



## **Rampion Offshore Wind Farm**



## **Non-Technical Summary**

**RSK Environmental Ltd**

**Document 6.4**

**December 2012**

**APFP Regulation 5(2)(a)**

**Revision A**

**E.ON Climate & Renewables UK Rampion Offshore Wind Limited**

---

**CONTENTS**

<b>NTS</b>	<b>NON TECHNICAL SUMMARY .....</b>	<b>1</b>
NTS.1	Introduction .....	1
NTS.2	Why is the Project Needed? .....	1
NTS.3	Consultation .....	2
NTS.4	Development of the Project.....	3
NTS.5	Project Details .....	7
NTS.6	Construction Programme .....	14
NTS.7	Planning Policy and Decision Making.....	14
NTS.8	Environmental Effects and Mitigation.....	14
NTS.9	Offshore Environment .....	15
NTS.10	Onshore Environment .....	32
NTS.11	Other Environmental Effects .....	40
NTS.12	Environmental Management .....	40
NTS.13	Further Information.....	41



---

## **NTS NON TECHNICAL SUMMARY**

---

### **NTS.1 Introduction**

---

- NTS.1.1 E.ON Climate & Renewables UK Rampion Offshore Wind Limited (E.ON) is proposing to construct an offshore wind farm off the Sussex coast, including associated onshore infrastructure, to generate and export up to 700MW of power to the national electricity transmission system (the Project).
- NTS.1.2 The Project will involve the construction and operation of up to 175 three-bladed wind turbines within a 139km<sup>2</sup> area of the English Channel, some 13km from the coastline. Connections will be made between the wind farm and the existing electricity grid by way of offshore and onshore cabling, and a new electricity substation at Bolney in Mid Sussex.
- NTS.1.3 As the proposal forms a Nationally Significant Infrastructure Project, E.ON has submitted an application seeking development consent to the Planning Inspectorate under the provisions of the Planning Act 2008.
- NTS.1.4 As part of the application, an Environmental Impact Assessment (EIA) has been undertaken to understand and predict the effects that the Project may have on the receiving environment. This has considered the effects that the construction, operation and decommissioning stages of the Project might cause to the existing condition of the environment, and takes into account measures incorporated into the project design and other methods (termed mitigation) that will be employed to reduce the significance of those effects.
- NTS.1.5 The findings of the EIA are reported in the Environmental Statement (ES) which forms part of the submitted application documentation.
- NTS.1.6 This document forms the Non Technical Summary (NTS) of the EIA process. It comprises a standalone document that presents a summary of the key findings of the assessment in an easy to understand manner, free from technical jargon.

### **NTS.2 Why is the Project Needed?**

---

- NTS.2.1 Over the next 10 years, many of the UK's coal-fired and nuclear power stations will close, resulting in a potential energy shortfall. In response, the UK Government has made a clear commitment to developing renewable energy sources within its National Policy Statements (NPS) for Energy. These documents form the main consideration for decision-making on Nationally Significant Infrastructure Projects (NSIPs) similar to the type being proposed by E.ON.
- NTS.2.2 The UK Government's strategy is to maximise the use of renewable energy sources by committing to sourcing 15% of its total energy from green sources such as wind, wave, tidal and biomass by the year 2020, with approximately 30-

35% of electricity from renewables. New offshore and onshore wind energy developments will contribute to achieving this target.

NTS.2.3 The shift towards energy production from renewables stems from a need to:

- Address the issue of climate change;
- Ensure security of the nation's energy supply;
- Replace existing ageing electricity generation infrastructure; and
- Provide economic growth opportunities.

NTS.2.4 The Project, if approved, will assist in reducing the nation's reliance on fossil fuel and energy imports. It is estimated that the average annual electricity generation from the Project will be equivalent to meeting the needs of some 450,000 average UK households<sup>1</sup>.



*Robin Rigg Offshore Wind Farm, Solway Firth.*

### **NTS.3 Consultation**

---

NTS.3.1 Consultation has formed an important part of both the EIA process and the ongoing design development of the Project. This has been undertaken during a two and a half year period with a wide range of agencies, organisations and individuals by way of regular correspondence, meetings and events.

NTS.3.2 Following a detailed scoping exercise undertaken in 2010, the scope and coverage of those matters requiring consideration in the EIA was developed and agreed with relevant stakeholders. This identified a need to consider a wide range of potential environmental effects associated with different phases of the

<sup>1</sup> Based on a provisional energy yield estimate of 2,100 gigawatt hours (GWh), a capacity factor of 35% and an average annual domestic household electricity consumption of 4,700kWh (DECC).

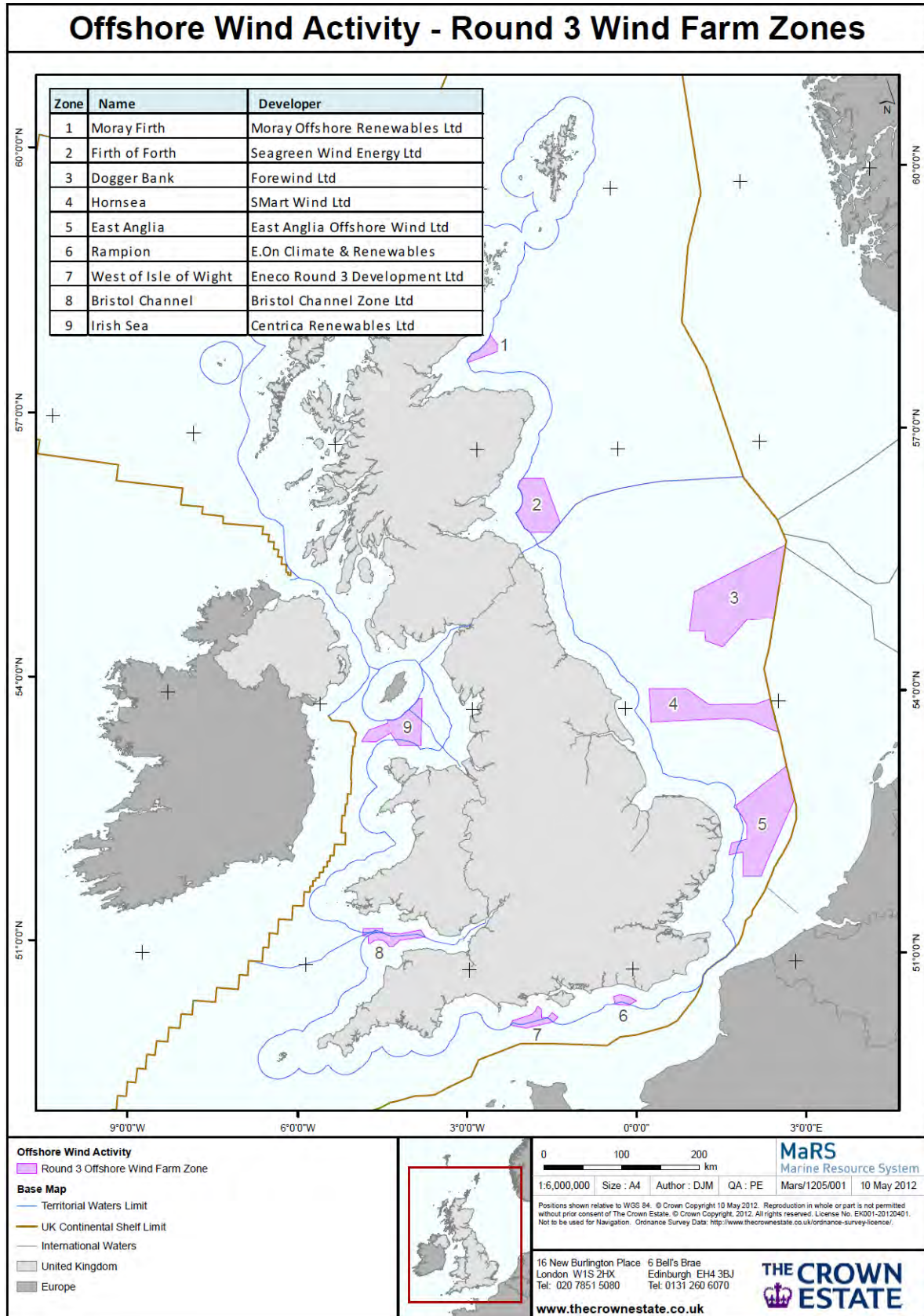
Project on both land and marine based interests, such as the visual impact of the offshore wind turbines from locations onshore.

- NTS.3.3 Dialogue was continued with these parties during the preparation of the EIA to obtain information and records on environmental sensitivities within defined study areas, and provide stakeholders with an opportunity to influence the assessment process and develop appropriate environmental mitigation.
- NTS.3.4 Community consultation was undertaken between February and May 2012 to gain feedback on the draft proposals, during which time some 4,700 people attended local public exhibitions and around 1,500 responses were received on the preliminary Project details and emerging EIA findings. These responses were considered and incorporated, where appropriate, into the final project proposal.
- NTS.3.5 A draft version of the Environmental Statement was then published as part of a formal consultation exercise with stakeholders between June and August 2012, and was publicised in local newspapers and available for view in council offices. The outcomes of this consultation were considered and incorporated, where appropriate, into the final project proposal and the final Environmental Statement which forms part of the submitted application.
- NTS.3.6 Details of the consultation and the responses received are included in the Consultation Report which accompanies the application (Document 5.1).

#### **NTS.4 Development of the Project**

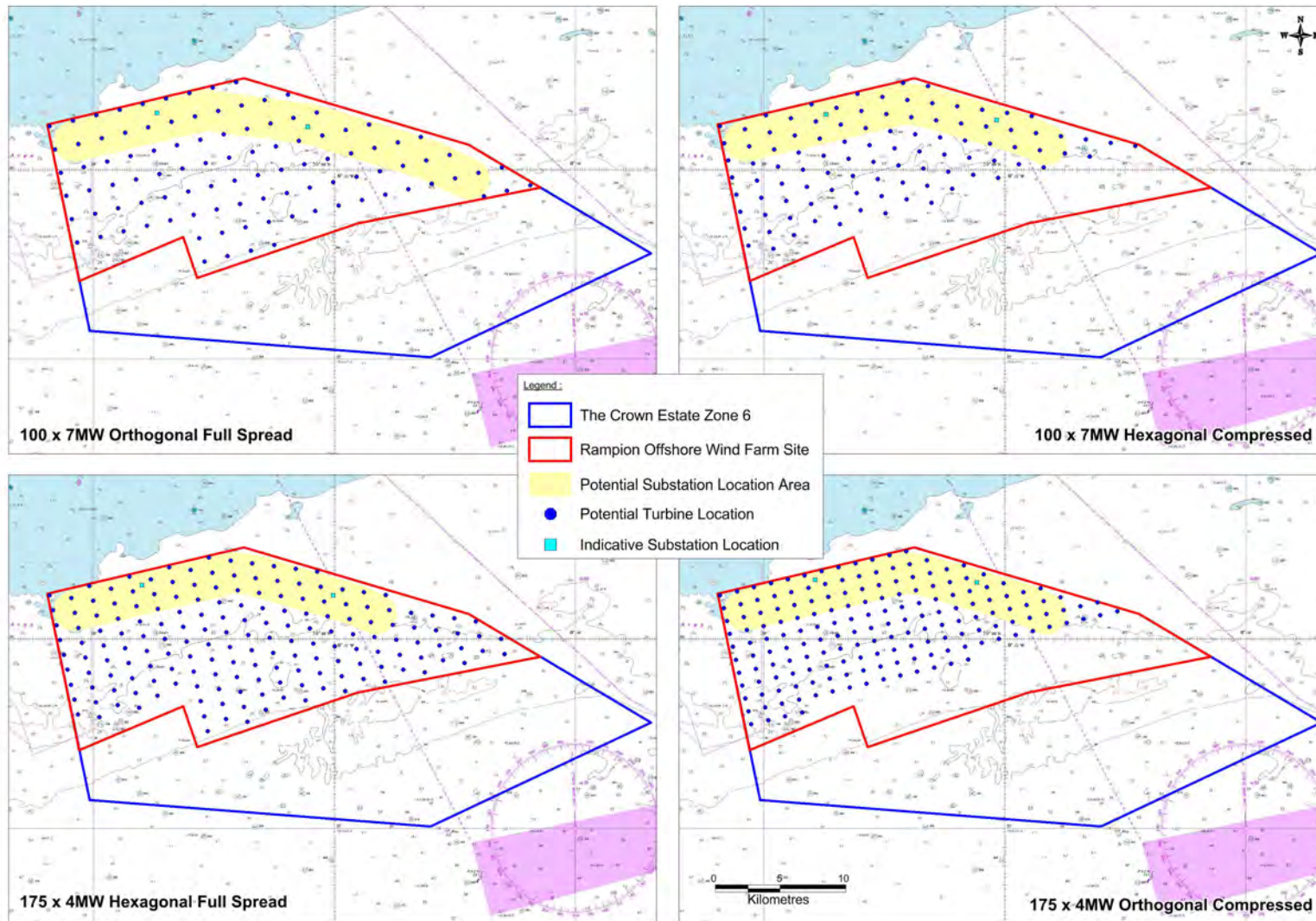
---

- NTS.4.1 Development of the Project has involved consideration of a number of technological, design and location alternatives.
- NTS.4.2 In 2008, E.ON undertook an appraisal of potential offshore wind energy development sites around the UK to identify potential constraints to progression of an offshore wind farm. This identified an area adjacent to the Sussex coastline (Zone 6), for which E.ON subsequently secured exclusive development rights from the seabed owner The Crown Estate in January 2010.
- NTS.4.3 E.ON then identified a feasible development area within Zone 6 to accommodate wind turbines; this noted water depths in the south of the zone as a key development constraint.
- NTS.4.4 A Project boundary covering 167km<sup>2</sup> was initially defined, which was subsequently reduced to 139km<sup>2</sup> following consultation and ongoing design development.
- NTS.4.5 As the exact wind turbine model and turbine numbers will not be known until the final Project design is determined, the EIA considered various possible combinations of turbine numbers and individual turbine size and capacity in a number of potential layout configurations, representing the 'realistic worst case'.



Round 3 Offshore Wind Farm Zones





*Indicative Turbine Layouts*



- NTS.4.6 Feasibility studies were undertaken between 2008 and 2010 to identify electricity grid connections, cable routes and potential cable landfall locations. The full Environmental Statement (Section 3 – Alternatives) provides information about the alternative options considered, constraints associated with each of these, together with the decision-making process which led to the final proposals within this application.
- NTS.4.7 A decision to bury the onshore cable route was made following informal consultation early in the process with statutory authorities to avoid adverse visual impacts across the South Downs.
- NTS.4.8 Connection into the existing 132kV electricity distribution system within the South Coast area was considered but discounted due to technical and consenting challenges. Options for connection into the 400kV transmission system were identified at three National Grid substations: Bolney in Mid Sussex; Lovedean in Hampshire; and Ninfield in East Sussex.
- NTS.4.9 Lovedean was discounted due to its distance from the offshore wind farm, and the need for considerably more cabling than the other two options making this option uneconomic.
- NTS.4.10 Studies for cable landfalls identified landing points between Worthing and Shoreham for a Bolney connection, and around Bexhill for a Ninfield connection. From this, preliminary offshore and onshore cable corridors were identified and evaluated against technical and environmental criteria.
- NTS.4.11 Option evaluation concluded that a connection to Ninfield via Bexhill would be cost prohibitive due to the length of cabling required, and would have also resulted in environmental impacts on nationally and internationally important ecological sites. A connection to Ninfield was therefore not considered further.
- NTS.4.12 Landfall options at Shoreham were discounted due to a combination of residential dwellings and the need to install cables within the designated Adur Estuary. A landfall at East Worthing via Brooklands Pleasure Park for the Bolney connection emerged as preferable as the offshore wind farm cables could be brought ashore without generating major community or environmental effects near the coastline.
- NTS.4.13 An area of search for the onshore and offshore cabling was then defined. Within this area, potential cable routes were identified by way of constraints analysis which sought to avoid environmentally sensitive sites and densely populated areas where possible.
- NTS.4.14 For the onshore connection, studies acknowledged that a cable route to Bolney would invariably need to pass through the South Downs National Park. A means of connection to minimise environmental impacts on this interest was developed early in the Project involving detailed route selection and development of appropriate construction working methods and mitigation.

- NTS.4.15 Constraints in the form of steep topography and the adjacent settlements of Steyning, Bramber and Upper Beeding precluded a cable route northwards through the Adur Valley. On this basis, a route through the uplands via Tottington Mount was defined and taken forwards. Refinements were then made to the route to avoid sensitive environmental features where possible identified by the EIA and during consultation.
- NTS.4.16 For the offshore connection, environmental and engineering studies were used to refine and reduce the overall corridor width, but further survey work will be required to identify the final marine cable route.
- NTS.4.17 To connect the onshore cable to the electricity network, studies identified a need for a new substation connection on land near to the existing Bolney National Grid substation. Two possible substation site options emerged from the appraisal, both located on land parcels adjacent to the existing substation. Following review, a preferred option was chosen on the basis of reduced ecological impacts.

---

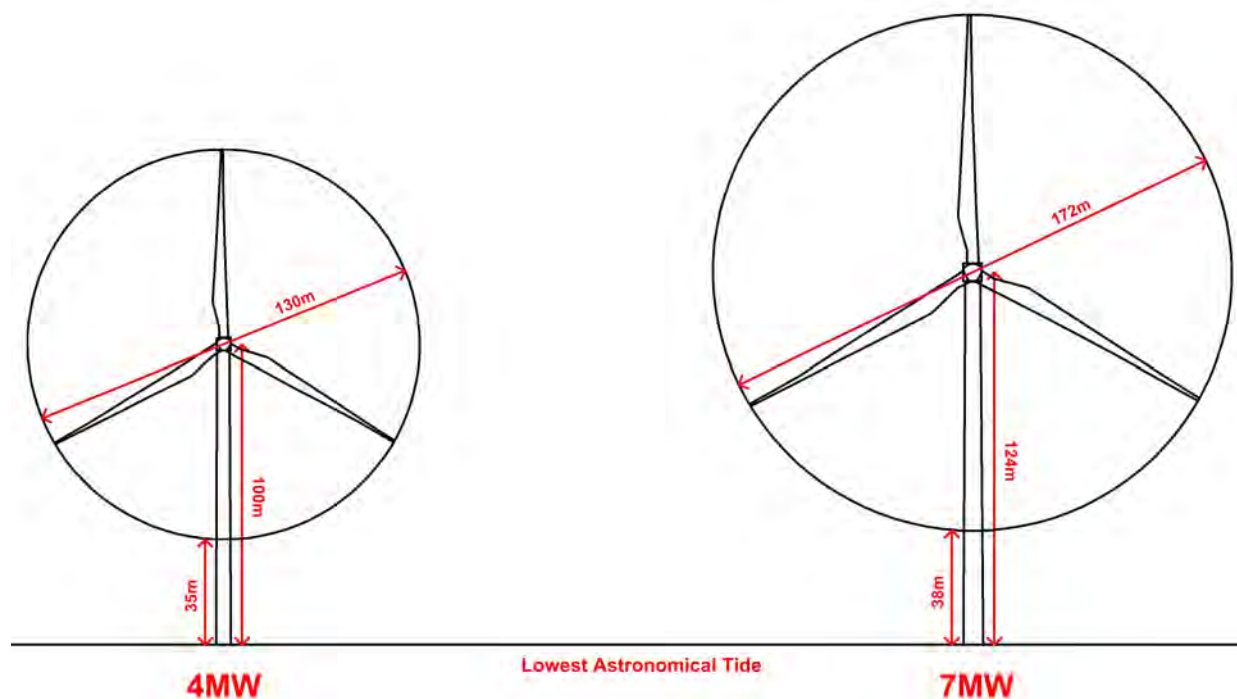
## **NTS.5 Project Details**

---

### **Offshore**

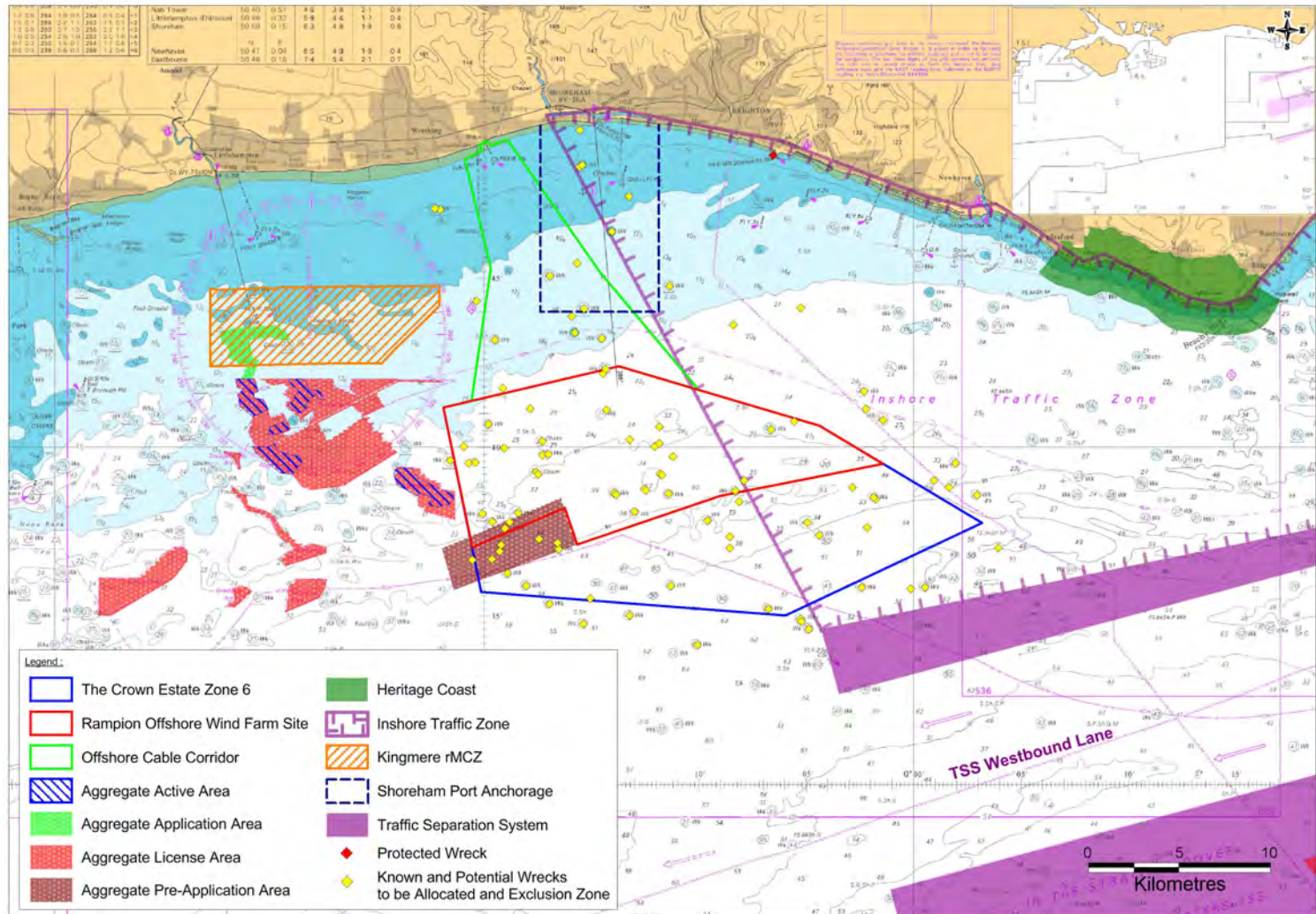
- NTS.5.1 E.ON is proposing to develop the wind farm within the shallow waters of a 139km<sup>2</sup> area of the English Channel. The site has a good wind resource that can be harnessed by the Project.
- NTS.5.2 There are no nationally or internationally important environmental designations in the area. A local Marine Site of Nature Conservation is located within the area, with additional sites of nature conservation interest also found inshore of the turbines. A recommended Marine Conservation Zone (rMCZ) lies approx 4km northwest of the Project. The area is subject to relatively high levels of commercial fishing activity.
- NTS.5.3 E.ON is seeking flexibility in the number and size of wind turbines to be installed as part of the Project. Wind turbines with a generation capacity of between 3MW and 7MW are under consideration and the final decision will be made following technical optimisation later in the process, based on the specific models available on the turbine market at that time and further understanding of site conditions. The site would be limited to a maximum installed capacity of 700MW and a maximum of 175 turbines. The type of turbine foundation will be selected from a range of options based on the type of seabed, so could vary across the site.
- NTS.5.4 The turbines will have tubular steel towers of between 5m and 7m diameter at the water level, tapering to 4m diameter at the top of the tower. A 'nacelle' containing the gearbox and generator will be fixed to the top of each tower. Electricity transformers will either be placed in the tower or nacelle of each turbine.

- NTS.5.5 Turbine heights will vary depending on the model chosen. For example, a 4MW model will be 165m above sea level to the tip of the blade; a 7MW model will reach 210m above sea level to the tip of the blade. The turbines will be finished in a light grey colour to reduce their visual impact, be marked for navigational purposes, and set out in a regular grid layout.
- NTS.5.6 The wind turbines have been designed to operate for a period of 20 to 25 years, and operate at wind speeds ranging from 3 metres per second up to 25 metres per second, at which point the turbines ‘feather’ the blades to avoid risk of damage during these relatively infrequent extreme wind conditions.
- NTS.5.7 Up to two offshore substations will be installed towards the northern boundary of the wind farm, and will be connected to the turbines by subsea inter-array cables.



#### *Indicative Range of Turbine Dimensions*

- NTS.5.8 The substations will be marked for navigational purposes and either clad or will be unclad with exposed painted steelwork. The substations will be up to 25m high and positioned 20m above sea level and will house a range of operational equipment, welfare facilities and accommodation (though it is not expected that there will be a need for staff to stay overnight at the substations except on rare occasions). Connection to the shore will be made using four cables buried in the seabed, the exact route of which will be determined by water depths, environmental sensitivities and geological conditions.

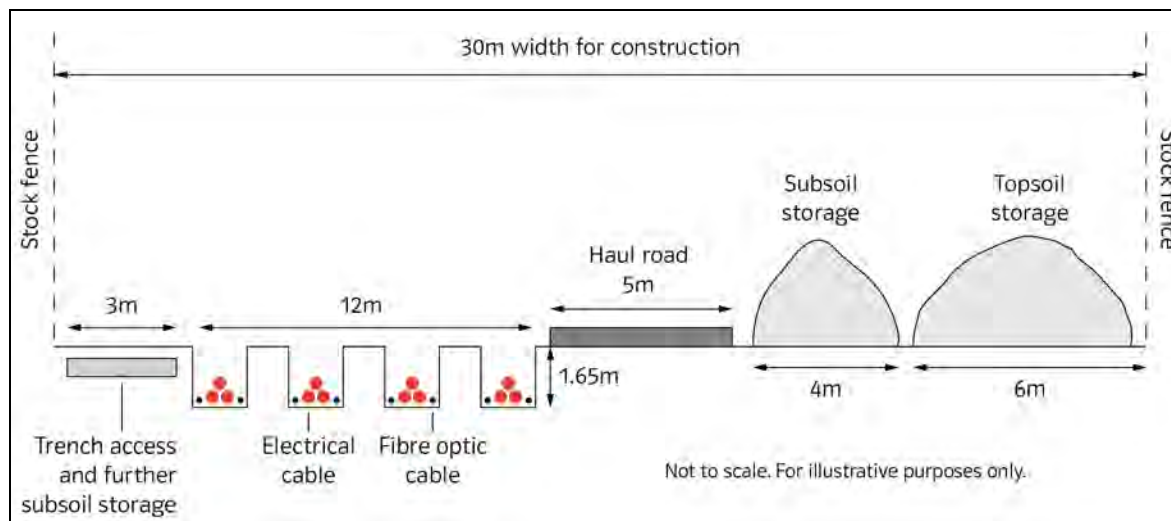


Key Offshore Environmental Constraints

- NTS.5.9 The offshore cables will connect with onshore cables at a landfall location at East Worthing. The marine cables will remain beneath the beach and seabed all the way out to the wind farm, with no surface disruption to the road and beach defences. Some machinery access to the beach and foreshore will be necessary to assist cable installation.
- NTS.5.10 Four joint bays will be installed underground on the north side of the A259 within Brooklands Pleasure Park to enable connection of the subsea cables to the onshore cable.

### Onshore

- NTS.5.11 The route for the onshore cable is around 26.4km long and the ‘working width’ which will be impacted will generally be no wider than 30m except at certain defined locations including those at which the cables will be drilled under the railway, River Adur and major roads. The full Environmental Statement shows a 40m corridor within which the 30m working width (which includes the cable easement itself together with room for a temporary construction ‘haul road’ and soil storage areas) will be ‘micro-sited’. The cable will be buried underground for its entire length, and will provide connection between the landfall and a new onshore substation.

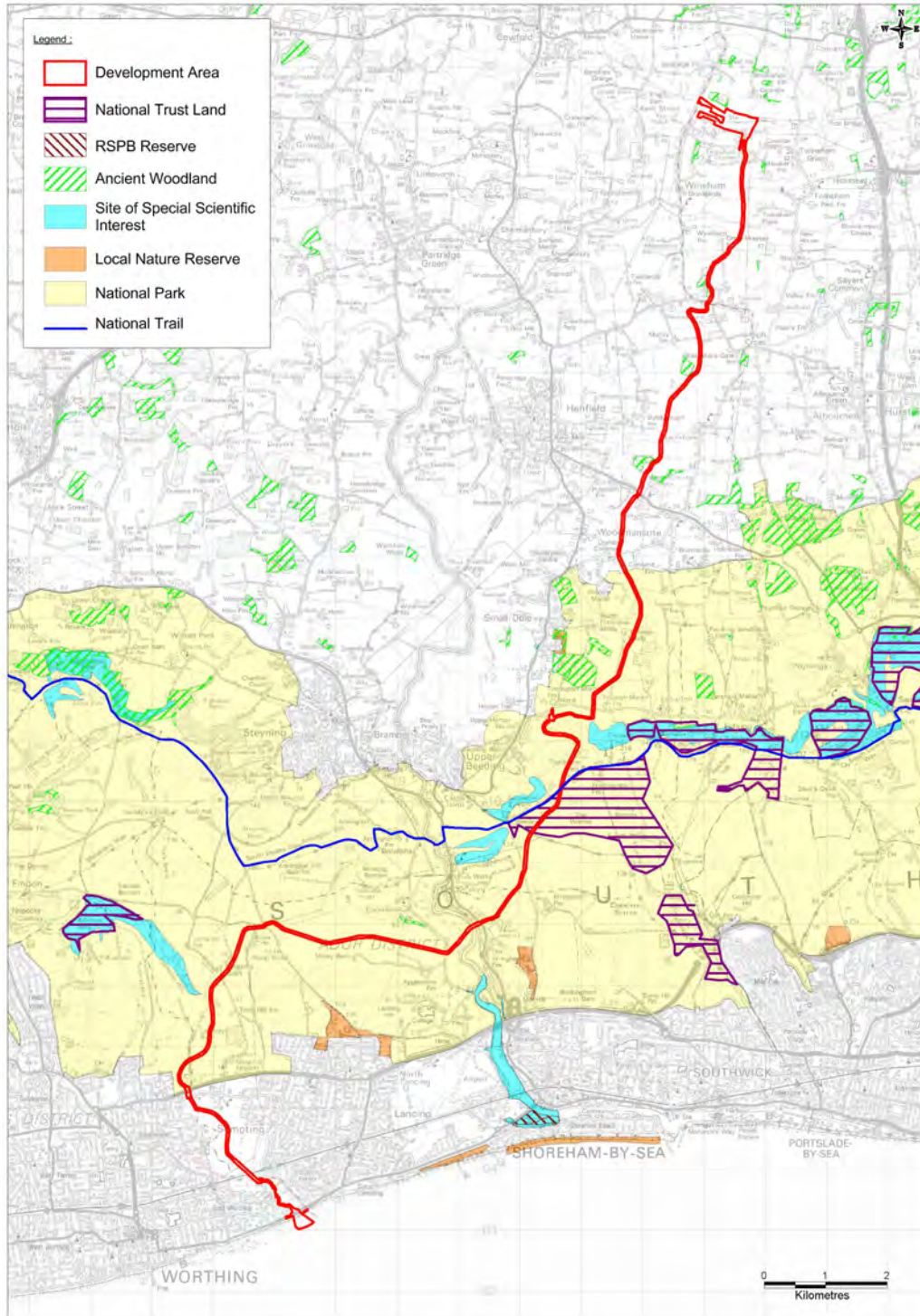


*Indicative cable trenching arrangement and working area*

- NTS.5.12 Where possible, environmental sensitivities have been avoided through careful routing. Notwithstanding this, sections of the corridor will pass through the South Downs National Park and in proximity to features and assets of importance such as ancient woodland. Appropriate construction techniques and environmental mitigation will be used in these areas to minimise impact. One example is the reduction in working width at Tottington Mount, in order to minimise impact on chalk grassland.
- NTS.5.13 From the landfall at East Worthing, the cable corridor progresses in a northerly direction crossing through part of the ‘Par 3’ golf course at Brooklands Pleasure



Park and passing underneath the main line railway, before continuing through the Sompting Gap and then heading eastwards to cross beneath the River Adur. The route ascends and traverses elevated land towards Tottington Mount before descending to the plain below. The corridor then continues north, passing east of Upper Beeding and Henfield, and routes west of Twineham before terminating at the proposed substation site located east of the existing National Grid substation at Bolney.



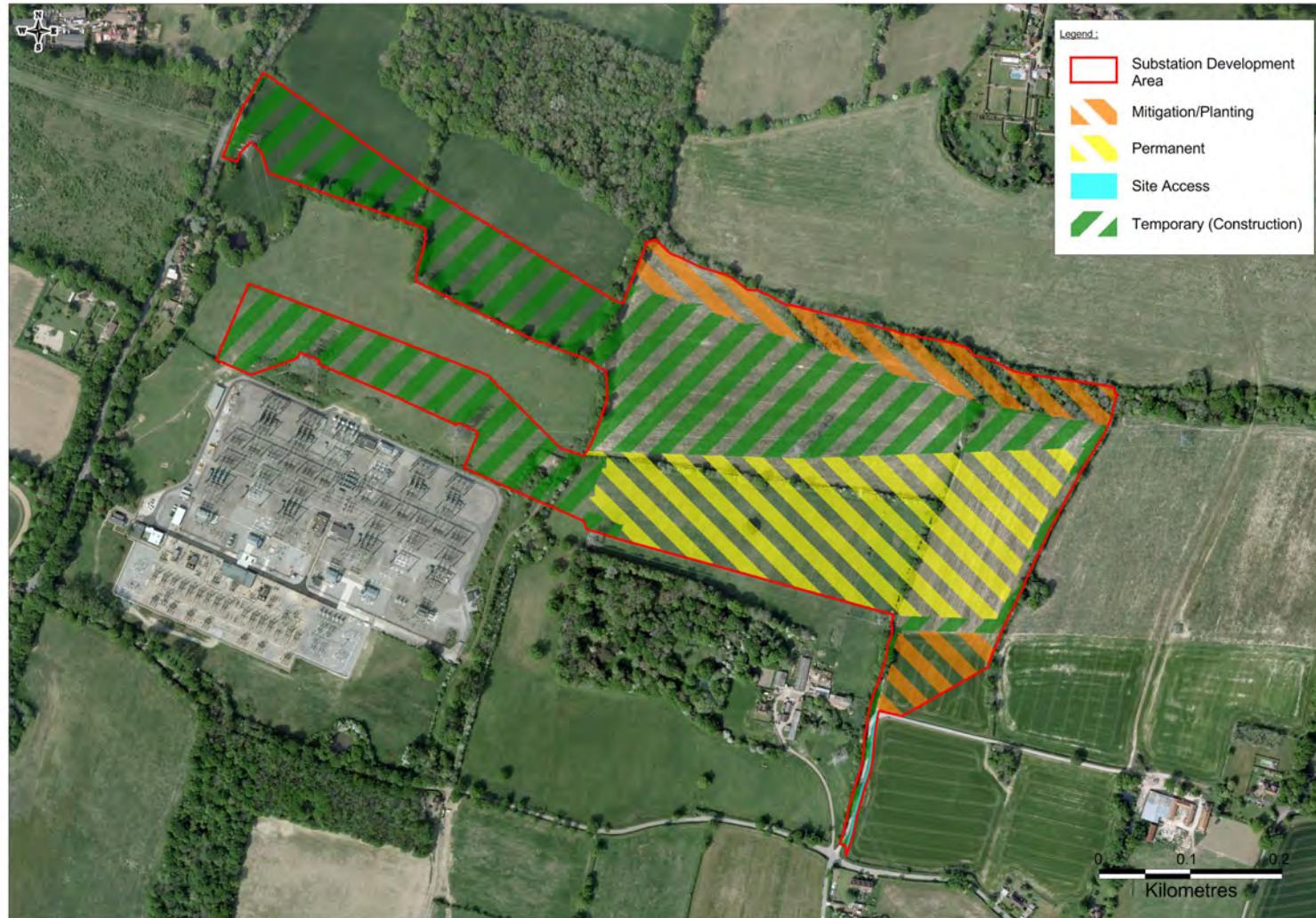
*Key Onshore Environmental Constraints*



- NTS.5.14 Several temporary construction compounds will be developed along the cable corridor. The exact locations of the compounds have not yet been identified, as the principal contractor will have an input into the decision process. However, an indicative broadly even distribution of compounds along the cable route has been assumed for the purposes of the ES. The final locations will be chosen to allow easy access to and from the cable route whilst also minimising impact on local residents, businesses and the environment, wherever possible.
- NTS.5.15 For the purposes of the ES, it has been assumed that the working width will be accessed directly from existing adjacent roads or farm tracks, and that no widening or vegetation (tree/hedgerow) removal would be required as a result of the side accesses.
- NTS.5.16 Working areas will be reduced in size in sensitive locations to safeguard environmental interests. In addition to open trenching, directional drilling will be used to pass the cable under major roads such as the A259, A27 and A283, as well as the railways and the River Adur. Following installation all disturbed areas will be reinstated.
- NTS.5.17 Sections of cable will be connected in underground bays spaced roughly every 600m - 1,000m within the corridor. The cable will then connect to a new substation at Bolney, the permanent footprint of which will be approximately 7 hectares. Additional land will be temporarily used during construction of the substation, and to provide landscaping opportunities to integrate the new feature into the receiving environment.
- NTS.5.18 The substation will contain a range of electrical equipment, the height of which will vary, with the tallest elements reaching around 12.5 metres in height. An underground connection will be made between the new substation and the existing Bolney substation to connect to the grid.



*The existing National Grid Bolney Substation in Mid Sussex*



*Proposed Onshore Substation Development Area*

---

## **NTS.6 Construction Programme**

---

- NTS.6.1 Subject to the Project being granted consent, a detailed design phase will be carried out over a period of around 12-18 months, during which time the final details of the Project will be agreed and fixed within the permitted range of flexibility set out in the ES. This period will cover matters such as the final choice of turbine layout.
- NTS.6.2 The overall construction period for the Project from the commencement of onshore works to completion of commissioning of the wind farm will be approximately 4 years. Offshore works are likely to take between 2 ½ and 3 years to complete, whereas the onshore works are expected to take up to 2 years and 4 months in total.
- NTS.6.3 The offshore wind turbines, substations and foundations will operate for 20 – 25 years and a decision would then be made on whether to refurbish the scheme to extend its life, ‘re-power’ the site with the latest wind turbine technology (subject to further consent being sought), or to decommission the scheme.
- NTS.6.4 In the case of decommissioning, the turbines would be dismantled and foundations removed to below the seabed. Only those offshore cables, sections of offshore cables or cable ends which are uncovered will be removed. It is anticipated that the onshore cables will be left buried in situ, or pulled out through the ducts (with minimal impact requiring excavation at the joint bays only) to be replaced by new cables to be run along the same route as part of future developments or wind farm repowering. The onshore substation at Bolney may continue to be used as a substation, but may require upgrading works at that time to enable continued use.

---

## **NTS.7 Planning Policy and Decision Making**

---

- NTS.7.1 As a Nationally Significant Infrastructure Project, the Project will be determined against National Policy Statements that set out the UK’s commitment to renewable energy and ensuring security of supply.
- NTS.7.2 Due regard will also be given to other national, regional and local planning policy documents as part of the decision-making process.

---

## **NTS.8 Environmental Effects and Mitigation**

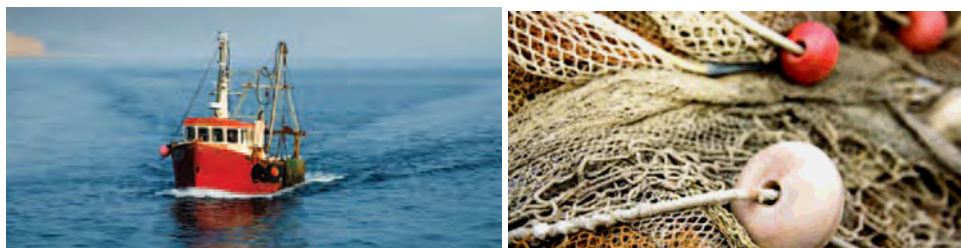
---

- NTS.8.1 Experts from a wide range of disciplines have undertaken the assessment of likely environmental effects, with studies undertaken in accordance with scopes agreed with the appropriate statutory consultees and nature conservation bodies following established standards and best practice guidance. Assessment has been based on the range of options deemed to represent ‘realistic worst case’.

NTS.8.2 The Project and its associated mitigation measures have been designed to minimise adverse environmental effects identified by the EIA process. Nonetheless, some effects are predicted to arise from the Project, the most significant of which are summarised below.

## NTS.9 Offshore Environment

---



### *Physical Environment*

- NTS.9.1 The assessment of the potential impacts of the Project on the physical environment (including bathymetry, shallow geology, seafloor sediments, oceanography and meteorology and water quality) has been undertaken using existing literature and site specific surveys, including geophysical and geotechnical surveys of the seabed; intertidal benthic ecology surveys, offshore benthic ecology surveys and sediment hydrodynamic studies.
- NTS.9.2 During both installation and decommissioning ‘jack-up’ vessels, with feet which penetrate into the seabed to provide a stable platform, and large anchors could cause indentations on the seabed. Minor disturbance to coastal features could be experienced at the export cable landfall site, though both will be temporary effects.
- NTS.9.3 During the installation phase mitigation measures will be used to minimise or remove impacts to physical features. Specific scour protection and burial methods will be recommended to minimise impacts to the seabed around turbine foundations. Similarly cable routes and any cable protection will be designed to cause minimal impacts on the seabed.
- NTS.9.4 During operation, sediment scour and/or accretion effects could be caused by both the presence of the turbine foundations and inter-array and export cables and cable protection measures. If necessary, scour protection (rock armour/stone) will be used to reduce scouring effects on the seabed and impacts to seabed sediments.
- NTS.9.5 Construction and decommissioning activities such as foundation installation and removal, and inter-array and export cable burial activities will temporarily increase suspended sediment concentrations and result in a degree of sediment re-distribution, however these effects will be over a very limited geographical area.



- NTS.9.6 The presence of turbine foundations could also produce changes to wave and current regimes affecting patterns of near-field (offshore) sediment transport and far-field (coastal) sediment transport. Effects on the wave regime will be such that the reduction in height will be at a maximum of less than 5%, and therefore always below the level which surfers consider to be a significant influence on the surf resource. Effects on far-field sediment transport (and therefore influence on sediment levels in coastal areas) are expected to be at most a minor impact.
- NTS.9.7 Removal of turbine foundations upon decommissioning at the end of the project life should allow the sediment and wave patterns to return to their pre-construction regimes.
- NTS.9.8 Installation of the export cable will create some increases in levels of suspended solids, but these will be temporary and are not expected to affect the water quality status or ecological status of the water body under the European Water Framework Directive (which applies to waters out to 1 nautical mile from shore).
- NTS.9.9 Construction phase residual effects will be negligible with respect to bathymetry, sediment transport and mobility, oceanography and meteorology, while impacts to geology and seabed sediments and water quality will be temporary and minor.
- NTS.9.10 In the operational phase impacts to the physical environment are expected to be negligible with the exception of far-field transport and wave heights where effects could be of a minor level.
- NTS.9.11 Residual impacts during decommissioning are expected to be similar to those of the installation phase.

#### ***Benthos and Sediment Quality***

- NTS.9.12 Benthos is the name for the community of organisms found on or in the seabed. To collect site-specific data about the local environment, benthic surveys took place on the intertidal cable landfall area (at low tide, on foot) and from a survey vessel in the offshore area, using both underwater cameras and sediment grabs to collect samples for laboratory analysis. This information was combined with broad-scale geophysical data to produce an integrated map of what habitats might be expected across the entire area.
- NTS.9.13 Going seaward from the Worthing – Brighton Road (A259) (under which the export cable will pass), the raised shingle beach drops steeply to an extensive flat sandy beach, with scattered cobbles and seaweed in places. Going into the shallow subtidal zone, much of the seabed consists of coarse sediment (such as gravel), with patchy exposed bedrock and mobile sand; in the southern half of the cable corridor much of the seabed is fine or muddy sand. In the wind farm site itself, mobile clean sand covers the south and southwestern part, while coarse/mixed sediment covers the north and western part. There are small, patchy areas of hard seabed – probably exposed bedrock – in the central part of

the wind farm, and along the southern boundary there appears to be a thin 'veneer' of sand over this.

- NTS.9.14 The type of seabed strongly influences the community of small invertebrate animals that live within, and on, the seabed. Over 4,000 small invertebrate animals – made up of nearly 400 species – were recorded from sediment samples and mostly consisted of bristle worms (including both mobile, active species, and those that occupy tubes), crustaceans (e.g. sand hoppers, shrimp), and molluscs (e.g. bivalve shells such as clams). A number of species were also recorded from the surface of hard seabed (such as cobbles or rock), including keel-worms, barnacles, sponges and colonial sea-mats. Some of the habitats such as mobile sand have a naturally low abundance and diversity of animals, whereas the fauna tends to be richer where the seabed is more stable and sediments are finer.
- NTS.9.15 The common starfish was the most abundant of the larger, more mobile animals recorded on the seabed surface, although crustaceans (such as hermit crabs, swimming crabs, spider crabs and shrimp) and other echinoderms (brittlestars and sea urchins) were also important. The non-native American slipper limpet was also recorded in shallow inshore waters, although this was expected given that this species is now widely established in the region. In the most inshore 2km of the cable corridor there is the potential for mussel beds to be present, and in at least one location these appeared to form an established mussel reef. The seabed conditions in the wind farm and cable route are also suitable for aggregations of the colonial Ross worm to develop.
- NTS.9.16 Sediments collected in both the intertidal and offshore surveys were tested for chemical pollutants. As expected for an area of intense human activity, contaminants were detectable, but not at such a level as to be of concern.
- NTS.9.17 Although there will be some damage and disturbance to benthic communities during construction activities, the overall impact will be limited by the relatively small areas affected. For example, although all of the benthos under the 'footprint' of the turbine foundation will be permanently removed as a natural habitat, in a worst-case scenario the extent of this will amount to less than 0.6% of the wind farm area. Other disturbance impacts will be temporary - with some death, injury and displacement of benthos - but communities will be able to return to normal afterwards. In the wind farm area, these temporary impacts could affect around 2% of the seabed (from installation of cabling between turbines, and the footprint of the foundation installation vessel), while approximately 1% of the seabed of the export cable corridor could be affected in the same way.
- NTS.9.18 Once the Project is installed and operational, benthic organisms will rapidly colonise new structures such as turbine foundations. Although these communities are likely to be slightly different to those found on natural habitat, the very small overall area affected limits this impact.



NTS.9.19 Electromagnetic fields (EMF) from live cables could have the potential to affect sensitive benthic organisms, but research on this is lacking at present. Any potential impacts to benthos from EMF are likely to be confined to a very small area, and significantly reduced by burial.

### ***Fish and Shellfish Ecology***

NTS.9.20 A diverse fauna of fish and shellfish is found in the area. As the ecology and breeding cycle of each of these species is different, the result is a complex system that changes both throughout the seasons, and geographically. A good example of this is the cuttlefish (a squid-like mollusc), which arrives in abundance close inshore (peaking in April/May) to breed and lay eggs, when it is exploited by local fisheries. A fish species of both conservation and commercial importance – the black bream – is also confined geographically, as it appears to require thin, coarse sediment in rocky, shallow (<20m) areas in which to excavate a 'nest' to lay its eggs. Spawning periods for different species span across the year, and an important population of herring have their peak spawning (in the middle of the English Channel, to the east of the Project site) in winter months.

NTS.9.21 Along with information from other studies and fisheries landings, fish surveys using different types of bottom trawl were conducted in different seasons. Fish found in the area range from tiny gobies to occasional sightings of the basking shark. Common elasmobranchs (i.e. sharks and their relatives, which have a cartilage skeleton) include lesser-spotted dogfish, smoothhound, and several species of rays.

NTS.9.22 However, bony fish are the most abundant and diverse. Smaller, abundant, species of no (or low) commercial value which live on the seabed include gobies, dragonets, solenette, weever, pouting, gurnard and dab. Two species of seahorses – which are legally protected – are also commonly found in the English Channel, and short-snouted seahorses were recorded in surveys of the wind farm area. Abundant and commercially exploited demersal (i.e. found near the seabed) roundfish include whiting, cod, bass, black bream and cod, while pelagic (i.e. swim in the water column) species include mackerel, horse mackerel, and herring. Flatfish that live on the seabed include Dover sole, plaice, brill and turbot. A few fish species in the area have life cycles that use both rivers and the sea, and are likely to at least pass through the wind farm area occasionally; these include sea trout and shad (which spawn in rivers) and eels (which spawn in the sea).

NTS.9.23 Shellfish encompass a wide range of molluscs and crustacean types, many of which are of commercial importance. Mussels and native oysters are attached to the seabed, whereas scallops, whelks, crab, and lobster are able to move limited distances. Cuttlefish and squid are highly mobile.

NTS.9.24 The main potential impact to fish from the Project is from the underwater noise generated when turbine foundations are hammered or 'piled' into the seabed

during construction. E.ON therefore commissioned experts in underwater noise to predict or 'model' the worst-case impact this might have. This modelling took into account scientific studies of fish hearing and behaviour, as well as information on water depth and the maximum levels of noise likely to be generated from piling a range of different pile diameters. As fish species have different hearing abilities, their sensitivity to noise varies greatly: of those in the area, species such as sandeel, sea trout and rays are considered relatively insensitive, while herring are considered to be the most sensitive.

- NTS.9.25 The most common and widespread negative impact that is likely to arise during piling is fish actively avoiding affected areas. The worst-case area that this might affect varies greatly with the species and foundation type – for example, just 100m for sandeel with the smallest pile diameter, to potentially 80km for herring with the largest. However, a number of measures will be in place to minimise the impacts of piling noise. Firstly, E.ON will use a 'soft start' for all their piling, where the power and frequency of each hammer blow will be gradually increased to allow most fish and shellfish to escape from potentially harmful levels of noise. Secondly, piling noise will be both intermittent and temporary: on average, each piling event is expected to take just two hours, with associated noise expected for around just 9% of any given monthly period; all piling is expected to take around 12-months. Thirdly, discussions will take place with the regulatory authorities regarding the potential need for some form of piling restrictions to ensure that noise levels do not disturb both herring and black bream during their most sensitive, peak spawning period. These restrictions may consist of using only smaller piles (that generate lower levels of noise) in certain areas of the wind farm, and will also considerably reduce potential impacts to a wide range of other species.
- NTS.9.26 During construction there may be other potential impacts as a result of disturbance of the seabed – for example, black bream nests could be damaged during installation of the cable, or small numbers of very small fish with limited mobility could be unavoidably crushed underneath the larger turbine foundations. Damage to black bream nests will be avoided by either routing of the cable or scheduling its burial outside of the spawning season.
- NTS.9.27 During operation of the wind farm, new habitat such as turbine foundations could alter the distribution of some species, representing both a minor loss of natural habitat for small seabed species and a gain of artificial habitat, especially for species that aggregate around structures such as reefs. Electromagnetic fields (EMF) emitted from live power cables could have the potential to affect fish and shellfish, particularly elasmobranchs. While elasmobranchs have certainly responded to cable EMF in experiments, results have varied between both species and even individuals, and no work has examined whether these have any implications or negative effects at a population or ecosystem level. A number of factors in the design of the cables used (3-core, sheathed, Alternating Current, AC, as opposed to Direct Current, DC) will be in place to minimise EMF emissions compared to potential alternatives, and the cable will be buried to a target depth of 1m.

### ***Nature Conservation***

- NTS.9.28 Marine species in the area of conservation interest include seahorses, undulate ray and native oyster. Benthic habitats of importance known to be in the area (or thought to have a high potential of occurring) include chalk seabed, mussel reefs, and Ross worm aggregations.
- NTS.9.29 There are a number of sites in the region of the Project that are protected (or under consideration to be protected) because of their marine nature conservation value. These include small and locally important Marine Sites of Nature Conservation (MSNCIs), and larger recommended Marine Conservation Zones (rMCZs), that are part of a nationally important network. Other more distant nature conservation sites with marine elements include Special Protection Areas (SPAs) for birds, and Special Areas of Conservation (SACs) for marine species and habitats.
- NTS.9.30 Only one designated site - an MSNCI (the City of Waterford shipwreck) - falls directly within the Project boundaries. Any potential impacts to it during construction, such as physical damage from anchors, will be completely avoided by placing a restriction zone around this site.
- NTS.9.31 Another site - the Kingmere rMCZ (4km northwest of the wind farm) has been proposed partly because of nationally important populations of a fish species, the black bream, which spawn here. Although piling noise will be an intermittent impact (see above), black bream could show avoidance reactions to piling noise and the Kingmere site could therefore be impacted. To mitigate this, during the peak black bream spawning season, there may need to be some form of piling restrictions imposed, such as limiting piling to the installation of smaller piles in the eastern part of the Project Array. These need for and extent of these restrictions will be discussed between E.ON and the regulatory authorities.
- NTS.9.32 The indirect impacts of piling noise were also raised as a concern in relation to herring. Although herring are not protected, they are known to be both sensitive to noise and a key prey item to breeding seabird (tern) colonies that contribute to designated SPAs in the wider region. Piling restrictions (installation of smaller piles in the western part of the wind farm area for example) may therefore need to be applied during the peak herring spawning season to mitigate potential impacts on terns, and the SPAs where they breed. Should piling restrictions need to be put in place for both herring and black bream, this would also reduce potential impacts to seahorses from piling noise.
- NTS.9.33 Construction activities on the seabed – such as the installation of turbine foundations or the export cables – has the potential to damage habitats of conservation importance such as chalk and mussel reefs, even if these do not form part of a currently designated site. E.ON will engage in ongoing discussions with regulators to ensure any such damage is minimised, for example through detailed pre-construction surveys and resulting ‘micro-siting’ as far as possible to avoid these habitats.

NTS.9.34 In the operational phase of the wind farm, potential impacts to birds from designated sites – such as collisions or avoidance – were found to be not significant.

### ***Marine Mammals***

NTS.9.35 The ability of marine mammals to move over long distances has dictated that the study area for these species needed to not only cover the vicinity of the Project site but also a wider study area, including much of the eastern English Channel.

NTS.9.36 A review of the available literature shows that the diversity of marine mammals in the eastern English Channel is relatively low. Only bottlenose dolphins and common dolphins have been observed regularly with harbour porpoises observed occasionally near-shore. Long finned pilot whales tend to be recorded in more offshore areas and minke whales are now seen more regularly in the western region of the English Channel. Grey and common seals are seen occasionally in the area but there are no known significant breeding/haul-out areas for either species in this region. A number of other cetacean species have been recorded within the wider study area but not considered regular visitors – these include killer whales, fin whales, sei whales and humpback whales as well as Atlantic white-sided, white-beaked, and striped dolphins.

NTS.9.37 Other marine 'megafauna' such as marine turtles, basking shark and the ocean sunfish are also occasionally recorded in the wider study area. Turtles have similar sensitivities to marine mammals in terms of noise, while basking sharks and sunfish are considered to be less sensitive.

NTS.9.38 To complement the literature review, 30 boat-based marine mammal transect surveys were undertaken over a 24 month period covering the Rampion site, the cable route corridor, an adjacent 'reference' area and a buffer of 5km beyond it. These surveys recorded six species of marine mammal; harbour porpoise, bottlenose dolphin, white-beaked dolphin, common seal, grey seal and minke whale. Of these the harbour porpoise was recorded most frequently, and seals were recorded on only a handful of occasions.

NTS.9.39 Project activities during the construction phase such as pile driving noise and increased vessel movements could affect marine mammals and the other large marine organisms listed above. In order to mitigate these impacts all piling work will be carried out under 'soft-start' procedures, this entails the pile hammer blows commencing at a low energy and reduced frequency before they begin to become more frequent and more powerful. The 'soft-start' period will allow those individuals in the area to move away from the noise source to avoid impacts. The use of acoustic deterrents may also be discussed with the regulatory authorities at the time of construction, if their application is considered suitable. These deterrents are underwater noises, which are unpleasant though not harmful to marine mammals, and encourage them to leave the area –the use of such devices needs to be appropriately licensed.

Other mitigation measures will be included in a Marine Mammal Mitigation and Monitoring Plan, which will be drafted in consultation with Natural England and agreed with the Marine Management Organisation (MMO) when the project design has been finalised.

- NTS.9.40 Indirect effects could also arise, such as impacts on species upon which marine mammals prey from pile driving or increased turbidity, although these impacts are expected to be negligible.
- NTS.9.41 During operation of the wind farm, impacts may arise from general noise created by maintenance vessels and the possibility for the mammals to be struck by vessels. These potential impacts will be mitigated by ensuring that vessel operations comply with a code of conduct that will advise how vessels should operate in respect of marine mammals.
- NTS.9.42 During the decommissioning phase plans will also be put in place to limit potential impacts to marine mammals.
- NTS.9.43 Overall, due to the relatively low numbers of marine mammals observed in the vicinity, and known records in the wider study area, with mitigation measures in place, impacts to marine mammals and other marine megafauna from installation, operation and decommissioning of the wind farm are not expected to be significant.

### ***Marine Ornithology***

- NTS.9.44 The potential impacts to marine ornithology from the construction, operation and decommissioning of the Project have been established via a literature review, consultation with Natural England (including agreement of the scope of the surveys) and a series of field surveys and detailed consideration of the proposed project activities.
- NTS.9.45 Baseline conditions were established through desk studies and field surveys, including boat-based and aerial baseline surveys that were carried out over two full years, following current COWRIE (Collaborative Offshore Wind Research Into the Environment) guidance with additional surveys being added during the main migratory periods. The survey area included the offshore wind farm area, the area of search for the export cable and a 5km buffer (the wider survey area).
- NTS.9.46 There are no designated areas of importance for offshore ornithology located in the vicinity of the proposed development. Species that might originate in, and hence be qualifying features for, distant designated sites (including SPAs and Ramsar sites) were however considered in the assessment because it is possible that they could use the ecological resources within/around the wind farm site and/or over-fly the site (and hence be at risk of collision mortality).
- NTS.9.47 Bird populations within 4km of the Offshore Project site included 6 very high sensitivity SPA species (brent goose, gannet, bar-tailed godwit, lesser black-backed gull, Sandwich tern and common tern), 4 high sensitivity EU Birds

Directive Annex 1 species (red-throated diver, Balearic shearwater, little gull and arctic tern) and a further 14 medium sensitivity species.

- NTS.9.48 Potential impacts were considered for the construction, operation and decommissioning stages of the wind farm, these included; barrier effects, disturbance and displacement, collision risk and changes in habitat and prey supply. Key risks from the project were identified as being collision risk to gannet, great skua, lesser black-backed gull, herring gull, great black-backed gull, kittiwake, and common and arctic terns, and disturbance to gannet, guillemot and razorbill. Specific consideration in the assessment was also given to other species potentially linked to an SPA (Sandwich tern, common tern, bar-tailed godwit), and to other Annex 1 species (including red-throated diver, arctic tern and little gull).
- NTS.9.49 A cumulative ornithological assessment was also undertaken, following COWRIE guidance, which looked at the potential for effects not only from Rampion, but other offshore wind farms in the UK.
- NTS.9.50 Mitigation measures have been incorporated in the design of the wind farm, by reducing the size of its footprint. In addition mitigation measures to reduce effects on herring will also benefit birds which feed on this species.
- NTS.9.51 Overall, there are not likely to be any significant residual impacts on marine ornithology as a result of the Project. No effects are predicted that would result in any breach of the Habitats Regulations, either alone or in combination with any other projects or plans.

### ***Seascape, Landscape and Visual Impact***

- NTS.9.52 A Seascape, Landscape and Visual Impact Assessment (SLVIA) and a Cumulative Seascape, Landscape and Visual Impact Assessment (CSLVIA) have been carried out as part of the assessment of impacts of the proposed offshore wind farm.
- NTS.9.53 The seascape is a large scale, visually unified and expansive area of open water, with few surface features. The seascape character setting of the site is influenced by land close to shore, becoming more uniform and generic further out to sea. The landscape character context is defined by a distinctive coastal 'plateau', behind which the land rises into the dip slopes of the South Downs. Coastal cliffs east of Brighton, culminating in the dramatic chalk cliffs around Beachy Head also characterise the landscape.
- NTS.9.54 Views towards the proposed wind farm are typically experienced at a distance from the site, most notably from the seafronts, settlements and elevated South Downs landscape and also from commercial, passenger and recreational vessels.



NTS.9.55 The assessment has considered the potential worst case development scenario (of 175 smaller turbines which fill the proposed development site), with the following predicted effects:

- A 'minor' effect during the (pre-turbine) construction stage;
- A 'major' visual effect on the character context of the elevated and coastal extent of the South Downs National Park and Sussex Heritage Coast;
- A 'major' to 'moderate' effect on landscape character where visual associations with the sea are most apparent, along the coastal edges and within the elevated extents of the South Downs;
- A 'major' effect on seascape character in areas near to the wind farm, or where landward context associations will be affected; and
- A 'major' to 'major/moderate' visual effect on the coastline, coastal settlements and elevated inland vantage points nearest to the northern boundary of the proposed wind farm, and from sea based views from recreational boats.

NTS.9.56 No additional large scale developments were identified as impacting on the landscape or visual character during the cumulative assessment.

NTS.9.57 Due to its location and scale, there are no available mitigation methods which could be used to reduce the visibility or 'screen' the Project, however it should be noted that the array area has been reduced in size and the distance between the coast and the closest possible turbine location has been increased following consultation on the Project, which has in particular had a beneficial effect in reducing the level of impact on the designated Heritage Coast.

### ***Marine Archaeology***

NTS.9.58 The potential impacts to marine archaeology from the construction, operation and decommissioning of the Project have been established via a desk based assessment of existing records and datasets and data gathered from the site from two offshore geophysical surveys, which determined the presence of possible archaeological features. The marine heritage asset study area (MASA) was defined as the wind farm Project area, the cable corridor and a 2km buffer around these.

NTS.9.59 The desk based assessment of this area identified a large number of wrecks from various eras. Many wrecks were well-documented charted wreck sites, but evidence for others was less clear. No protected wrecks or protected military sites were identified. The geophysical surveys identified various seabed 'contacts' of archaeological interest and some which related to cables.

- NTS.9.60 The potential for significant archaeological features dating from the Mesolithic period (8,500- 4,000 BC) to the modern day along palaeo-valleys present in the cable corridor area was also noted.
- NTS.9.61 Any construction activity that affects the seabed, including cable and foundation installation and temporary activities from vessels such as jack-up rigs may impact on marine heritage assets. Indirect impacts, such as scour and sediment deposition, could also arise from construction processes.
- NTS.9.62 During the operation and maintenance phase, previously buried sites may be exposed due to changes in local scouring and sedimentation patterns (indirect impacts). In addition, anchoring of maintenance vessels may also directly damage archaeological sites.
- NTS.9.63 All known marine heritage assets will be avoided when the detailed design of the wind farm is carried out. The primary mitigation during construction, operation and decommissioning is avoidance using appropriately sized 'Exclusion Zones' and the implementation of 'Archaeological Protocols'. Protocols will include appropriate reporting to English Heritage, archiving and the production and publication of Written Statements of Investigations (WSI).
- NTS.9.64 Should unexpected marine heritage assets be identified during the construction work, there will be no residual effects, providing that Protocols are followed.

### ***Navigation and Shipping***

- NTS.9.65 The impacts to Navigation and Shipping from the construction, operation and decommissioning of the Project have been established via a desk based assessment including analysis of Automatic Identification System (AIS)<sup>2</sup> and Radar surveys, together with meetings/workshops with the local Harbour Authorities, the Maritime and Coastguard Agency (MCA) and other key navigational stakeholders
- NTS.9.66 The traffic currently using the Offshore Project site mostly comprises of fishing vessels, recreational craft and cargo vessels (mainly en route to/from Shoreham Port as well as to Newhaven), but also includes marine aggregate dredgers.
- NTS.9.67 Potential impacts to vessels during construction include a reduction in navigable sea room, the need for route deviations, increased collision risk, an increase in fishing gear snagging risk and potentially restricted access to Shoreham Port.
- NTS.9.68 During the operational phase, impacts are likely to comprise of a reduction in navigable sea room due to the presence of the wind turbines and offshore substations, deviations to shipping routes (particularly commercial vessels

<sup>2</sup> AIS is an automatic tracking system used by vessels and Vessel Traffic Services (VTS) for identifying and locating other vessels. It is used as a supplement to marine radar systems, providing information on the identity, position, course and speed of vessels.

to/from Shoreham, as well as the displacement of established recreational craft racing routes) and an increase in collision risk, which may lead to an increased number of incidents. Other impacts on emergency response include reduced Search and Rescue (SAR) access and a reduction in pollution and salvage response accessibility within the Offshore Project site. Impacts associated with the cables include potential electromagnetic interference on small craft using magnetic compasses, and an increased risk of anchor or fishing gear snagging.

NTS.9.69 Following consideration with the Navigation Risk Assessment, mitigation measures which will be employed during construction and operation include:

- Development and implementation of an Emergency Response Co-operation Plan (ERCoP);
- Use of Safety Zones (during the construction phase);
- Ensuring that vessels are 'fit for purpose';
- Promulgation of information including Notices to Mariners and Chart updates;
- Effective works and vessel management;
- Aids to Navigation as per THLS requirements;
- Marine Coordination of vessels and activities;
- Air draught clearance between vessel masts and Wind Turbine Generator (WTG) blades;
- Compliance with MGN 371; and
- Ongoing consultation and information promulgation with key navigational stakeholders.

NTS.9.70 Possible residual effects during the construction phase (with 'minor' or 'moderate' significance) include an increased risk of collision, deviations from historical routes and anchor or fishing gear snagging risk. Construction activities for the wind farm will lead to a reduction in navigable sea room in the area and there may be some potential restrictions on access to Shoreham Port during this period.

NTS.9.71 Residual impacts in the operational phase (due to the presence of the wind farm) with a 'moderate' or 'major to moderate' significance include a reduction in navigable sea room, deviations from historical routes (including reduced access to local ports), an increased collision risk and impacts on marine Radar use. There may be an increased number of incidents leading to increased SAR occurrences with potential for reduced SAR access within the site, reduced

pollution and salvage response capabilities. Impacts due to the subsea cables associated with the project include anchor or fishing gear snagging.

### ***Telecommunications***

- NTS.9.72 The potential impacts to communication systems from the construction, operation and decommissioning of the Project have been established via a desk based assessment. A series of stakeholders (Ofcom, Joint Radio Company (JRC) and Atkins Global) were consulted on the proposals, but no concerns or objections to the Project were raised.
- NTS.9.73 Several telecommunication features could be affected by the construction and operation of the project. Wind turbines and other large metallic reflectors such as cranes can affect Very High Frequency (VHF) radio systems, Television (TV) signals, Global Positioning Systems (GPS), radio communications, Automated Identification Systems (AIS), mobile telephony and various Marine Communications systems.
- NTS.9.74 All potential impacts during construction, operation and decommissioning phases of the Offshore Project are considered to be 'negligible' with the exception of Marine radar/Vessel Traffic Service (VTS) radar systems, which, without mitigation measures being imposed, could have a 'moderate' impact.
- NTS.9.75 No specific mitigation measures are proposed during the construction and decommissioning phases. During operation changes to vessel routes in the vicinity of the Offshore project site may be implemented to accommodate the wind farm and minimise its effect. Further, discussions will be held with the Marine and Coastguard Agency (MCA) and Trinity House Lighthouse Service (THLS) during the detailed design phase to ensure that effects are minimised.
- NTS.9.76 Residual impacts are considered 'negligible' with the exception of potential impacts to marine radar due to the presence of the turbines. This is considered a minor impact when the relevant mitigation measures are applied. Cumulative impacts are not anticipated to be significant.

### ***Civil and Military Aviation***

- NTS.9.77 The potential impacts to aviation from the construction, operation and decommissioning of the Project have been established via a desk based assessment and consultation with relevant stakeholders.
- NTS.9.78 The project site is located in an area entirely underneath controlled airspace (Worthing Control Area (CTA) – designated as Class A Controlled Airspace). Other aviation interest include a licensed aerodrome at Shoreham, the Royal Navy Portsmouth Danger Area Complex and the National Air Traffic Service (NATS) radio navigation beacon at Seaford within the vicinity of the Project site.
- NTS.9.79 The possibility of effects on the following type of aviation resources have been reviewed - military airfields, air defence radars, MoD low flying activity,

meteorological radars, aerodromes, en-route airspace, low level visual flight rules (VFR) traffic and helicopter routes (main routes and support routes to offshore installations).

- NTS.9.80 For the majority of the aviation interests, effects from the project will be 'negligible' and as such no mitigation measures are proposed for the construction and decommissioning periods, with the exception of notifying the relevant aviation authorities and other stakeholders on the likely turbine installation programme.
- NTS.9.81 Agreed timings with the Civil Aviation Authority (CAA) for the installation of lighting will be sought, to minimize the period when turbines are installed but not displaying lights and it is also expected that aviation lights will stay in place on each turbine until dismantled. Consultation and use of industry guidance will ensure the development is as visible as possible to aviation when in operation.
- NTS.9.82 There may be residual impacts to radar systems, which E.ON anticipate can be reduced to a 'negligible' level through liaison with operators during the detailed design stage. No cumulative impacts are anticipated.

### ***Socio-Economics***

- NTS.9.83 The potential socio-economic impacts have been established via a desk based assessment and in consultation with relevant stakeholders. The Project site is near to West Sussex, East Sussex and Brighton & Hove. The South Downs National Park has also been included in the assessment.
- NTS.9.84 The economic profile of East Sussex the area tends to underperform the wider South East region, though the area has a thriving tourist industry and marine recreation is popular.
- NTS.9.85 The Rampion wind farm project will provide potential benefits in terms of job creation and inward investment. During construction, it is estimated that the Project will employ 500 personnel on board construction vessels, and 184 personnel will be employed for offshore commissioning and support vessel requirements. Employment for between 85 and 162 personnel for onshore support during the operational phase is also anticipated. Indirect and induced job creation is expected, and will be in addition to those people directly employed. The chosen location for a permanent Operations & Maintenance (O&M) base at Newhaven will create between 65 and 85 full time jobs, the majority of which would be recruited locally, and will also give rise to contract opportunities for existing businesses. A small-scale influx of workers will have a negligible impact to the existing population of the area.
- NTS.9.86 There could potentially be a temporary minor disturbance to the surrounding community and tourism sector during construction and there may be positive, negative or neutral reactions to the wind farm - this is considered to be a moderate impact. E.ON will agree a construction window for the landfall works with Worthing Borough Council to minimise disruption and will discuss the

potential to develop a visitor centre(s) with the local authorities, which may attract visitors to the area.

- NTS.9.87 The decommissioning phase of the project will have negligible impacts to local populations, employment and the local economy, but a moderate impact is expected to tourism, associated with increased marine and vehicular traffic.
- NTS.9.88 No significant residual effects as a result of project construction, operation and decommissioning are expected.

### ***Commercial Fisheries***

- NTS.9.89 The potential impacts on commercial fisheries from the construction, operation and decommissioning phases of the Project have been established via a desk based assessment and consultation with a large number of relevant stakeholders.
- NTS.9.90 The fisheries in the region of the Project are diverse, and use a wide variety of different methods to catch a range of species. Important methods include scallop dredges, beam trawling for sole and other flatfish, potting for lobster, crab and whelks and both drift and fixed nets for a wide range of species. The wind farm area is fished by UK vessels mainly operating from various south coast ports, and the French and Belgian fleets also fish within the site<sup>3</sup>. Smaller vessels tend to operate further inshore, with larger vessels operating in deeper waters.
- NTS.9.91 Due to safety measures such as temporary exclusion zones which will be in place during construction, potential impacts on commercial fisheries include restricted access to fishing grounds, increased steaming times, interference with fishing activities (e.g. fouling of equipment) and the loss of fishing grounds.
- NTS.9.92 There may also be impacts to commercially important fish and shellfish stocks arising from changes in behaviour due to some types of pile driving activities. These could have a 'moderate' impact rating; however, seasonal and/or spatial restrictions on piling designed to protect certain species during peak spawning will reduce impacts to a range of other commercial species.
- NTS.9.93 Construction impacts from interference to fishing activities would be mitigated by communicating information on the location and timing of construction activities to fishing fleets. A code of practice for construction and maintenance vessel crews will be developed which will minimise interference with those fishing
- NTS.9.94 During the operational phase, impacts will include potential interference to fishing from maintenance activities, such as vessel movements. The loss of traditional fishing grounds could also potentially impact commercial fisheries,

<sup>3</sup> French and Belgian registered vessels have historic fishing rights to fish in waters between 6nm and 12nm from the coast.



although effects have been assessed as being of 'minor' or 'negligible' significance. The predicted impacts from increased steaming times or interference with fishing activity during operation are also considered to be of 'negligible' significance in EIA terms.

- NTS.9.95 During operation, fishermen will be made fully aware of the locations of wind farm infrastructure, which will be marked on charts and lit to industry standards. Codes of practice for maintenance vessels will help avoid conflicts with the fishing fleet.
- NTS.9.96 Measures to reduce impacts on commercial fishing will also be imposed during the decommissioning phase to minimise effects on the industry, whilst observing safety requirements.

### ***Other Marine Users***

- NTS.9.97 Extraction of aggregate (the sand and gravel used in construction) from the seabed is an important industry in the eastern English Channel and there are a number of licenced areas immediately to the west of the wind farm. This includes a small strip that overlaps the wind farm area that will be the subject of ongoing discussion with both the seabed owner and the licence holder to ensure no conflict arises.
- NTS.9.98 Infrastructure in the Project area includes groynes on the landfall beach, wastewater outfalls in the shallow parts of the cable route corridor, and two redundant telecommunications cables across the wind farm site. Except for some planned wind farms on the northern French coast, the only other offshore energy development in the area is the proposed Navitus Bay Wind Farm (approximately 70km to the west, beyond the Isle of Wight), which is not in such an advanced stage of design as Rampion. A few locations in the broader area outside of the Rampion wind farm are used as disposal sites, such as for silt from harbour dredgings and even human remains. Historically, unexploded munitions were also dumped off the Isle of Wight and the wind farm and cable area will be surveyed for these before construction.
- NTS.9.99 The area is popular with a wide range of recreational users, especially in the summer months. Beach-based activities include seaside tourism, dogwalking, and angling. Swimming, jetskiing, surfing and kitesurfing are also popular, and beaches near the landfall have water quality classed as 'good' or better. SCUBA diving and spearfishing are highly popular, and while some takes place from the shore, most is boat-based; along with recreational angling (including both private and charter boats), activity tends to concentrate around features such as reefs or shipwrecks. Anglers target a wide range of species, but bass and black bream are particularly popular. Sailing, including both racing and training, is also important in the area.
- NTS.9.100 In the construction phase, existing infrastructure such as outfalls or groynes will be avoided to prevent damage or interference, and bathing water quality is not

expected to be impacted. However, as a result of safety considerations, it is likely that there will be temporary, short-term and localised disruption to some of the varied economic and recreational activities. These might arise, for example, from temporary restriction of beach access during laying cable at the 'landfall', or by an exclusion zone being placed around cable-laying vessels offshore, which might require other vessels to make minor deviations from their normal routes. These impacts will be minimised as far as possible by widely communicating details of planned activities to the community, for example by issuing Notices to Mariners.

- NTS.9.101 Although temporary and intermittent in nature, the levels of underwater noise generated by piling turbine foundations into the seabed could potentially cause injury to divers and spearfishers. However, a number of strict measures will be in place to prevent this occurring. Most importantly, all diving activity will be strictly excluded from the relatively small area where the highest (and potentially most harmful) levels of noise will occur, and this area will be patrolled with guard vessels. Furthermore, a diving liaison officer will be appointed to directly engage with and advise the community, and a pro-active communications plan will be put in place utilising direct communications with divers and dive groups, announcements in the local media and updates published on E.ON's website with links from dive interest websites to clearly convey information on the planned location and duration of any piling activity to divers. A 'soft-start' procedure will also be used in all piling, where the power and frequency of hammer blows is gradually increased. This will allow any divers further away from the exclusion zone adequate time to decompress and surface, before experiencing 'startle' or unpleasantly loud levels of noise.
- NTS.9.102 Piling may cause short-term disruption to recreational anglers, as some of the fish they target may temporarily swim away to avoid noise, although bass and black bream are not considered as being particularly sensitive. As for diving, publication of details of piling activity in advance will help reduce any potential impacts.
- NTS.9.103 When the wind farm is operational, there may be some positive impacts to recreational sea users. Fish and other marine life will aggregate around turbine foundations, which might attract divers and anglers. The surfing community initially expressed concern that the presence of the foundations would reduce the height of the waves reaching the shore, but changes to the wind farm design since then have shown that these impacts will not be detrimental to surfing.

## NTS.10 Onshore Environment

---



### ***Agriculture and Soils***

- NTS.10.1 The land use context of the proposed substation site and cable route corridor is one of marked contrasts and differing landform topography. A significant quantity of land is currently under private ownership and farmed.
- NTS.10.2 Construction of the onshore cable will involve temporary disturbance to approximately 70 hectares of agricultural land which is categorised as ‘best and most versatile’, whilst construction of the onshore substation will result in the permanent loss of approximately 7 hectares agricultural land of the same classification. Current agricultural operations will be subject to temporary localised disturbance and/or severance as the cable is installed, and land parcels associated with the substation site will be permanently taken.
- NTS.10.3 E.ON will liaise with affected landowners and tenants to ensure the works are planned and timed to reduce conflicts with farming operations, and to ensure access for animals and machinery is maintained.
- NTS.10.4 Best practice construction and site management techniques will be employed to safeguard and reinstate valuable soil resources, and to prevent the spread of any pests, diseases and weeds.
- NTS.10.5 Following mitigation, slight to moderate adverse effects are predicted due to the loss of and/or disturbance to agricultural land, with effects of a comparable order predicted on current operations due to disturbance and land take.

### ***Air Quality***

- NTS.10.6 Local air quality around the onshore cable corridor and substation site is relatively good and typical of a rural environment. The nearest Air Quality Management Area is located some 500m west of the cable route and relates to traffic sourced pollution around the A24 Warren Road and A27 Upper Brighton Road.
- NTS.10.7 The onshore cable route crosses or passes close to a number of locally designated sites, and some sections of the route and the substation site are in proximity to residential dwellings. Construction activities such as earthworks may generate dust and soiling, which could cause temporary adverse impacts at these locations. These will be managed by way of dust prevention, suppression

and containment measures. These will render an adverse effect of no greater than slight significance.

- NTS.10.8 Construction traffic, plant and machinery emissions will be below the thresholds that cause significant air quality impacts. Following construction, there will be no significant effect on local air quality from operation of the onshore Project components.

### ***Ground Conditions***

- NTS.10.9 The construction phase is predicted to give rise to the greatest potential for significant effects on onshore soils, geology and hydrogeological interests.
- NTS.10.10 The assessment has identified that the principal environmental risks relate to: ground instability caused by the excavation of chalk; accidental chemical spillages leading to the contamination of groundwater and soil resources; and localised flooding of excavated areas during construction operations. Risks have also been identified in respect of encountering areas of previously contaminated soils, groundwater or gas associated with historic landfill sites.
- NTS.10.11 Best practice preventative measures and site management techniques will be employed to protect the receiving environment against physical damage and reduce pollution risk. Sampling and testing of soils, groundwater and gas in areas of known or suspected contamination will be undertaken, and plans for avoiding, handling, removal and disposal will be prepared to minimise exposure to any potential hazards. In particular, specific methodologies and mitigation measures will be agreed and implemented in conjunction with Worthing Borough Council for the section of the cable route passing through the historic landfill site at Brooklands Pleasure Park.

### ***Hydrology (Water Resources and Flood Risk)***

- NTS.10.12 The potential impacts on the receiving water environment have been considered using a flood risk assessment and a review of hydrological sensitivities within and in proximity to the onshore cable route corridor and substation site.
- NTS.10.13 Available information indicates that water quality associated with rivers, streams and sewers with a relationship to the onshore cable route is variable and, at best, of moderate quality. South of Upper Beeding, the River Adur contains part of the 'Adur Estuary Site of Special Scientific Interest (SSSI)'.
- NTS.10.14 The watercourses along the onshore cable route mainly comprise field drains and ditches. These will be diverted and reinstated on completion of the cable installation works. Apart from the River Adur crossing which will be crossed via directional drilling, the default crossing method of watercourses will be trenching, but drilling may also be employed in certain cases.

- NTS.10.15 A number of surface water features such as lagoons, ponds and ditches have been recorded in proximity to the substation site.
- NTS.10.16 Effects will be principally associated with: an increased risk of water pollution through the movement and run-off of silt, water and other materials along trenches and roads into nearby waters during rainfall periods; any spillages of construction materials which can find their way into waterbodies and groundwater resources; and the potential for physical damage to watercourses.
- NTS.10.17 A Flood Plan will be established where works are planned within the flood plain to inform the workforce what actions should take place should a flood event occur.
- NTS.10.18 The onshore substation will be designed to incorporate sustainable methods of drainage to compensate for constructing an increased area of hardstanding, and to control surface water run-off. Mitigation measures have been developed in line with established guidelines to control sediment release during soil stripping and earthworks, and to protect the environment from substances such as fuels, lubricants, and cement.
- NTS.10.19 components do not give rise to an effect greater than moderate significance during construction. There will be no effects on existing flood or coastal defences as these will be crossed using specialist drilling techniques. Future maintenance events and the long term operation of the onshore components will not result in any significant hydrological effects.

### ***Terrestrial Ecology***

- NTS.10.20 The local environment associated with the onshore components contains a diverse range of ecologically valuable coastal and grassland habitats, watercourses, and species including badger, bats, great crested newts and birds. Parts of the environment are afforded statutory and non-statutory protection due to the importance of some flora and fauna.
- NTS.10.21 High value areas of habitat have been avoided through the development and refinement of the onshore cable route. Key issues relate to: habitat and species loss within the South Downs National Park; the loss of important grassland habitat around Tottington Mount; and the loss of notable plant species. The assessment has identified these effects to be significant at the district and county level.
- NTS.10.22 A number of ecological surveys will be undertaken prior to construction including tree surveys. In addition, measures will be put in place to reduce construction working areas in sensitive locations, and to reinstate disturbed habitats.
- NTS.10.23 The onshore works will present opportunities to beneficially reinstate derelict ponds at Erringham Site of Nature Conservation Interest, and to control

encroaching scrub on sensitive chalk grassland slopes at Applesham Farm Bank Site of Nature Conservation Interest.

NTS.10.24 Following completion of the construction works, there will be no effects on terrestrial ecology associated with the operation of the onshore components.

### ***Archaeology and Cultural Heritage***

NTS.10.25 The receiving onshore environment contains a series of Scheduled Monuments, Registered Parks and Gardens, Listed Buildings, Conservation Areas and recorded archaeological sites of varying importance, sensitivity and age.

NTS.10.26 Consideration was given to the potential for direct (physical) impacts on the receiving onshore archaeological and historic environment, and any wider indirect (visual) effects on the setting of historic assets arising from the construction and operation of both the onshore and offshore components of the Project.

NTS.10.27 Physical impacts from construction of the cable are predicted on a Bronze Age cross dyke on Tottington Mount (Scheduled Monument). Impacts of varying degree are predicted on a number of non-designated heritage assets where they may be impacted by the working width. Impacts on historic boundaries at road, field and stream crossing points are also predicted. Potential exists to encounter unknown archaeology during the works.

NTS.10.28 A comprehensive mitigation strategy is proposed for the study and recording of physically affected sites and features. This will involve advanced excavation and recording of the scheduled monument, followed by post-excavation assessment. Precautionary methods including trial trenching, earthwork surveys and field boundary recording will be undertaken where potential for impact exists along the rest of the cable route. An archaeological watching brief will be implemented in case currently unknown features of interest are encountered during construction.

NTS.10.29 Subject to mitigation, the assessment identified no residual physical impacts will occur on any onshore archaeological or cultural heritage assets. There are predicted residual visual effects on 91 designated onshore heritage assets as a result of the presence of the offshore wind farm impacting on views out of heritage receptors, however these impacts are not considered significant. Upon decommissioning, any impacts would be fully reversed.

### ***Landscape and Visual Impact***

NTS.10.30 In relation to landscape character and visually sensitivities, a 2km assessment study area around the onshore components was defined through the process of consultation. A number of viewpoints were also identified so that the visual impact of the substation could be determined.

NTS.10.31 The study area contains numerous designated features and protected assets including:

- The South Downs National Park, National Trust land;
- Ancient Woodland;
- Listed Buildings;
- Tree Preservation Orders;
- Local landscape designations;
- Recreational and outdoor land; and
- Footpaths and informal trails.

NTS.10.32 Visual exposure varies across the study area. Views of the cable corridor and substation site are available from dwellings, footpaths and recreational areas. More distant views from the fringes of the study area and beyond feature the corridor and substation site as a relatively small component in the overall outlook.

NTS.10.33 The onshore cable will be constructed through a series of national and locally defined landscape character areas of acknowledged quality and value, several of which fall within the South Downs National Park. The substation site occupies a landscape characterised by mixed pastoral and arable farming contained by a strong hedgerow pattern, with pockets of woodland and electricity transmission infrastructure forming key features.

NTS.10.34 The design-development process has sought to avoid direct impacts on landscape features where possible. Construction of the onshore components will, however, result in locally marked landscape modifications with a loss of hedgerows, scrub, grassland and small areas of woodland. For a short term, this will conflict with the established land use pattern, and will prove significant in the more exposed elevated landscapes and in close proximity views from visually sensitive locations.

NTS.10.35 Mitigation measures have been incorporated into the Project to:

- Integrate the onshore components into the local landscape pattern;
- Restore disturbed sections of landscape associated with the cable route;
- Compensate for the loss of landscape features through the planting of trees and shrubs, and reseeded grassland areas; and
- Maintain the open aspect and character of the local environment whilst providing a degree of visual containment of the substation.

- NTS.10.36 Landscaping and reinstatement measures associated with the cable route will mature over time, and will render a neutral effect on landscape character and the visual environment after construction. Specific methodologies to be employed in sensitive sections, such as at Tottington Mount, will reduce the initial impact through minimising the cable working width and only excavating topsoil directly above the cables rather than across this entire width, as using temporary access track formed of 'bog matting'.
- NTS.10.37 The effect on the substation will reduce as planting measures develop over time. Once the planting has matured, the substation will have an effect of minor significance on landscape character. Effects of comparable significance are predicted in visual terms from six of the nine assessed viewpoints, with the remaining viewpoints not predicted to experience any perceptible visual change from the operation of the substation.

### ***Noise and Vibration***

- NTS.10.38 A combination of noise monitoring and predictive calculations have been undertaken to establish the existing noise climate and the change in noise levels that will result from construction and operation of the onshore components. Potential changes in noise that may be heard onshore from the construction and operation of the offshore wind turbines was also considered in response to this being a common question from members of the public during the consultation phase.
- NTS.10.39 Daytime and night-time noise monitoring undertaken around the onshore cable corridor and substation site confirmed the area is relatively quiet, with road noise and animal noise audible.
- NTS.10.40 Onshore cable route construction will result in elevated noise levels that may cause some disturbance at locations within 50m of the route. Such effects will be of short duration and of minor significance.
- NTS.10.41 Predictions of daytime construction noise associated with earth moving and general construction activities identified that noise levels at the nearest sensitive location to the onshore substation site will be below a level likely to cause disturbance, and will not be significant.
- NTS.10.42 The potential for vibration to occur from construction of the cable route and substation was considered to be negligible. The assessment identified that piling activities during construction of the offshore wind turbines does not have the potential to cause onshore noise disturbance.
- NTS.10.43 Significant noise impacts were predicted at the nearest residential receptors as a result of the horizontal directional drilling works proposed at the railway, Sompting Bypass, A281 and B2116. Potential was also identified for the operation of the substation to cause disturbance at night to neighbouring properties. Construction mitigation measures were therefore developed to address these specific issues.



- NTS.10.44 Best practice construction methods will be used to minimise noise generated throughout the construction of the cable route and substation. Screening will be provided to block the line of sight between the drilling rig, associated plant and affected residential receptors to reduce noise impacts. Such measures will reduce impact significance to minor.
- NTS.10.45 Operational substation noise impacts were identified as being potentially significant at nearby residential properties. Mitigation will be incorporated into the final substation design to control such impacts, and may take the form of applying mitigation to equipment to reduce noise at source, modifying the site layout, and/or erection of noise barriers. This will reduce impact significance to an order of minor.
- NTS.10.46 Modelling of impacts confirmed that it is unlikely that the noise from the offshore turbines and substations operating would be audible onshore, even at very quiet coastal locations.

### ***Socio-Economics***

- NTS.10.47 The West Sussex region benefits from a variety of tourist attractions and attractive scenery including the South Downs National Park. A review of the onshore study area - comprising Worthing, Adur, Horsham and Mid Sussex local authorities – revealed a varied settlement pattern and a range of community and recreational facilities.
- NTS.10.48 The onshore cable route has been routed away from population centres, houses and recreational interests as far as possible. Notwithstanding this, the assessment has recorded temporary adverse effects of no greater than moderate significance on tourism, community and recreational interests. These specifically relate to marked reductions in amenity associated with temporary closures of facilities and attractions, loss of revenues and general construction disruption during installation of the onshore cable including disruption to affected public rights of way (including the South Downs Way National Trail) and open access areas.
- NTS.10.49 There will be up to 100 personnel working on the onshore cable route at any one time, and up to 250 personnel working on installation of the substation at its peak. Temporary beneficial effects of minor significance have been identified in relation to increased expenditure within the local economy on services, shops and accommodation.
- NTS.10.50 No direct impacts are predicted on the local population structure or character of the region due to construction of the onshore components. Local employers, suppliers and trade bodies are will be kept abreast of the onshore works to encourage participation in contract and supply tenders, in order to enhance local and regional economic benefit from the Project.
- NTS.10.51 A public rights of way (PRoW) communications strategy will be prepared in discussion with local groups and PRoW officers. Advance notice of any

temporary PRow closures or diversions including bridleways, and planned disruption to recreational areas, will be given to user groups to address issues of restricted access and loss of amenity.

NTS.10.52 Minor adverse effects on recreational amenity will remain post construction in relation to a small but permanent footpath diversion that will be required around the substation.

### ***Transport***

NTS.10.53 The effects of the onshore Project components on transportation have been assessed, with consideration given to any increases in traffic during construction. Other related aspects concerning severance, pedestrian and driver delay, amenity, and safety were also considered.

NTS.10.54 Consultation was undertaken with authorities responsible for both the strategic and local road networks in proximity to the cable corridor and substation site, to obtain traffic data and information regarding the suitability of routes to handle construction traffic.

NTS.10.55 The assessment study area focused on routes that are likely to be used by construction traffic; these comprise the A27 and A23 trunk roads, single carriageway roads through urban areas, and single carriageway strategic routes and B classification roads through areas of open countryside. Available data indicates traffic flows vary significantly along these routes.

NTS.10.56 Deliveries will use the local highway network to arrive at site compounds and material storage areas, and may require minor improvements to accommodate larger vehicles and abnormal loads.

NTS.10.57 Approximately 2,100 Heavy Goods Vehicle (HGV) deliveries (excluding abnormal loads) will occur during the construction of the onshore cable route; these will comprise deliveries of cable, ducting and aggregates. Construction of the onshore substation will require approximately 6,400 HGV deliveries. It is predicted that no more than 40 HGVs will enter or leave the site daily; these will be directed to the substation site via the A272.

NTS.10.58 Additional HGV journeys will be made to accommodate abnormal loads, specifically cable drums (360 deliveries) and substation transformers (4 deliveries).

NTS.10.59 Construction staff working along the cable corridor and substation site will make low numbers of vehicle journeys by private vehicle. Following construction, vehicle journeys will be limited to occasional testing, inspection and maintenance visits.

NTS.10.60 A Traffic Management Plan will be developed prior to construction; this could include specific measures to minimise HGV movements during peak hours, ensure temporary accesses can accommodate all vehicle types and manage

traffic flows and deliveries as well as wheel-wash facilities at site entrances to avoid transfer of mud onto local roads. Implementation of these measures will mean the effects of severance, congestion and driver delay, pedestrian delay, and safety are not significant.

## **NTS.11 Other Environmental Effects**

---

- NTS.11.1 The EIA has considered whether the effects summarised above will combine with each other and cause significant effects on environmental sensitivities, and whether activities associated with other developments and projects in the locality will interact with the Project.
- NTS.11.2 Temporary effects will likely occur during construction of the onshore components of the Project for local residents and people engaged in recreational activities in the vicinity of the proposed cable route and substation during construction. Such people are likely to be subject to a combination of a reduction in visual amenity and increased nuisance. The assessment of marine impacts also identified that effects on one environmental receptor could have secondary effects on another (for example, impacts on spawning fish could affect the breeding success of terns and gulls which feed on the fish). Mitigation will be used to limit such effects, where possible.
- NTS.11.3 Other onshore and offshore developments such as regeneration proposals and wind farms may be implemented at the same time as the Project, which can cause what is known as a cumulative effect. The potential for cumulative effects has been considered, with the EIA confirming that any interactions will not result in any significant effects on environmental sensitivities assuming that appropriate mitigation measures are used.

## **NTS.12 Environmental Management**

---

- NTS.12.1 Mitigation measures set out in the Environmental Statement will be secured, implemented and managed using best practice methods and legal obligations.
- NTS.12.2 To ensure environmental protection during construction of the Project, the contractor employed by E.ON will be required to comply with relevant British Standards covering environmental management systems.
- NTS.12.3 Environmental Management Plans will be developed for both the onshore and offshore elements of the Project. These will set out various management, survey and monitoring procedures that will be implemented on site to help prevent local disruption and minimise environmental impacts. They will also set out how and when site inspections, checks and audits will be undertaken
- NTS.12.4 A full-time environmental officer and an emergency response team will be employed during construction to ensure effective environmental management on the Project. All site personnel will be required to have appropriate health, safety and environment training.

**NTS.13 Further Information**

---

NTS.13.1 The application documents, including the Environmental Statement and this NTS are also available to download electronically from the National Infrastructure Planning website at the following address:

**[www.infrastructure.independent.gov.uk](http://www.infrastructure.independent.gov.uk)**

NTS.13.2 The full Environmental Statement, including this NTS, is available by writing to the address below at a cost of £900 (to cover production costs (including a delivery charge, note that this is a very large suite of documents) for a hard copy format or free on DVD.

**Post: FREEPOST RAMPION OFFSHORE WIND**

or

**Email: [rampion@eon.com](mailto:rampion@eon.com)**

NTS.13.3 Further hard copies of this NTS are available free of charge from the same address.