallow seabed receptors and prehistory receptors, indirect effects such as those from changes in sedimentation and erosion patterns, as well as visual impacts to the setting of the archaeological environment. Embedded mitigation includes the production of a Written Scheme of Investigation (WSI), which will outline mitigation measures, and the implementation of Archaeological Exclusion Zones (AEZs) around features of archaeological interest, in which no works will be undertaken.
- 200 During construction, the assessment concluded that potential effects due to the loss/ disturbance of seabed and archaeological receptors, as well as indirect effects due to changes in physical processes and changes to the visual setting would be of **Negligible** to **Minor** adverse, which is not significant in EIA terms. **Minor** to **Moderate** (significant) beneficial effects were also concluded in some cases where appropriate pre-construction archaeological investigation on seabed and prehistory receptors takes place, and through the implementation of the Offshore Renewables Protocol for Archaeological Discoveries (ORPAD).
- 201 In the O&M phase, potential effects as a result of permanent physical loss/ disturbance of seabed and prehistory receptors, and indirect effects from changes to physical processes and changes to the visual setting were concluded to be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms. **Minor** to **Moderate** (significant) beneficial effects were also predicted where appropriate archaeological investigation on seabed and prehistory receptors takes place, and through the implementation of ORPAD.
- 202 Potential effects in the decommissioning phase were concluded to be the same as for the construction and O&M phases, of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms. **Minor** to **Moderate** (significant) beneficial effects were concluded in some places with archaeological investigation and through the implementation of ORPAD.
- 203 The cumulative effects assessment considered the potential effects of Thanet Extension together with other projects and plans within the wider area, including marine aggregate dredging and disposal sites, other OWFs, cable and pipeline installations, commercial fisheries, shipping and navigation features, as well as coastal developments. The assessment concluded that potential cumulative effects would be of **Negligible** to **Minor** adverse significance, and/ or **Minor** to **Moderate** beneficial. In terms of transboundary effects, the assessment concluded that any potential effects could be of **Negligible** to **Minor** significance, with the potential for effects of **Minor** to **Moderate** beneficial significance.

### *Inter-relationships*

- 204 The EIA for Thanet Extension to date has also assessed the potential for inter-related effects to arise, which are defined as multiple effects upon the same receptor. These occur either where a single effect acts upon a receptor over time to produce a potential additive effect (such as over the construction, O&M and decommissioning phases of a development), or where a number of separate effects interact to affect a single receptor (for example underwater noise and increased SSC on fish and shellfish receptors).
- 205 Potential inter-related effects have been identified based on the detailed individual assessments undertaken, as well as in the specific inter-relationships assessment (Volume 2, Chapter 14 (Document Ref: 6.2.14)). Overall, the inter-relationships assessment for Thanet Extension has not identified any significant inter-related effects that were not already covered by the topic-specific assessments. Certain individual effects were identified that did interact with each other, however it was concluded that these would not produce any effects of greater significance than when considered in isolation.
- 206 The NTS outlines how the EIA process to date has assessed the potential for the construction, O&M and decommissioning of the onshore elements of Thanet Extension to create effects upon the onshore environment as characterised by the review and analysis of existing and site-specific survey data, peer reviewed literature, desk-based studies and modelling of specific parameters. This

section of the NTS provides an outline of the onshore assessments undertaken to date; more information on the assessments can be found within Volume 3 of the ES.

### *Onshore Landscape and Visual Impact Assessment*

- 207 The onshore Landscape and Visual Impact Assessment (LVIA) considers the potential effects to the landscape and visual receptors as a result of the construction, O&M and decommissioning of the onshore components of Thanet Extension. The assessment was informed by desk-based study, site-specific photography, modelling and photographic visualisations (photomontages) of the infrastructure. The study area comprises a 1 km buffer around the landfall and onshore cable route, as well as a wider 5 km buffer around the onshore substation. A full description of the assessment can be found within the ES (Volume 3, Chapter 2: Offshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2)).
- 208 The physical landscape of the Country Park and Nature Reserve is divided into irregular shaped compartments, some with restricted access due to sensitive wildlife or during periods of seasonal grazing. The grassland within these compartments is fenced throughout and grassland tends to be much longer within these compartments. Along the onshore cable route and within the Country Park and Nature Reserve there are some small stands of trees near the access to Sandwich Road and at the boundary between the Country Park and Nature Reserve. Other vegetation along the onshore cable route within the Country Park and Nature

Reserve includes occasional smaller groupings or isolated small trees and shrubs and the shrubs and trees that separate the Country Park and Nature Reserve from Sandwich Road. The proposed substation area is currently used as a storage area and does not have any distinct landscape elements within it. There are large trees and shrubs that follow the River Stour to the east.

- 209 The landscape character of the onshore cable route is primarily coastal in character around Pegwell Bay, Sandwich Bay and the River Stour. Much of the route passes through the Pegwell Bay Country Park until it reaches the industrial landscape context of Richborough Port and Richborough Energy Park. The substation area and the southern part of the cable route are located within the Sandwich Corridor LCA and Sandwich Bay LCA, as defined by the Dover District Landscape Character Assessment.
- 210 There are no international, national or regional landscape designations within the onshore LVIA study area.
- 211 Principle sensitive visual receptors within the study area include roads, settlements, recreational routes and other features from which visual receptors would experience views. The assessment identified several viewpoint locations which are described within the onshore LVIA chapter.
- 212 The assessment considered potential changes to physical landscape and landscape character, and effects on visual receptors. Embedded mitigation incorporated into the project design has included the site selection process, which considered

landscape character and visual amenity alongside other technical and environmental constraints. For example, existing tree planting around the proposed substation area will provide visual screening for the majority of visual receptors in the area.

- 213 During construction, the majority of potential effects on the physical landscape and landscape character due to the construction of the substation were predicted to be non-significant. Significant effects however were predicted to one LCA (Pegwell Bay) as a result of the landfall and cable route construction. Effects on other LCAs assessed during cable route and landfall construction were concluded to be non-significant. Visual effects as a result of the substation construction were concluded to be **non-significant**, with the exception of one viewpoint from the A256 Richborough Port Roundabout. Visual effects from the construction of the cable route and landfall were concluded to be **non-significant**, with the exception of one viewpoint (near the bird hide in Pegwell Bay Country Park) in the case of landfall options 2 and 3.
- 214 During the O&M phase, it was concluded that there would be no significant effects on the physical landscape or landscape character as a result of the substation, cable route and landfall. The assessment also concluded that there would be **no significant** visual effects to any of the assessed viewpoints as a result of the substation, cable route or landfall.
- 215 During decommissioning, it was concluded that there would be no significant effects on the physical landscape or landscape

character as a result of the substation, cable route or landfall. The assessment also concluded that there would be **no significant** visual effects to any of the assessed viewpoints as result of the of the substation, cable route or landfall

- 216 Cumulative effects are an inherent part of the SLIVA and are therefore considered within the assessments for the construction, O&M and decommissioning phases of the development.

### *Socio-economics*

- 217 The assessment of potential effects on socio-economics considered effects as a result of the construction, O&M and decommissioning of Thanet Extension, examining the interaction between the proposed development and the local and wider economy within two study areas. It also considers the potential for the local labour force to absorb new employment opportunities in terms of capacity and skills profile. The baseline description has been informed using data from the study areas using existing relevant datasets from the Office for National Statistics (ONS), which provides data on population, labour market and employment conditions, and is described in detail within the socio-economics chapter. A full description of the assessment can be found within the ES (Volume 3, Chapter 3: Socio-economics (Document Ref: 6.3.3)).
- 218 Specifically, the assessment considers potential effects as a result of direct and indirect employment creation, Gross Value Added (GVA) creation, the potential for displacement of workers

currently employed in other industries, and demand for housing. Embedded measures incorporated into the project design to mitigate potential adverse effects include ensuring access for local businesses and supply chains and access for local employment opportunities.

- 219 The assessment concluded that potential effects during construction, O&M and decommissioning as a result of the impacts of direct and indirect employment creation, direct and indirect GVA creation, local employment, employment displacement, and impacts on demand for housing and accommodation would range from **Minor** adverse to **Minor** beneficial, which are not significant in EIA terms. Beneficial effects are expected in terms of employment and GVA creation, as well as through local employment, whilst adverse effects related to displacement of workers in other industries, and the increase in demand for local housing.
- 220 Cumulative effects as a result of Thanet Extension combined with other plans and projects in the region were concluded to be of **Negligible** significance across all receptors, which is not significant in EIA terms.

### *Tourism and Recreation*

- 221 The assessment considers the potential effects on tourism and recreational activities within the study area, including both onshore and offshore receptors, during the construction, O&M and decommissioning phases of Thanet Extension. The assessment

of impacts to tourism and recreation identified four main study areas, focusing on direct and indirect onshore and offshore receptors, depending on the nature of the receptor assessed. The description of the existing environment draws on a review of existing data and includes maps, relevant legislation and policy and internet searches, as well as site-specific walkover surveys to identify additional features and levels of public use. A full description of the assessment can be found within the ES (Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4)).

- 222 The study identified onshore recreational resources including Public Rights of Way (PRoW) and promoted trails and footpaths, Pegwell Bay Country Park, Stonelees Nature Reserve and the River Stour as resources that could potentially be affected by Thanet Extension. The study noted that nearly all of the resources identified appeared to be heavily used, however operating within their carrying capacity and aided by good levels of maintenance.
- 223 In terms of offshore recreational resources, the study identified bathing waters, water sports activities, sailing and recreational angling (as well as bait collection) as potential receptors. A full description of these offshore resources is provided within the tourism and recreation chapter.
- 224 The tourism economy is largely seasonal and is based on the more traditional seaside destinations, however the area benefits from all-weather attractions which encourage tourism all year round (such as Canterbury Cathedral) and varies considerably across the wider study area. Data suggests that tourism contributes over £1.2

billion to the Kent Economy, although employment supported directly by tourism within the wider study area is comparable to that found nationally (around 9%), however tourism-related employment in Thanet is around 20% higher than that seen nationally.



**Figure 11 Recreational sailing at the nearby Kentish Flats Extension Offshore Wind Farm**

- 225 The assessment considered potential effects on onshore and offshore recreational receptors, as well as on the tourism economy, as a result of restriction of access, modifications to rights of way, restrictions on parking, restriction of access to Pegwell Bay, and visual intrusions arising from the proposed project. Embedded mitigation includes keeping PRoW and promoted trails and footpaths open where practicable and reinstating disturbed PRoW following construction activities, as well as careful routing of the onshore cable to avoid key areas of sensitivity.
- 226 During construction, potential effects due to direct and indirect effects on onshore and offshore recreation and utility users would be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 227 In the O&M and decommissioning phases, potential direct and indirect effects on onshore and offshore recreational users, as well as effects on the tourism economy were concluded to be of **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.
- 228 The cumulative impact assessment concluded a **Negligible** cumulative impact across all receptors.

#### *Onshore Biodiversity*

- 229 The assessment of potential effects on onshore biodiversity considered the impacts to sensitive onshore ecological receptors

as a result of the construction, O&M and decommissioning activities associated with Thanet Extension, including both terrestrial ecology and ornithology. For onshore biodiversity, the study area was based on a 500 m buffer around the proposed onshore development boundary. The assessment drew on existing data sources, as well as site-specific ecological surveys to identify designated nature conservation sites, habitats and species present that could potentially be affected by Thanet Extension. A full description of the assessment can be found within the ES (Volume 3, Chapter 5: Onshore Biodiversity (Document Ref: 6.3.5).

- 230 The proposed development is located in an area which includes statutory designated nature conservation sites including the Thanet Coast and Sandwich Bay SPA and Ramsar, Sandwich Bay SAC, Sandwich and Pegwell Bay National Nature Reserve (NNR), and the Sandwich Bay to Hacklinge Marshes SSSI. These sites are designated for a variety of habitats, species and features such as breeding and non-breeding birds. The area also includes non-statutory sites.
- 231 Habitats in the area comprise improved and semi-improved neutral grassland, scattered and dense scrub and scattered trees adjacent to an extensive area of mudflats, coastal saltmarsh, coastal sand dunes and floodplain grazing marsh to the east. Further south, the area contains a sports facility (Baypoint Sports Club) dominated by amenity grassland and scattered trees. The southernmost area of land within the proposed development boundary is largely hardstanding in the vicinity of Richborough

Port. West of the A256 towards Richborough Energy Park, the area is dominated by man-made structures and hardstanding, with areas of improved grassland, scattered trees and scattered and dense scrub.

- 232 Within this mosaic of habitats, there is the potential to support several notable and protected species, including bats, water vole, otter, badger, breeding and over-wintering birds, reptiles, great crested newts, natterjack toads, terrestrial and aquatic invertebrates, and vascular plants.



Figure 12: A bat

- 233 The onshore biodiversity assessment considered potential effects on ecological receptors as a result of direct damage and disturbance, habitat loss, and pollution effects. Mitigation measures embedded into the project design include the use of existing field access points for vehicles where possible, the storage of topsoil (and therefore the seedbank) in affected areas for reinstatement post-construction, the implementation of appropriate buffers around bird nests during the breeding season.
- 234 The assessment concluded that potential effects as a result of direct and indirect damage and disturbance, habitat loss and pollution are **not significant** for all stages of the project.
- 235 In terms of cumulative effects, the assessment concluded that there would be no further significant effects when Thanet Extension is considered alongside other planned and proposed projects in the area.

#### *Ground Conditions, Flood Risk and Land Use*

- 236 The assessment considers the potential effects on ground conditions, flood risk and land use due to activities associated with the construction, O&M and decommissioning of the onshore components of Thanet Extension. The study was based on a review of existing data sources such as the British Geological Survey (BGS) and Environment Agency (EA), as well as the findings of site-specific walkover surveys. The study area comprised the proposed onshore development boundary as well as a 500 m buffer. A full description of the assessment can be found within the ES (Volume

3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)).

- 237 The proposed development boundary lies in an area of low-lying topography, with a variety of agricultural and industrial past land uses. The land surrounding the site is made up of a combination of agricultural, natural sand and mudflats, and industrial land. A historic landfill site on-site is located to the east of Sandwich Road, in which the Pegwell Bay Country Park is located, filled with household and inert waste. The area also includes the former Richborough Power Station, and a disused hoverport to the north. More recently, the area includes a solar farm to the west.
- 238 Soils within the site boundary and surrounding area are classed as variable and highly permeable soils of leaching potential. The area is underlain by mostly well drained, loamy and clayey soils of coastal flats with naturally high groundwater. The River Stour lies within a few meters of the proposed substation location and 360 m to the south of the proposed cable route. Rainfall run-off and surface water is considered to be a potential source of flood risk in the area, in particular in the lower elevation ground across the central and southern areas of the proposed development boundary.
- 239 The assessment identified several sensitive receptors including water resources, flood risk receptors, conservation sites and land quality receptors. It considered the potential effects of Thanet Extension on ground conditions, flood risk and land use as a result of works at the existing sea defence, potential pollution and

displacement of flood waters. Embedded mitigation includes routing of the cable route to avoid key hazards, the requirement to complete extensive site investigation works prior to construction, and the effective design of site drainage to ensure that flood risk is minimised (including utilising Sustainable Urban Drainage principles).

- 240 During construction, the assessment concluded that potential effects as a result of possible pollution and effects on human health and property due to removal of the sea defence would be of **Negligible to Minor** adverse significance.
- 241 In the O&M phase, it was concluded that potential effects due to possible pollution and effects on human health and property as a result of sea defence removal, and effects due to displacement of flood waters associated with the cable protection berm would be of **Negligible to Minor** adverse significance, which is not significant in EIA terms.
- 242 In the decommissioning phase, it was concluded that potential effects as a result of possible pollution and effects on human health and property due to removal of the sea defence would be of **Negligible to Minor** adverse significance.
- 243 The cumulative effects assessment considered Thanet Extension alongside other planned and proposed projects and concluded that there were no significant effects.

### *Onshore Historic Environment*

- 244 The onshore historic environment assessment considered the potential for the construction, O&M and decommissioning of Thanet Extension to have effects on the archaeology and cultural heritage of the study area, which included the proposed onshore development boundary, as well as a 500 m buffer in all directions. This was to allow information on heritage assets in close proximity to Thanet Extension to be collected in order to fully understand the potential for as-yet unrecorded assets. In order to understand the significance of potential effects, baseline data has been reviewed to identify known or suspected archaeological sites within the site boundary, and to characterise the heritage resource from the study area. A full description of the assessment can be found within the ES (Volume 3, Chapter 7: Onshore Historic Environment (Document Ref: 6.3.7)).
- 245 The study area for Thanet Extension is located in a rich and diverse historic landscape that holds evidence for human activity from the earliest occupation of Britain to the present day. There is substantial evidence for pre-historic occupation of Thanet, particularly of the land on the margins of the wetland of the Wantsum Channel. Excavations of this area have produced evidence of Romano-British activity around Ebbsfleet, including potential evidence for the earliest Roman Activity in Britain. The proximity of Thanet to continental Europe and the apparent suitability of the coast here for landing in the pre-modern period means that (although impossible to verify) Ebbsfleet is also

recorded as the initial landing place of the Anglo-Saxons in England and as the landing place of the Augustinian Mission.

- 246 Geoarchaeological evidence shows evidence for key coastal and anthropogenic processes such as land reclamation in the medieval period, contributing to the heritage significance of the area. The area appears to have been primarily agricultural in the post-medieval period, due to the gradual decline of Sandwich resulting from changes to navigation and the size of vessels used, as well as the construction of a harbour at Ramsgate in the mid-17<sup>th</sup> century.
- 247 In the First World War, the area was a major embarkation point for men and materiel for the Western Front, with the construction of a military port at Richborough. The site was re-used in the Second World War, and the suitability of the area as an invasion site from mainland Europe led to the construction of substantial anti-invasion and anti-aircraft defences.
- 248 More recently, the area has seen development including the construction of Richborough Power Station and other industrial development within the former Richborough Port site, as well as the expansion of Cliffsend, and the construction of golf courses. Landfill sites are also recorded at Pegwell Bay and Stonelees Golf Course.
- 249 Within the wider region outside of the study area, there are a number of designated heritage sites along the north and east coast Kent, comprising mainly Grade I and Grade II listed buildings, and scheduled monuments.

- 250 The assessment considered potential direct and indirect effects on archaeological receptors, as well as effects due to changes in setting as a result of the proposed development. Embedded mitigation included careful routeing of the onshore cable route to avoid key areas of sensitivity, and the production of an agreed programme of archaeological work as identified through further work.
- 251 In the construction/ decommissioning phases, the assessment concluded that potential effects as a result of disturbances of elements of the anti-invasion defences at Pegwell Bay and the Boarded Groin and associated floodbanks would be of **Negligible** significance, which is not significant in EIA terms.
- 252 During the O&M phase, potential effects resulting from changes in setting of the identified Conservation Areas and listed buildings were concluded to be of potential **Negligible** to **Minor** adverse, which is not considered significant in EIA terms.
- 253 The cumulative effects assessment concluded that no adverse cumulative effects were anticipated.

#### *Traffic and Transport*

- 254 The assessment of potential effects on traffic and transport as a result of the construction, O&M and decommissioning activities associated with Thanet Extension within an identified study area defined as the highway network around Cliffsend. The study was informed by an initial desktop study to identify potential

construction access routes, highway infrastructure and transport facilities within the proximity of the proposed development. Review of existing data, as well as the undertaking of surveys including automated and manual traffic counts also informed the assessment. A full description of the assessment can be found within the ES (Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8)).

- 255 The local highway network includes the A256, the A299 and Sandwich Road. The A256 and A299 are dual carriageways subject to the national speed limit (70 mph). the A256 acts as the main north-south connection between Cliffsend and Dover, carrying a significant amount of traffic on a daily basis, with peak flows exceeding 3,000 vehicles as well as a large proportion of Heavy Goods Vehicles (HGVs). The A299 provides the main east-west connection between Ramsgate and the M2, transitioning from a dual carriageway to a single carriageway upon entering Ramsgate. Sandwich Road links Cliffsend with the roundabout with the A256 and is a single carriageway (with a single file traffic calming arrangement in its southern section) and has variable speed limits ranging from 30 to 60 mph.
- 256 Detailed vehicle, cyclist and pedestrian counts are presented within the traffic and transport chapter, however light goods vehicles make up the majority of the baseline vehicle flows, with HGVs accounting for less than 2% of the baseline flows. No serious accident trends or clusters were identified within the study area.

The baseline environment also includes pedestrian, cycle, and bus routes within the local area.

- 257 The assessment considered the potential effects on traffic and transport receptors due to construction traffic associated with Thanet Extension. As part of the embedded mitigation, a Traffic Management Plan to manage and control vehicle movements will be developed.
- 258 In the construction, phases of the development, the assessments identified that there would be no significant effects due to impacts including delays to drivers, public transport or pedestrian amenity, PRow crossings, or accidents and safety. The assessment concluded that all potential effects would be **Minor** adverse, which is not significant in EIA terms.
- 259 The assessment of O&M has been scoped out due to the low number of vehicle trips occurring at this phase. For decommissioning, there is some uncertainty in final vehicle numbers associated with this activity, resulting in the assessment has been scoped out and would be assessed when required.
- 260 Any potential cumulative effects arising from Thanet Extension considered alongside other plans and projects were assessed as not significant.

### *Air Quality*

- 261 The air quality assessment has assessed the potential effects on air quality as a result of the onshore construction, O&M and decommissioning activities of Thanet Extension, including the landfall, onshore cable route, and substation. The assessment draws on existing data and air quality management reports by local authorities, as well as predicted traffic counts defined by the project description. A full description of the assessment can be found within the ES (Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9)).
- 262 Thanet Extension is not located within any Air Quality Management Areas (AQMAs), however it is located adjacent to the Thanet AQMA, encompassing a number of urban areas within Thanet due to exceedances in NO<sub>2</sub> levels. The nearest air quality monitoring stations are located around 18 km to the south of the proposed development boundary, however there are two automated monitoring sites nearby, 2.3 and 4.4 km away respectively. Data from these stations between 2013 and 2016 showed that there have been no exceedances of Air Quality Objectives (AQOs for NO<sub>2</sub> or PM<sub>10</sub>). In terms of passive monitoring, NO<sub>2</sub> concentrations have been generally below the AQO in recent years at the sites closest to the proposed development. There has been exceedance of the AQOs at passive monitoring stations 3.2 km from the boundary.
- 263 The assessment of potential effects on air quality as a result of impacts of construction dust and construction vehicle and plant emissions on human and ecological receptors. Mitigation measures embedded into the project design include the implementation of a construction management plans for traffic, and the following of standard guidance measures and principles of good practice.
- 264 During construction, the assessment concluded that potential effects due to increases in road traffic generated pollutant concentration and impacts from dust on human and ecological receptors would be of **Negligible** to **Minor** significance, which is not significant in EIA terms.
- 265 In the O&M phase, potential effects due to increases in traffic generated air quality pollutant concentrations on human and ecological receptors would be of **Negligible** significance, which is not significant in EIA terms.
- 266 During decommissioning, potential effects due to dust impacts on human and ecological receptors would be of **Negligible** to **Minor** significance.
- 267 The cumulative effects assessment considered the onshore elements of Thanet Extension alongside other planned projects and developments in the area, including residential development, solar farms, a biomass heat and power station and industrial units, and concluded that potential cumulative effects would be of **Negligible** to **Minor** significance, which is not significant in EIA terms.

### *Noise and Vibration*

- 268 The noise and vibration assessment examines the potential effects that may be generated through the construction, O&M and decommissioning of Thanet Extension upon sensitive areas or premises used by people. To inform the study, calculations were made based on the attenuation of noise from various activities including construction noise associated with excavation and cable laying, piling at the substation, noise from construction traffic, and noise from the operational substation. A full description of the assessment can be found within the ES (Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10)).
- 269 The existing baseline has been characterised by a baseline sound survey undertaken in April 2017 at multiple locations that were representative of noise sensitive receptors in the vicinity of Thanet Extension. The existing environment currently comprises a mix of rural, industrial, commercial and recreational uses, and the significant contributor to existing background noise is from road traffic on the A256 dual carriageway or from industrial/commercial premises. The existing ambient noise environment at each of the locations is described in detail within the noise and vibration chapter.
- 270 The assessment considered potential effects as a result of impacts due to temporary construction noise, construction traffic, offshore piling, and the operation of the onshore substation. Embedded mitigation measures include the production of a Noise and Vibration Management Plan within the Code of Construction Practice, which would set out requirements for construction such as the use of effective silencers and noise insulation on plant, and the use of local noise screening where necessary.
- 271 It was concluded that potential effects in the construction phase as a result of construction noise, traffic noise, vibration and offshore piling noise would be of **Minor** adverse significance, which is not significant in EIA terms.
- 272 In the O&M phase, it was concluded that potential effects from operational fixed plant (the substation) would be of **Minor** adverse significance, which is not significant in EIA terms.
- 273 Potential effects from decommissioning activities through decommissioning noise and traffic noise were concluded to be of **Minor** adverse significance, which is not significant in EIA terms.
- 274 The cumulative effects assessment considered the potential effects of Thanet Extension in-combination with other plans and projects in the area, including the Richborough Solar Farm. It was concluded that the potential for cumulative effects is considered unlikely.

### *Aviation and Radar*

- 275 The aviation and radar assessment considers the potential effects on aviation and radar receptors as a result of the presence of WTGs and other infrastructure required during the construction, O&M and decommissioning phases of Thanet Extension. A full

description of the assessment can be found within the ES (Volume 3, Chapter 11: Aviation and Radar (Document Ref: 6.3.11)).

- 276 A number of aviation and radar receptors were identified including London Southend Airport (58.7 km away), SAR activities, the National Police Air Service (NPAS), and Kent International Airport (Manston), which is now closed however a consultation to re-open the airport is taking place.
- 277 The assessment considered the potential for effects as a result of impacts to SAR and NPAS operations, the Primary Surveillance Radar of London Southend Airport, and flight operations when WTGs are considered as physical obstructions. Embedded mitigation includes the notification of aviation stakeholders of the location and dimensions of any infrastructure and associated construction activities, and the fitting of obstacle lighting on WTGs.
- 278 In the construction phase, the assessment concluded that potential effects as a result, physical obstructions to helicopter SAR and NPAS operations would be of **Minor** adverse significance, which is not significant in EIA terms.
- 279 During O&M, it was concluded that potential effects due to the presence of WTGs and infrastructure causing a physical obstruction to flight operations, and the potential to interfere with the London Southend Airport PSR system would range from **Negligible** to **Minor** adverse significance, which is not significant in EIA terms.

- 280 In the decommissioning phase, it was concluded that effects due to physical obstructions to helicopter SAR and NPAS would be of **Negligible** significance, which is not significant in EIA terms.
- 281 In terms of cumulative effects, the assessment concluded that that any potential effects would be of **Negligible** significance. As there are no operational non-UK airports within close proximity of Thanet Extension, any potential transboundary effects were predicted to result in a **Negligible** effect.

#### *Public Health*

- 282 The public health chapter considers the potential effects on the health of the local population. Public health effects are covered in various chapters such as Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6), Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9) and Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10). A full description of the assessment of potential effects on public health can be found in the ES (Volume 3, Chapter 12: Public Health (Document Ref: 6.3.12)).
- 283 The chapter identified that the human receptors who would be most at risk from potential impacts would be those with a high rate of continuous occupancy, such as pupils in residential educational facilities, or patients in healthcare facilities. Those using the area for leisure activities such as those using PRoWs, sports facilities and sites of historical or cultural significance would be at lower risk due to a shorted exposure time.

284 The assessment considered the potential for affects as a result of soil (dust), water and air emissions, increased levels of noise, EMFs, as well as effects on community stress and wellbeing. In terms of embedded mitigation, the electrical infrastructure will be designed to comply with current guidelines on levels of public exposure.

285 For construction and O&M, the assessment concluded that potential health effects as a result air, water, noise and soil emissions; community stress and wellbeing and electromagnetic radiation exposure would range from **Negligible** to **Minor** adverse significance. This is considered not significant in EIA terms.

286 The cumulative impact assessment considered the impacts during O&M of exposure to electromagnetic radiation from emitting infrastructure which are connecting to the Richborough Energy Park. The assessment concluded there would be a **Minor** adverse impact, which is not significant in EIA terms.

## 7 Further information

287 Key consultation documents will include the ES and details of the principles that would be applied to the design and construction of Thanet Extension. These documents will be available during the examination of the application which will give members of the public an opportunity to engage with the examination process.

288 In addition to the posting of newsletters, the community will be made aware of the project via notices issued to local media and through the Thanet Extension web pages.

289 Copies of the full ES can be requested (at a cost of £2,000) by post, addressed to:

Thanet Extension Offshore Wind Farm  
Vattenfall Wind Power Ltd  
1<sup>st</sup> Floor  
1 Tudor Street  
London  
EC4 Y0AH  
United Kingdom

Or by email – [info@thanetextension.com](mailto:info@thanetextension.com) or  
[melanie.rogers@vattenfall.com](mailto:melanie.rogers@vattenfall.com)

290 The full ES is publicly available via the PINS website (<https://infrastructure.planninginspectorate.gov.uk/projects/south-east/thanet-extension-offshore-wind-farm/>) and the project website (<https://corporate.vattenfall.co.uk/projects/wind-energy-projects/thanet-extension/>). Copies of the ES are also available through USB memory sticks which are accessible by contacting the above address or email addresses.

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