



Galloper Wind Farm Project
Environmental Statement – Chapter 1 Introduction
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Galloper Wind Farm Limited



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1 INTRODUCTION

1.1 Environmental Statement

- 1.1.1 Galloper Wind Farm Limited (GWFL) is proposing to construct an offshore wind farm in the Outer Thames Estuary including associated infrastructure to facilitate export of power to the national electricity transmission system. The proposed development is known as Galloper Wind Farm (GWF). This document constitutes the Environmental Statement (ES) for the project, and presents the findings of the Environmental Impact Assessment (EIA) process.
- 1.1.2 This ES appraises the environmental impacts predicted from the proposed GWF project. The ES is prepared in order to support the consent application process and is required under the Infrastructure Planning Regulations (Environmental Impact Assessment) Regulations 2009 (which transpose the EIA requirements of the EU Directive (EIA Directive) 85/337/EEC (as amended by Directive 97/11/EC and Directive 2003/35/EC) (see **Chapter 3 Legislative and Planning Context**).
- 1.1.3 The objectives of the ES are to ensure that environmental factors are considered throughout the project, and the decision-making process, and potential adverse and beneficial environmental impacts are identified and assessed (see **Chapter 4 Approach to EIA**). As a result of this assessment process, potential measures to avoid or minimise any likely significant impacts can be identified and where necessary subsequently implemented.
- 1.1.4 The EIA encompasses all activity associated with the development (both offshore and onshore components). Therefore, the ES for the proposed GWF project presents the full findings of the EIA for the offshore wind farm (including offshore platforms, inter and intra-array cables and met masts), export cable route, cable landfall, onshore works, onshore substation components and grid connection.

1.2 Application for Development Consent

- 1.2.1 As an offshore generating station with a capacity greater than 100 megawatts (MW), the proposed GWF project qualifies as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 (“the 2008 Act”).
- 1.2.2 The application will include grid connection works which are being treated as an ‘electric line above ground’ NSIP in their own right under the 2008 Act. This ES assumes that GWF will comprise these two NSIPs.
- 1.2.3 The principal consent for the construction, operation and decommissioning of the wind farm, overhead lines and associated infrastructure will take the form of a Development Consent Order, under the 2008 Act (See **Chapter 3**).

1.3 The Applicant

- 1.3.1 SSE Renewables Developments UK Ltd (SSER) and RWE Npower Renewables Ltd (RWE NRL) have been awarded the rights to develop the proposed GWF project as part of The Crown Estate's Round 2.5 Offshore Wind Farm extension programme.
- 1.3.2 This joint venture between two of Europe's leading offshore wind developers builds on the existing successful partnership between SSER and RWE NRL on the adjacent 504MW Greater Gabbard Offshore Wind Farm (GGOWF) project which is anticipated to be fully operational in 2012, making it the largest operational offshore wind farm in the world.
- 1.3.3 **SSER** (formerly known as Airtricity) is responsible for the development and construction of Scottish and Southern Energy's (SSE) renewable energy projects across the UK, Ireland and Continental Europe. SSE is the UK's leading generator of renewable energy, with over 2,200 Megawatts (MW) of capacity, and is the second largest generator in the UK, with a total electricity generation capacity of 11,500MW.
- 1.3.4 **RWE NRL** is the UK subsidiary of RWE Innogy and already operates offshore wind farms at North Hoyle (60MW) and Rhyl Flats (90MW), in north Wales. The company is also constructing the Gwynt y Môr offshore wind farm (576MW), also situated off the north coast of Wales. A number of additional major projects, including Triton Knoll (1,200MW) and Atlantic Array (1,500MW), are currently in development. As one of the companies comprising the Forewind consortium, RWE NRL is also involved in development of the world's largest offshore project, Dogger Bank (approx. 9,000MW), situated off the east coast of England. RWE Innogy is progressing a number of offshore wind farms on the European continent, currently constructing the Nordsee Ost (295MW) and Thornton Bank offshore wind farms (325MW), and is developing the Innogy Nordsee 1 project (approx. 1,000MW). Overall, RWE Innogy operates renewable power plants with a total rated capacity of 2,200MW and invests approximately 1.1 billion euros a year in the expansion of renewable energy within Europe.
- 1.3.5 The applicant name for the joint venture (JV) between SSER and RWE NRL is **Galloper Wind Farm Limited**, and is referred to as **GWFL** throughout this ES.

1.4 Round 2.5 Extension Projects

- 1.4.1 The Crown Estate, which provides rights for development on the seabed in the UK, believes there is an opportunity for the delivery of extension schemes to realise additional offshore wind capacity, which could be brought into operation ahead of longer term Round 3 projects. To this end, The Crown Estate formally made an announcement on extensions to operational, under construction or consented Round 1 and 2 projects on the 29th July 2009.

- 1.4.2 GWFL formally submitted a tender bid for the proposed GWF project to The Crown Estate in December 2009 and was subsequently awarded exclusive rights to develop the proposed wind farm on 20th April 2010.
- 1.4.3 Whilst The Crown Estate did not set a maximum size limit for the extension projects, they did state that the scale of the extension should be appropriate to the scale of the original site taking into account environmental and other constraints¹. To this end, the proposed GWF project submitted to The Crown Estate was for a nominal 504MW, this being the same scale as the adjacent GGOWF.
- 1.4.4 Following this review, The Crown Estate determined that an additional 2GW of offshore wind capacity in the form of extensions to Round 1 and 2 wind farm projects could be let, which would see offshore wind reach an installed capacity of 48GW by 2020. The five sites awarded rights were:
- Galloper Wind Farm (504MW);
 - Kentish Flats 2 (51MW);
 - Thanet 2 (147MW);
 - Burbo Bank Extension (234MW); and
 - Walney Extension (750MW).
- 1.4.5 A further two projects, Race Bank and Dudgeon have been offered the chance to develop additional capacity of 80MW and 260MW respectively, within their existing site boundaries.

1.5 The Galloper Wind Farm Project

Project site

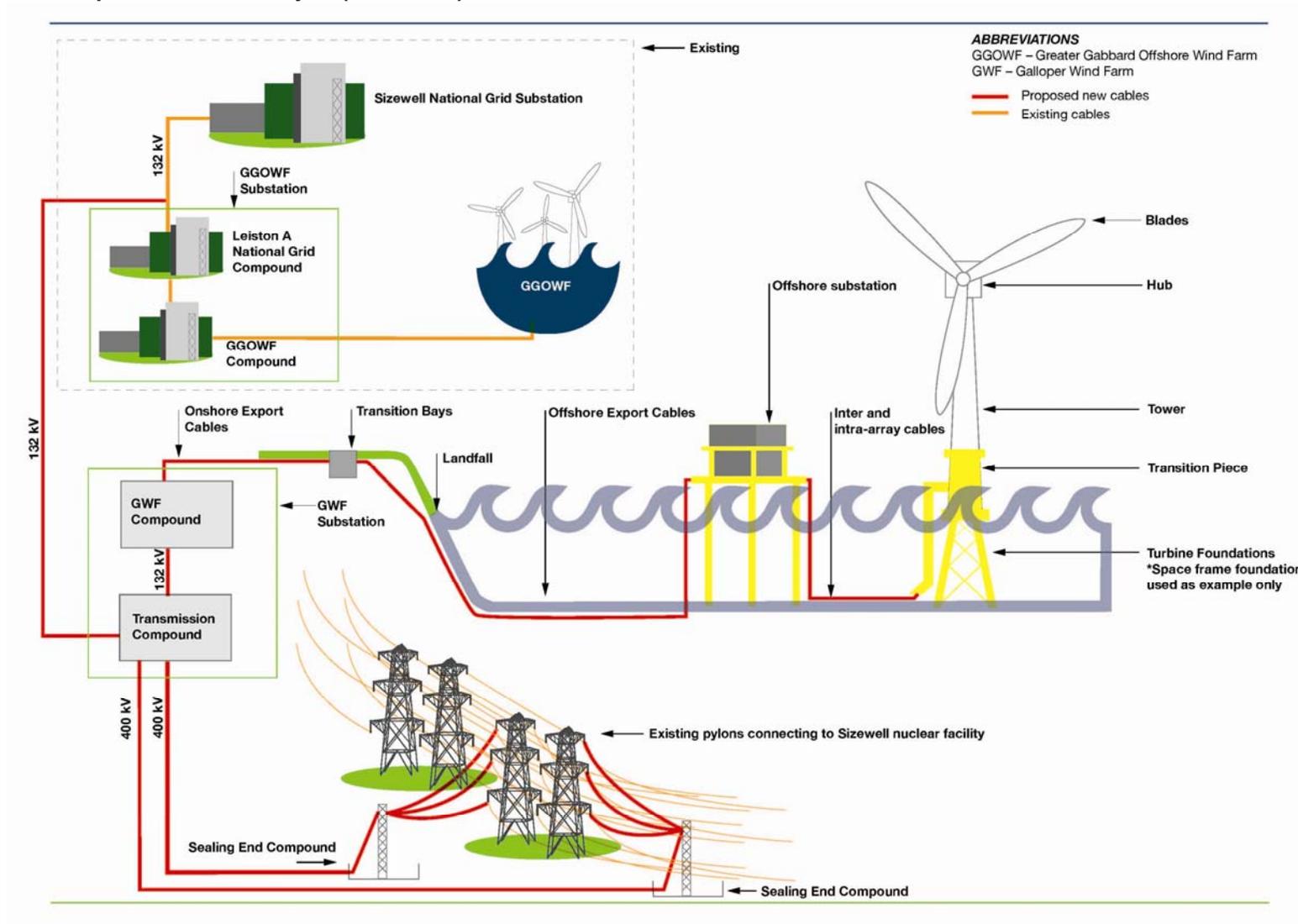
- 1.5.1 The proposed GWF development comprises the installation, operation and subsequent decommissioning of an offshore wind farm in the Outer Thames Estuary, located approximately 27km (14.6 nautical miles) at its closest point to the Suffolk coast. **Figure 1.1** shows a schematic arrangement of the primary onshore and offshore components of the proposed GWF project and their relationship to the existing GGOWF.
- 1.5.2 The wind farm comprises three key areas (development areas A, B and C). Wind turbine generators (WTG) and associated infrastructure may be developed in all, part or not at all in some of these areas and may vary in density across each one. Area A is located around a shallow underwater sand bank, known as Outer Gabbard, with two further shallow underwater sand banks, known as Inner Gabbard and Galloper situated to the west of the development area. The site straddles the UK territorial waters limit of 12nautical miles from shore. **Figure 1.2** provides a plan of the proposed

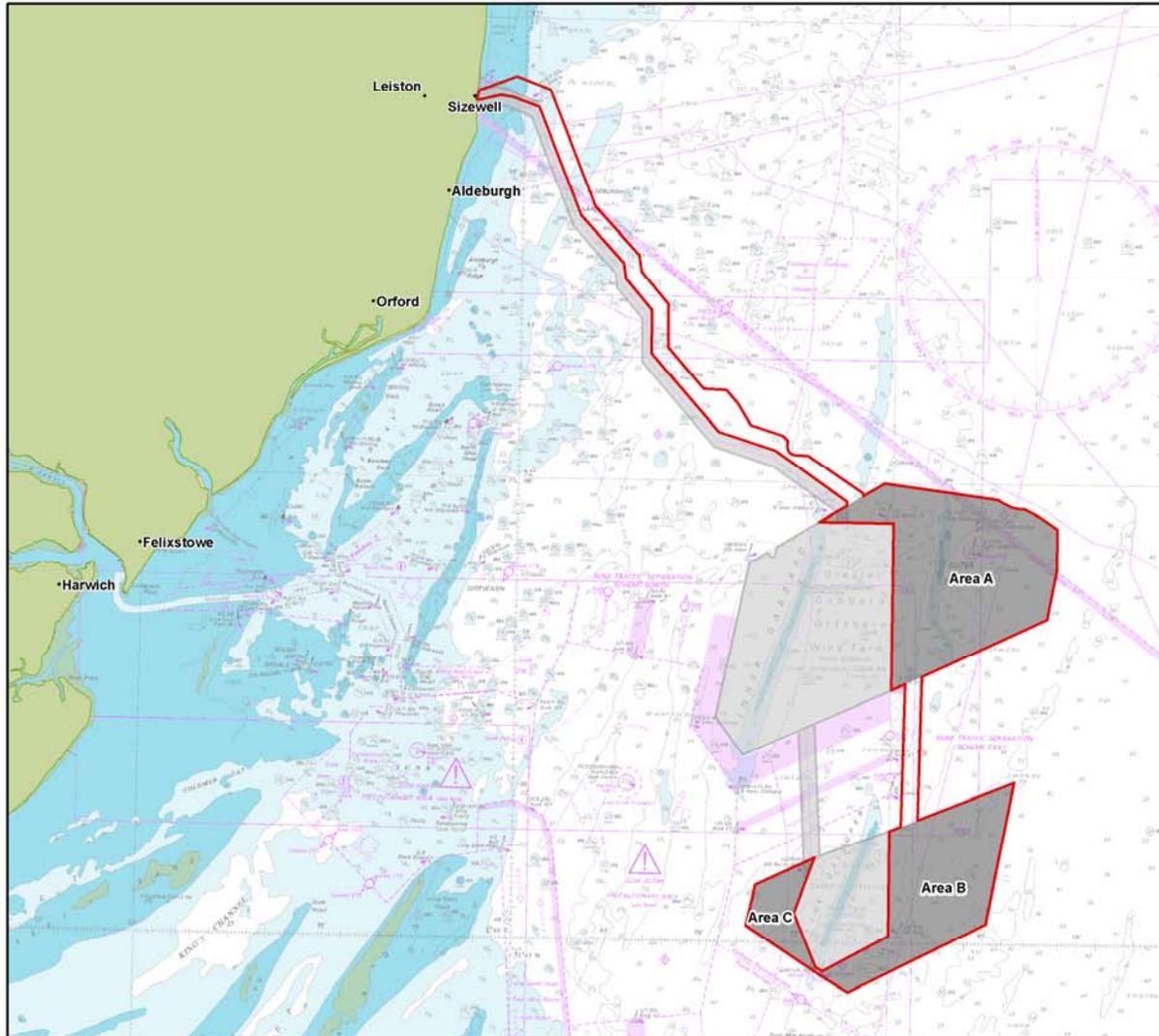
¹ http://www.thecrownestate.co.uk/print/our_portfolio/marine/offshore_wind_energy/r1-r2-lease-area-extensions.htm

GWF project areas, including the export cable corridor which has a landfall to the south of Sizewell.

- 1.5.3 The connection point to the electricity transmission system is at a proposed new substation facility sited on private land between Leiston and Sizewell, approximately 1km inland on the Suffolk coast. GWFL secured a Grid Connection Agreement from National Grid Electricity Transmission plc (NGET) in December 2009, i.e. the location where the electricity generated by GWF is connected to the 400kV national electricity transmission network. This 'Grid Connection Agreement' is located at Sizewell. **Figure 1.3** provides an overview of the onshore aspects of the proposed GWF project.

Figure 1.1 The Galloper Wind Farm Project (schematic)



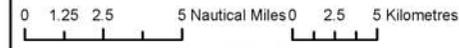


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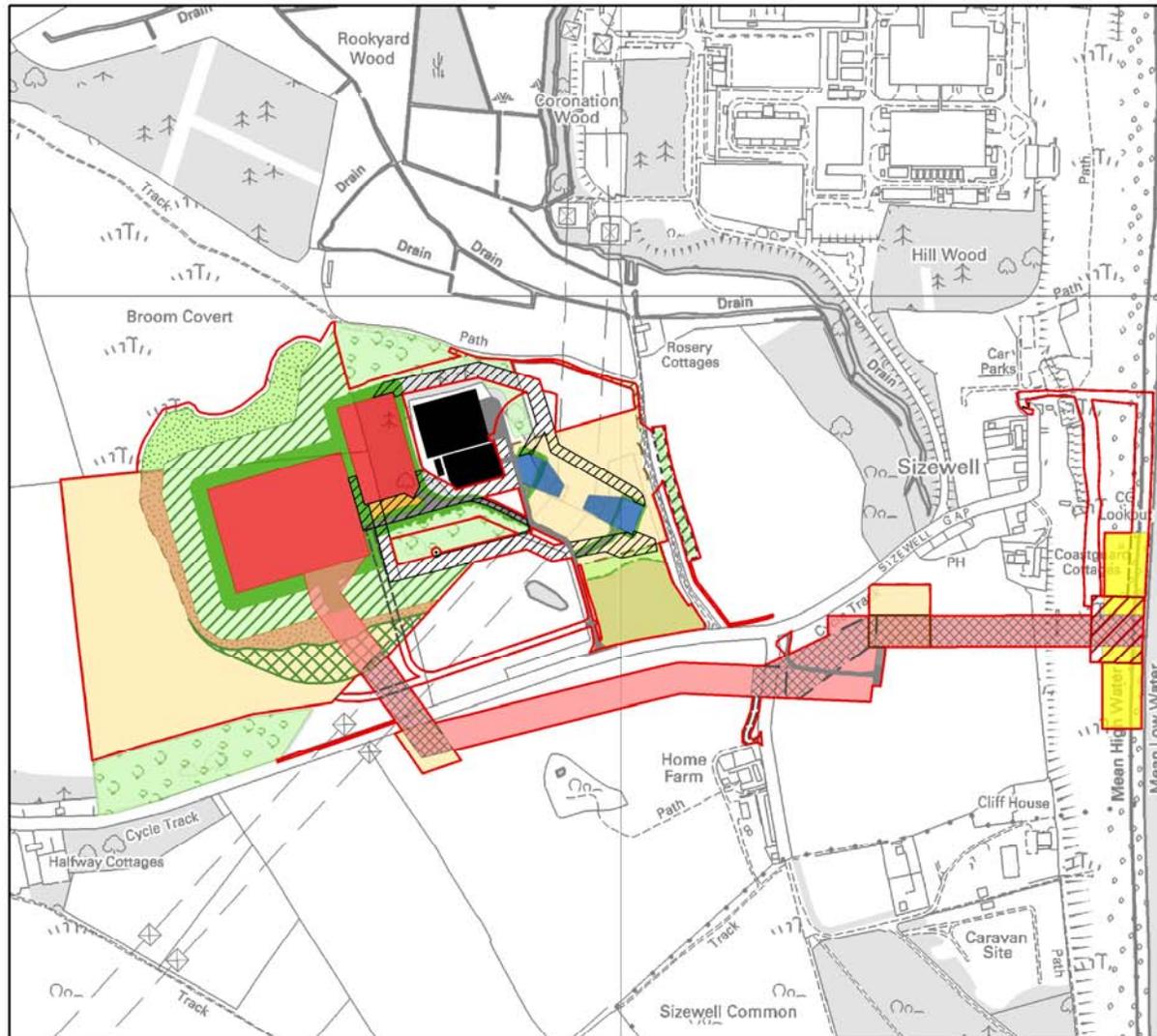


Galloper Wind Farm
 Greater Gabbard Wind Farm

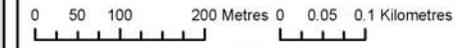
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Galloper Wind Farm	
Figure 1.2	
Project overview: Offshore	
Drawing Number: GWF_343_R9	Rev: 9
Date: 27/10/11	Created: LW
Scale: 1:400,000	Page: A4
Datum: WGS1984	Projection: UTM Zone 31N



- Greater Gabbard Onshore Substation
- Greater Gabbard Car Park & Access road
- Galloper Wind Farm Proposed Infrastructure**
- Onshore Development Footprint/Order Limits
- Substation
- Export Cable Corridor
- Estimated Extent of Drilling
- Estimated Extent of Optional Drilling
- Other Electricity Cables & Utility Corridors
- Maximum Extent of Transition Bays
- Landfall Cable Working Area
- DNO Area (including Transformer)
- Anchor Area
- Sealing End Compound, Gantry, Connection & Pylon Works
- Access Road
- Temporary Access Road
- Area within which Temporary Beach Access(es) must lie
- Temporary Construction Areas
- Grassed Areas (Including any Earthworks)
- Existing Woodland Areas
- Proposed Woodland/Woodland Edge Planting (Including any Earthworks)
- Potential Additional Landscape Area/ Earthworks (Subject to Commercial Agreement)
- Land Returned to Pasture (After Earthworks)
- Land Returned to Arable (After Earthworks)
- Improvement for Long Term Reptile Habitat (if necessary)
- Translocation Area
- Access Route for Landscape Mitigation Works
- Relocated GGOWF Communications Pole and Cable



Galloper Wind Farm
Figure 1.3

Project Overview: Onshore

Drawing Number: GWF_358_R6		Rev: 6
Date: 27/10/11	Created: LW	Checked: JA
Scale: 1:8,000	Page: A4	
Datum: OSGB36	Projection: British National Grid	

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Project overview

- 1.5.4 Detailed information on the technical components of the project is provided in **Chapter 5 Project Details** of the ES; however, the following paragraphs provide an overview of the scheme for context. The important legal distinction between GWF and some of the onshore grid works, which are being treated as a NSIP in their own right, is explained in **Chapter 3**.
- 1.5.5 The proposed GWF project will comprise up to 140 WTG, each with a rotor diameter in the range 107m to 164m. Typical rated capacities of current and future marketed turbines in this size range vary from 3.6MW to 7MW. The maximum number of WTG will be dependent on the rated capacity of the individual turbines used, their rotor diameter and the optimised design for the scheme; however the maximum output capacity of GWF will be constrained to 504MW. The maximum tip height of the WTG will be 195m above Lowest Astronomical Tide (LAT) and with a minimum clearance of 22m above Mean High Water Springs (MHWS).
- 1.5.6 The WTG will be arranged within all or part of each of the three development areas (if at all), with a minimum separation distance of 856m between the smallest rotor diameter turbines in the prevailing wind direction (and 642m at 90 degrees to the prevailing wind direction). Larger turbines may be spaced further apart as turbine spacing is a function of rotor diameter. This is explained in **Chapter 5** and also in relevant individual assessment Chapters. The WTG will be rigidly fixed to the seabed by foundations, of which four fundamental options are proposed: monopile, space-frame (covering jackets and tripods, both with piled and suction can options), gravity base structure and suction monopod.
- 1.5.7 The WTG will be connected to each other within each array, or arrays, by buried subsea cables. These subsea cables will be connected to a maximum of four offshore platforms, comprising electrical substations, collection platform(s) and/or an accommodation platform. The substations transform the WTG interconnection voltage to a higher voltage for transmission to shore by up to three export cables. The collector platform(s) connect multiple cables to a single larger cable, potentially transforming the voltage upwards, for onward transmission to an offshore substation.
- 1.5.8 In addition to the above, up to three ancillary meteorological monitoring masts (nominally 120m above LAT) are proposed within the wind farm array development areas. These masts will provide wind speed monitoring for performance evaluation and planning of works at the site.
- 1.5.9 An accommodation platform may be required to provide an on-site base during periods of intense construction and operational maintenance or emergency activity.
- 1.5.10 The proposed GWF project will be connected to shore via 132kV Alternating Current (AC) high voltage cabling, comprising up to three export cables. The cables will be installed through the foreshore area via a technique known as directional drilling (DD) as utilised for the adjacent GGOWF project.

- 1.5.11 Up to three onshore ‘transition bays’ will be excavated inland of the cable landfall in order to connect the multi-core offshore export cables to the single-core onshore cables. The onshore cable route will run between the onshore transition bays and the onshore substation, which includes infrastructure for both GWF and onward transmission to the national electricity network (the national grid). The connection point to the electricity transmission system is adjacent to the proposed onshore substation at a new facility sited on private land between Leiston and Sizewell, approximately 1km inland on the Suffolk coast. This connection will be achieved by connecting upwards to the existing 400kV overhead line circuits that currently serve Sizewell.
- 1.5.12 The substation will comprise two adjacent but discrete compounds; one containing GWF infrastructure “the GWF compound” and the other containing NGET transmission infrastructure “the transmission compound”. These compounds will be collectively referred to as “the substation” throughout this ES. The substation will contain a variety of electrical components and each compound will be enclosed with fencing. A larger area will be required during construction to incorporate a site compound, car parking, storage areas and other supporting works. The GWF compound will connect via underground cabling to the adjacent transmission compound. There is the potential for the first installed export cable to pass from the GWF compound directly to the existing Leiston A compound using a proposed utility corridor, rather than into the transmission compound.
- 1.5.13 The permanent components and buildings within the GWF compound will be up to a maximum of 14m tall and will also include the potential for lightning protection rods to extend up to 3m above (comprising rods up to 50mm diameter). However 75% of the GWF compound will be constrained to a maximum height of 8m for buildings and equipment, with 3m lightning rods above. The transmission compound will be up to a maximum of 13m tall in some areas, but restricted to 11m across more than 50% of its area.
- 1.5.14 Two additional fenced areas will be required adjacent to the existing overhead line circuits and are referred to as ‘Sealing End Compounds’ (SEC). These compounds do not form part of the main substation referred to above, but are connected to it by 400kV underground cables. The SEC serve to transfer the underground cables to overhead wires which link up to extended arms on the existing transmission towers (pylons). A gantry within each of the SEC will be the tallest structure (other than the lines connecting upwards) and will be up to 13m in height.
- 1.5.15 A further underground cable route will connect from the new transmission compound to existing NGET cables that run from Leiston A substation to Sizewell (**Figure 1.1**). These cables are for the purposes of meeting security of supply standards with respect to GWF’s connection.

- 1.5.16 The project could have an operational capacity of up to 504MW, and could generate enough electricity for approximately 500,000 households²

Project timescales

- 1.5.17 The offshore construction phase of the wind farm is most likely to last approximately three years, with the need to access the site 24 hours per day at all times of the year, depending on weather. However due to the risks and constraints on supply chain and logistics experienced by offshore wind farms, a total 56 month construction window is assessed in this ES to ensure that the most likely alternative construction strategies and timescales would still lie within the assessment. A construction safety zone will be applied for separately from the Development Consent Order (DCO), although a safety zone statement is included with this application. The construction of the onshore substation and associated works is anticipated to take up to two years and some key activities will need to be undertaken in conjunction with grid outages as specified by NGET. Prior to construction, and after consents have been granted, GWFL will enter into a 50-year lease with The Crown Estate.
- 1.5.18 During its operation the wind farm will be serviced and maintained from a local port. Such a location will be the result of commercial discussions and is not known at this stage. An operational safety zone will be applied for separately from the DCO. Inspections of support structures and subsea cables will be performed on a regular basis, as will ad-hoc visits for surveillance purposes and the replacement of key components.
- 1.5.19 The assessment assumes that the wind farm will be decommissioned at the end of its lifetime (namely 25 years) and presumes likely worst case scenarios. Both the lease offered by The Crown Estate and the Energy Act 2004 have provisions for decommissioning, and the extent and timing of wind farm decommissioning will be in accordance with these principles and common industry practice.
- 1.5.20 The potential for re-powering, rather than decommissioning, of the wind farm (i.e. replacing the WTG) is available. The decision on re-powering is subject to the ongoing performance of the wind farm and would be subject to a future consent application to the relevant authorities. Accordingly it is not assessed in this ES.

Ability to deliver

- 1.5.21 SSE and RWE NRL are currently constructing the GGOWF project which was awarded consent on 19th February 2007, with construction commencing onshore in July 2008. The project will consist of 140 WTG with a total capacity of 504MW, enough to power approximately 500,000 homes.

² based on site specific data indicating a load factor of approximately 40% and using the annual UK household consumption of 3.3MWhrs

- 1.5.22 As of September 2011 GGOWF has achieved the following progress:
- The first power has been generated and delivered to the national electricity grid;
 - All 140 turbine foundations have been installed;
 - Approximately 108 turbines are in place;
 - The first export cable has been energised and the second is installed;
 - The operations base at Lowestoft is now operational; and
 - The wind farm remains on schedule for completion in 2012.
- 1.5.23 As joint owners of the GGOWF project, SSE and RWE NRL have prior knowledge of the area which will allow GWFL to move forward with confidence that the proposed GWF site is developable. Furthermore, GWFL has taken a pro-active approach to the development of the proposed GWF project through undertaking site surveys and consultation prior to the award of the site (see **Chapter 5**). The proposed GWF project is therefore well placed to contribute to helping the UK to meet its binding 2020 target, as well as other commitments with regard to climate change and energy use (see **Chapter 2 Project Need, Policy Framework and Guidance**).

1.6 Structure of the Environmental Statement

Non-technical Summary

- 1.6.1 A standalone Non Technical Summary (NTS) of the ES has been produced. This document provides, in simpler non-technical language, an overview of the project and a summary of the key findings from the ES.

Environmental Statement

- 1.6.2 The ES provides detailed information on the project, the baseline environment and an assessment of the subsequent impacts that may occur from the construction, operation and decommissioning phases of the project. Further details on the approach taken throughout the EIA process can be found in **Chapter 4**.
- 1.6.3 **Chapters 1 to 7** of the ES form the introductory chapters, providing the context to the EIA and the project. These chapters specifically cover the following:
- The need for the project and the legislative and planning context;
 - The planning framework and policy guidance;
 - The approach to the EIA and definition of impact significance levels;
 - The project design and the construction, operation and decommissioning process for the wind farm and associated infrastructure;
 - The site selection process and alternatives considered; and

- The consultation undertaken to date.

1.6.4 **Chapters 8 to 28** form the assessment Chapters in relation to the physical, biological and human parameters that have the potential to be impacted by, or have impact upon, the project. Each individual Chapter is structured accordingly:

- Introduction – sets the context for the parameter under discussion;
- Guidance and consultation – details all relevant guidelines that have been followed and provides brief details on any relevant consultation undertaken;
- Methodology;
 - Study area – provides a definition of the study area used within the Chapter;
 - Characterisation of the existing environment – describes the sources of data and the methodology used to undertake the baseline data collection; and
 - Assessment of impacts – explains the impact assessment process.
- Existing environment – describes, using the data identified in the methodology section, the existing conditions for the relevant parameter within the study area;
- Assessment of potential impacts;
 - Realistic worse case scenario – where necessary, outlines the details of the development which are considered to be the worse case scenario for the receptor or impact being assessed, referred to below as the "Rochdale Envelope";
 - Potential impacts during the construction phase (applying the Rochdale Envelope) – assesses the predicted impact from each aspect of the construction activity where relevant and assigns a predicted significance level for each impact. Also provides mitigation proposals and residual impacts where known or considered necessary;
 - Potential impacts during the operational phase – as above, but for the operational phase of the project; and
 - Potential impacts during the decommissioning phase – as above, but for the decommissioning phase of the project.
- Inter-relationships – will identify where the parameter under discussion could be influenced by other parameters considered within the EIA and therefore whether it is taken forward in the inter-relationships Chapter (**Chapter 29**);

- Cumulative impacts – will identify, describe and evaluate the combined ‘within project’ impacts as well as the cumulative impacts in relation to GGOWF and other projects and activities;
- Proposed Monitoring – if appropriate, where verification of predicted impacts is required, monitoring programmes will be outlined; and
- Summary – provides a concise tabulated summary of the salient points from the assessment of the relevant parameter under discussion.

- 1.6.5 **Chapter 29 Inter-relationships** identifies where multiple impacts occur on the same receptor and establishes where there is potential for spatial and temporal overlap of the impacts.
- 1.6.6 **Chapter 30 Cumulative Impact Assessment** addresses the relevant impacts that have the potential to occur within the project, between other wind farms and also with other development / activity over all phases of the project.
- 1.6.7 **Chapter 31 Transboundary Effects** considers effects in relation to Impacts that might occur on the environment within other European Economic Area (EEA) member states (i.e. not within the UK Regional Economic Zone (REZ)) and impacts that might occur on interests of another EEA member state within the UK REZ.
- 1.6.8 **Chapter 32 Conclusions** provides a concise summary of the findings of the ES.
- 1.6.9 Chapters 8, 9, 11 to 14, 20, 22 and 23 describe and assess the ecological and nature conservation impacts of GWF. The assessments provide a description of the habitat types at the site and in its vicinity and identify the potential for any protected species or areas of particular nature conservation interest to be affected by the construction, operation and/or decommissioning of GWF. This information has been used to identify potential ecological effects and to identify measures to avoid or mitigate such effects.
- 1.6.10 In these Chapters, plans are provided showing the location of statutory or non-statutory sites of nature conservation importance, and habitats of protected species, important habitats or other diversity features close to site and in the wider vicinity. As such the figures (taken together) and these Chapters fulfil the requirement of Regulation 5(2)(l) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 to provide such plans and an assessment of any effects on the sites, habitats and features covered by Regulation 5(2)(l) likely to be caused by the proposed development.
- 1.6.11 Chapter 19 describes and assesses the potential impacts of GWF on cultural heritage resources (both designated and undesignated), including buried archaeological sites, historic buildings and historic landscapes. The Chapter

provides a number of plans showing the location of those cultural heritage assets within and close to the application site and in the wider area. As such the figures (taken together) and this Chapter fulfil also the requirement of Regulation 5(2)(m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 to provide such plans and an assessment of any effects on the sites, features and structures covered by Regulation 5(2)(m) likely to be caused by the proposed development.

Appendices

- 1.6.12 For certain parameters, specialist technical studies or site surveys have been undertaken to help inform the EIA. The data associated with these studies / surveys is described within the ES and is provided in full within the Technical Appendices.

1.7 Document Availability

- 1.7.1 The ES is available to view or download online at www.galloperwindfarm.com.

- 1.7.2 Copies of the ES are also available by contacting:

Kate Harvey
55, Vastern Road
Reading
RG1 8BU
E-mail: galloperwindfarm@sserenewables.com
Telephone: 0845 26 26 264

- 1.7.3 A charge may be made for hard (paper) or soft (CD/DVD) copies of the ES.