



Humber Gateway Offshore Wind Farm

Non-Technical Summary of the Onshore Substation
and Cable Spur Environmental Statement

October 2009

e-on



Humber Gateway Offshore Wind Farm could generate enough energy to power up to 195,000 homes a year.*

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Who we are

E.ON Climate & Renewables UK Humber Wind Limited, an indirect wholly owned subsidiary of E.ON UK plc, has separately applied for consent to build and operate an offshore wind farm off the Holderness Coast of East Yorkshire. If consented, the wind farm will be known as the Humber Gateway Offshore Wind Farm.

E.ON is one of the UK's leading power and gas companies, generating and distributing electricity, and retailing power and gas. We generate around 10% of the UK's electricity from coal, gas and oil-fired power stations, combined heat and power stations and renewable electricity generating plants.

Our strategy recognises and embraces the importance of renewable energy and we have a growing portfolio of 21 wind farms, covering offshore and onshore. This includes two operational offshore wind farms at Blyth, Northumberland and at Scroby Sands, Norfolk.

We're currently constructing our third offshore wind farm, Robin Rigg in the Solway Firth. We're also jointly developing the London Array which, once built, will be one of the world's largest offshore wind farms.



The Environmental Statement assesses the environmental impacts in relation to the existing biological, physical and human environments.



All about this document

An application for the consents to build a project such as the Humber Gateway Offshore Wind Farm must be accompanied by information on the likely significant effects that the project may have on the environment. In addition, a description of the measures to minimise any negative effects must also be given.

This information is gathered through a process known as Environmental Impact Assessment (EIA), the results of which are written up in an Environmental Statement (ES). This document is the Non-Technical Summary of the ES for a new section of the onshore cable route, together with the onshore substation. It has been prepared by ERM, our environmental consultants.



Three environmental statements

The Humber Gateway project is covered by three separate Environmental Statements:

- Offshore Environmental Statement (submitted in April 2008);
- Onshore Cable Route Environmental Statement (submitted in April 2008); and
- Onshore Substation and Cable Spur Environmental Statement (which is summarised in this Non-Technical Summary).

Each of these three main components of the overall project requires its own consent. Consent for the project is sought through two principal pieces of legislation. These are the Electricity Act 1989 (Section 36) from the Department of Energy and Climate Change for the offshore components and the Town and Country Planning Act 1990 (Section 57) from East Riding of Yorkshire Council (the local planning authority) for the onshore components.

Within this document, you will find information on impacts associated with the new onshore substation and the proposed new spur of the underground cable.

More copies

If you would like to obtain copies of any of the Environmental Statements, please write to the address below or email humberenquiries@eon-uk.com. A full set of paper copies is available at a cost of £250 or £100 for an individual ES to cover production costs. A separate CD-ROM version is available at £5 each.

Please make cheques payable to:

E.ON Climate & Renewables UK Humber Wind Ltd.

Post your cheque with your name and address to:
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Copies of this Non-Technical Summary document are free of charge and can be downloaded from: eon-uk.com/humbergateway



Photomontage – view from Spurn Head Visitor Centre.

Description of the Humber Gateway project

The wind farm

The wind farm site lies north of the mouth of the River Humber and 8km to the east of Spurn Head. This long sand peninsula shelters the entrance to the Humber Estuary. The northernmost point of the site is around 8km from Easington. Its southernmost point is 18km from Grimsby.

The site is around 15km from the nearest point on the Lincolnshire coast, Donna Nook.

The site is located within the Greater Wash Strategic Environmental Assessment area, which was recognised by the UK Government in 2002 as a suitable location for offshore wind farm development.

The proposed Humber Gateway Offshore Wind Farm would consist of between 42 and 83 wind turbines, depending on the capacity of the turbines. The maximum capacity of the wind farm would be 300MW. The wind farm site covers an overall area of 35km² and is located in waters of around 15m in depth.

In addition to the turbines and their foundations, the wind farm will include up to three meteorological masts (to measure wind speeds and weather conditions at the site). There will also be an offshore substation and cables to connect the turbines to the offshore substation. Subsea cables will then bring the electricity ashore at a point near Easington. A specialist technique will be used to drill under the beach and the cliffs. Once the subsea cables come ashore, they will then join an underground cable which will run 30km and connect into the National Grid near Salt End, east of Hull.

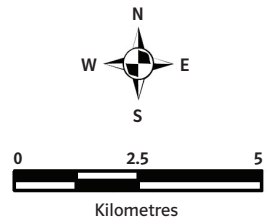
In April 2008, an application with a supporting ES was submitted to the Department for Business, Enterprise and Regulatory Reform (now the Department for Energy and Climate Change), seeking approval for the construction of the offshore elements of the wind farm.



- Substation and cable spur application site boundary
- Substation and cable spur study area
- Existing onshore application site boundary (submitted April 2008)
- Humber Gateway offshore application site boundary (submitted April 2008)
- Indicative offshore cable route options

NB: Only one offshore cable route will be taken forward. Routes shown are indicative.

Location of the Humber Gateway Offshore Wind Farm site. Reproduced from Ordnance Survey digital map data. © Crown copyright. All rights reserved. 2007 license number 0100031673. Projection: British National Grid.





The onshore cable

An underground cable will run under predominantly agricultural land from Easington to Salt End on the east side of Hull (a distance of around 30km). This will enable the electricity to be connected into the National Grid at a new substation to be constructed near Salt End. To facilitate the cable installation, there will be two temporary construction compounds, which will be used for storage of materials and plant.

The underground cables will be laid in two trenches, with the construction works taking place over two years, between the months of April and October.

It's anticipated that cable installation could commence almost a year before the offshore works, so the overall construction programme would be around three years.

In April 2008, a planning application with a supporting ES was submitted to East Riding of Yorkshire Council, seeking approval for the construction of the underground cable.

New onshore substation and cable spur

Since April 2008, it's been necessary to identify an alternative location for the substation and therefore make some minor alterations to the original underground cable route (at the western end, to link into the new substation). This cable spur will therefore replace a small part of the cable route that was included in the Onshore Cable Route ES submitted in April 2008. This Non-Technical Summary relates to the ES that deals with the new onshore substation and cable spur only.

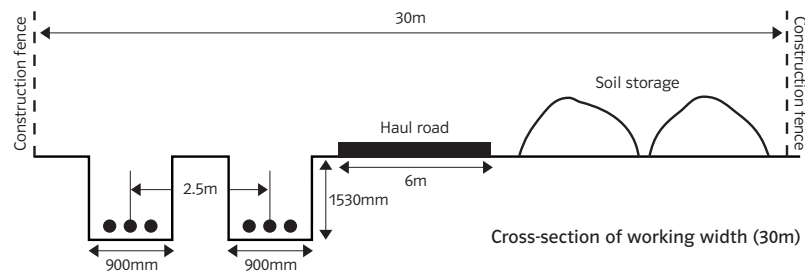
The proposed route of the cable spur will be from the new electricity substation site located at Staithes Road, on the east side of Hull. It will then pass through open land and under Hull Road (A1033), before running across farmland parallel with the A1033, to the west of Hedon.

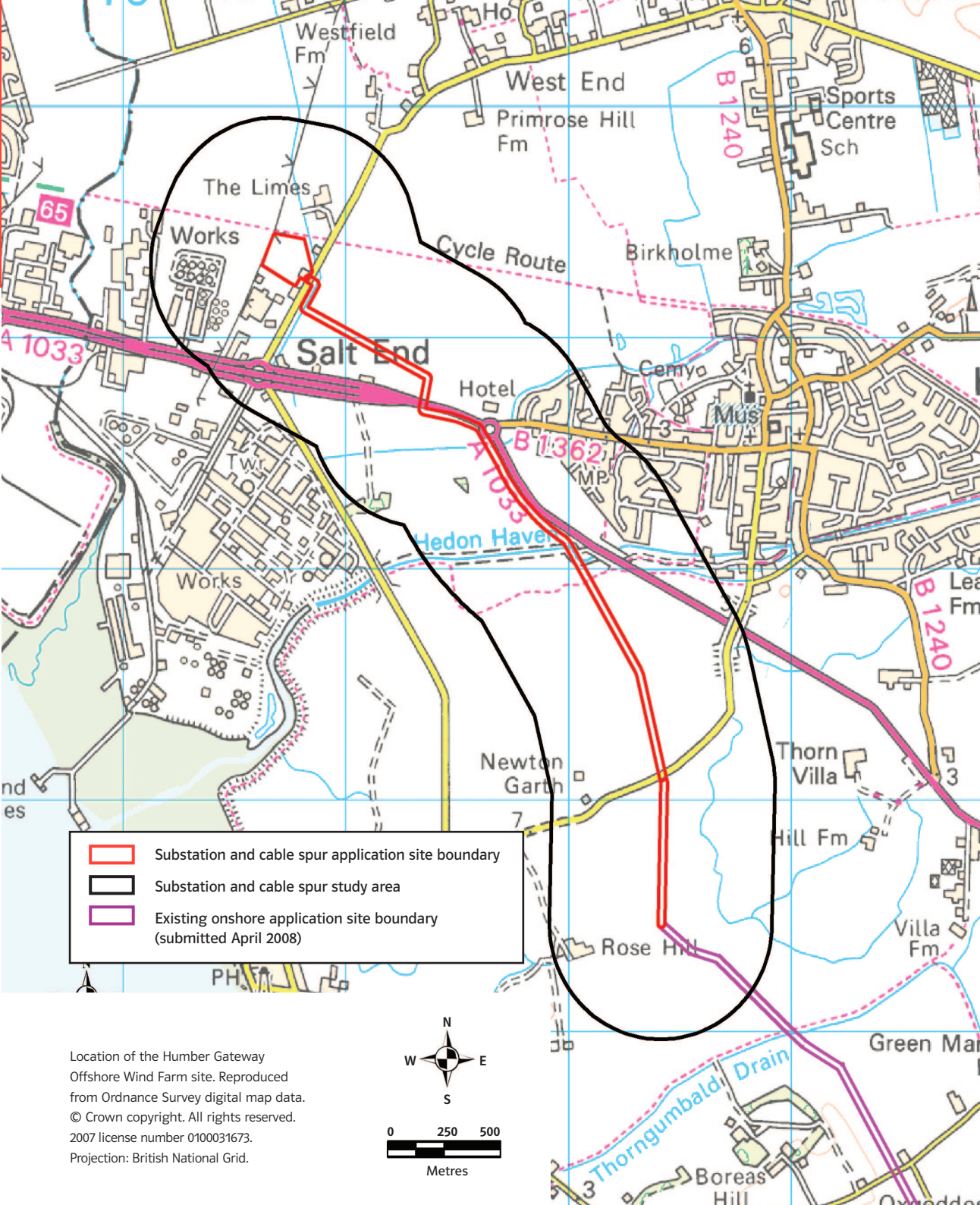
It will then pass under Hedon Haven and then head south to link with the remainder of the cable route near Rosehill Farm.

The length of the cable spur will be approximately 3.6km and will comprise of six underground cables split into two adjacent parallel trenches. All construction activities will take place within an area referred to as the working width, which will generally be 30m wide.

The substation site is located just off Staithes Road on industrial land*, adjacent to existing National Grid electricity transmission lines. Neighbouring land use is predominantly industrial, although there is a commercial unit currently let by a children's nursery, with whom agreement has been reached to relocate should this application be approved.

* Policy Ec4: The Council allocates 45 hectares of land to the west of Staithes Road and north of Hull Road (A1033) between Salt End roundabout and the city boundary for industry, falling within classes B1, B2 and B8 of the Town and Country Planning (Use Classes) (Amendment) Order 1995.





The proposed new substation will consist of two compounds.

- 1) A 275kV substation compound owned and operated by National Grid in the northern part of the site. This will include a gated access road from the existing site access, one 275kV switchgear building (maximum dimensions 45m long x 21m wide x 16.5m high), two connections to the existing tower line, a pair of overhead landing steel lattice support structures, and other equipment.
- 2) A 132kV (indicative rating) substation compound owned and operated by E.ON in the southern part of the site. This will include a gated access road from the existing site access, two main transformer units (maximum dimensions 7m long x 3m wide x 4m high), reactive compensation equipment, control buildings (maximum dimensions 12m long x 7m wide x 5m high) and other equipment.

The proposal does not involve any additional overhead lines, only variations to the existing tower.

Overall programme

Subject to the relevant permissions and consents, the Humber Gateway project is planned to operate for 40 years, which is the term of the lease of the offshore site from the Crown Estate. After 20 to 25 years, re-powering (ie replacing the wind turbines at the end of their economic life with new turbines) may be necessary, but this would be subject to further environmental studies and the need to apply for further consents.

Location of the Humber Gateway Offshore Wind Farm site. Reproduced from Ordnance Survey digital map data. © Crown copyright. All rights reserved. 2007 license number 0100031673. Projection: British National Grid.

Humber Gateway Offshore Wind Farm could save up to 395,000 tonnes of carbon emissions every year.*



The need for the project

In recent years, there has been growing awareness of the need to reduce carbon emissions to slow down the pace of climate change resulting from human activity. The electricity generating industry is one of the sources of carbon emissions, as traditionally fossil fuels have been burned to generate electricity.

The contribution of renewable energy is critical to progressing towards lower carbon emissions. E.ON believes that the Humber Gateway project will provide a clean and efficient means of energy generation. The scheme will also help to tackle climate change and make a significant contribution to the UK's renewable generation targets.

The substation and cable spur described in this Non-Technical Summary are essential components of this project and are required to feed the electricity generated by the wind farm into the National Grid.

* The carbon dioxide savings are current estimates of likely emissions savings, since the yield of the wind farm will not be accurately known until it's built. The estimate is based on the following generally accepted calculation methodology: energy yield in Giga Watt hours (GWh) x 430gCO₂ per kilo Watt hour (kWh), where energy yield equals 921,375,000kWh.

Obtaining planning approval

Planning permission for the substation and cable spur is being sought from East Riding of Yorkshire Council (the local planning authority) through Section 57 of the Town and Country Planning Act 1990.

There are a number of other approvals that will be required under other regulations, including:

- Land Drainage Act 1991; and
- Habitats Directive.

Consents for the offshore components of the project are being sought through different legislation.

The Environmental Impact Assessment (EIA) process

EIA is a systematic process, whereby the significant impacts that the project is likely to have on the environment, both positive and negative, are identified and assessed. An early stage of the process, referred to as scoping, is carried out to identify the topics that need to be included in the EIA process. This involves consultation with a wide range of organisations to gather information and views on potential impacts that the project may have. These topics are then assessed in detail.

If any significant impacts are identified, consideration is given to measures that could be put into place to minimise them - these are known as mitigation measures. Any significant residual impacts that will remain, even after the adoption of mitigation measures, are then described.



Scoping and consultation

As part of the previous Onshore Cable Route EIA, a scoping exercise was carried out to identify the main environmental issues that needed to be considered. This included the distribution of a scoping report and consultation with around 40 statutory and non-statutory bodies representing key interest and user groups in the area of the Humber Gateway onshore site.

The scoping report included information on:

- details of the development (including its construction, operation and decommissioning)
- the key potential impacts of the development
- the key issues to be considered in the EIA.

Given the relative geographic proximity of the new infrastructure locations to those of the original scheme and similar industrial land use type, it was considered that the scope of the EIA for the substation and the cable spur was unlikely to change from that previously identified. Furthermore, following the submission of the Onshore Cable Route ES, further consultation has been carried out, particularly with the Environment Agency, Humber Archaeology Partnership and Natural England.

During the preparation of this ES, there has been dialogue with neighbours who may potentially be affected by the proposals. Information about the project has also been provided to the Highways Agency, Environment Agency, relevant Parish Councils and East Riding of Yorkshire Council regarding the issues relevant to their jurisdiction.





Impacts of the onshore substation and cable spur

The following sections summarise the likely environmental impacts associated with the construction and operation of the onshore substation and underground cable spur that will connect the Humber Gateway Offshore Wind Farm into the National Grid.

The following environmental topics were assessed:

- soils, agriculture and land contamination
- air quality and dust
- archaeology and cultural heritage
- landscape and visual impact
- noise and vibration
- other social and economic issues
- traffic and transport
- ecology and nature conservation and
- water resources and flood risk.

Cumulative impacts from other existing or planned projects or activities in the area have also been addressed. Consideration has also been given to any aggregate effects resulting from this substation and cable spur application, in combination with the existing cable route as described in the April 2008 Humber Gateway Onshore Cable Route ES.

Soils, agriculture and land contamination

The potential impacts with respect to soil, agriculture and land contamination are related to potential contamination sources from substation construction and operation, and potential impacts to soil and agriculture from cable spur construction.

There are **no significant impacts** anticipated from substation construction, operation and decommissioning to soil and agriculture as the site comprises made ground.

Given the history of the substation site, it's unlikely that contamination will be encountered in any more than localised hotspots. However, ground contamination during construction and operation could occur.

The main potential sources of contamination at the substation site are transformers which will be oil filled. In order to prevent spills or leaks from entering the ground each will be located within an oil tight bund. The bunds will be connected to an underground sump which will be kept clear of rainwater through the use of a 'bund water control unit' which will be designed to pump water only and shut off if oil is detected. Routine inspection of plant and equipment will be carried out to ensure that there are no minor oil or fuel leaks.

In addition, good working practices during construction, operation and decommissioning will ensure potential impacts associated with soil contamination are minimised. Therefore **no significant impacts** in respect of land contamination are anticipated during the construction, operation or decommissioning of the substation.

To install the underground cable spur, a trench of up to 1.5m in depth will be dug and the soil temporarily stored alongside the trench prior to backfilling.



View from Hedon towards proposed substation and cable spur site.

To avoid damage to the structure of the soil, construction works will only be carried out during the drier months of April to October. Topsoil will be stripped on a field by field basis and stored in a mound running along one side of the trench (soil from different fields and hedgerow areas will be separated). Subsoil will be excavated from the trench line and stored separately. Soil will be stored for a maximum of 20 days so no significant deterioration in soil fertility due to anaerobic conditions is anticipated. Stockpiles will be a maximum of 2m in height to avoid compaction from the weight of the overlying soil. As a result of this mitigation, **no significant impacts** are anticipated in relation to soils from the cable spur.

It's possible that pollutants that may be present in the soil from current or historical sources, such as the Hedon Landfill at Hedon Haven, may be encountered and disturbed during excavation of the cable trench. However, given the inert nature of the landfilled material, the working practices planned for cable installation and the predominance of agricultural land in the area, no significant contamination is likely. **No significant impacts** are therefore anticipated in relation to land contamination from the cable spur.

Approximately 9 hectares of agricultural land will be temporarily required during construction of the cable spur, most of which is considered to be of good quality. The construction works could affect agriculture as a result of the temporary loss of productive land, reduced bank stability and restricted flow of field drains, fracturing of field drains, removal of field boundaries to allow continual construction, the temporary restriction of access and the severance of fields. To address this, a condition survey will be carried out prior to construction to confirm the condition of fences, field drains and hedgerows along the cable route. This will enable an evaluation to be made of any damage during construction and will allow for reinstatement.

Following construction, the area will be reinstated according to a specification to be agreed with the landowners. Any replacement planting that is required will be carried out during the first appropriate season following reinstatement. Any drainage works will be agreed with the relevant Internal Drainage Board, the Environment Agency and the landowner.

As a result of this mitigation, there will be **no significant impacts** during the construction phase or in the long term to agriculture from the cable spur.

Following mitigation measures there will be **no significant impacts** during construction, operation or decommissioning of the substation or cable spur on soils, agriculture or from land contamination.



Air quality and dust

The potential impacts on air quality that may arise are related to emissions from construction vehicles (nitrogen dioxide and particulate matter) and from dust production during construction activities.

Hull Road (A1033) and Staithes Road will be affected by increases in traffic flows. However, the incremental increases from construction traffic on these roads are predicted to be well within the assessment criteria. Levels of traffic pollutants in the vicinity of the A1033 and Staithes Road are currently acceptable, and the air quality standards are unlikely to be exceeded in the future. **No significant impacts** on air quality are therefore anticipated from traffic associated with construction, operation or decommissioning of the substation or cable spur.

There are a number of properties located within 150m of the substation and cable spur route, and mitigation measures will therefore be required during construction activities to minimise the potential for dust nuisance to occur. Construction will be undertaken in accordance with best practice, including measures to minimise dust impacts from construction activities. For example, vehicles will be washed to remove dust from the wheels before leaving the construction site. These mitigation measures will be incorporated into the site Construction Management Plan and will ensure **no significant impacts** will occur from dust emissions during construction, operation or decommissioning of the substation and cable spur.





Photomontage – viewpoint from Westfield Farm looking south towards the proposed substation (infrastructure between two cooling towers).

Archaeology and cultural heritage

It's possible that archaeological remains within the footprint of the works might be disturbed or damaged by excavation of foundations, topsoil stripping and other activities at the substation site and in digging the cable trench during construction and decommissioning.

However, the siting of the substation to avoid archaeological deposits means that direct impacts on known sites will be avoided and it's unlikely that unknown archaeological remains will be encountered during construction.

To avoid any impacts on unknown archaeological remains and the known sites in the cable spur working width, a range of mitigation measures will be implemented through a Written Scheme of Investigation which includes the use of an 'archaeological watching brief'. This will ensure that where possible, all discoveries will be preserved where they are found, and that any discoveries are fully recorded.

There will therefore be **no significant impacts** during the construction, operation or decommissioning of the substation and cable spur.

Landscape and visual impact

There are potential temporary and permanent visual impacts associated with the construction and operation of the substation from the introduction of new buildings and infrastructure and the potential loss of vegetation. Some change to existing views will arise as a result of the introduction of built elements associated with the substation and the relocation of the modified pylon. It's therefore predicted that there will be a **minor significant impact** to the visual environment from the construction, operation and decommissioning of the substation. However, due to the low sensitivity of the landscape and the industrial nature of some neighbouring areas, there will be **no significant impacts** on the landscape arising from the construction, operation or decommissioning of the substation.

At an early stage, a decision was made to bury the cable underground, even though this is considerably more expensive than an overhead cable supported by pylons. This decision ensures that major impacts on the landscape and on the visual environment have been avoided. Despite this, temporary impacts could result

from the construction works, and could continue until any vegetation that has been removed can re-establish itself. These impacts could result from activities such as stripping of vegetation, removal of walls and fences, stripping of topsoil and the presence of construction plant and storage compounds. It's therefore predicted that there will be a **minor significant impact** to landscape features and to the visual environment during the construction of the cable spur. **No significant impacts** to the landscape and visual environment are anticipated from the operation or decommissioning of the cable spur.

There will be **no significant impacts** on the setting of conservation areas and listed buildings from construction, operation or decommissioning of the substation and cable spur.



Noise and vibration

Although construction and decommissioning noise may be audible at the substation site, there will be **no significant impacts** at noise sensitive receptors as there are no residential properties or other sensitive receptors within 100m. Operational noise associated with the substation will also result in **no significant impacts** as noise from this source will be controlled by selecting and installing equipment that is specified to ensure appropriate off-site noise limits are met.

Noise impacts from the construction and decommissioning works associated with backfilling the cable trench could occur at nearby properties. Good site practices and a noise barrier will however be sufficient to mitigate the potential impact, and therefore no significant impacts are likely. **No significant impacts** from noise are anticipated from the cable spur operation.

No significant impacts are anticipated from vibration generating plant or activities as no such activities are proposed within 100m of the nearest sensitive receptors from the substation or cable spur. Additionally, experience gained from similar projects indicates that vibration from general site activities will not be significant at these distances.

Socio-economics

The socio-economic impacts that are likely to arise as a result of the construction, operation and decommissioning of the cable spur will not occur in isolation of the remainder of the cable route to the landfall at Easington. This is because the cable spur and the rest of the cable will be constructed and operated as one single project. The socio-economic benefits therefore arise from the project as a whole.

The construction phase of the project will potentially give rise to positive benefits to the local economy over the two year construction period, primarily as a result of additional employment but also the use of other local services.

In total, around 37 personnel will be required for construction of the cable spur and between 70 and 95 for the construction of the substation and associated infrastructure. The workforce will be sourced from within both the local and wider economy and from both existing contracted or employed personnel and new employees. This will benefit the local economy to some degree and is considered to be a **minor temporary positive significant impact**.

No significant impacts are anticipated to local communities or landowners during the construction, operation and decommissioning of the substation and cable spur.





Traffic and transport

Construction and decommissioning of the substation and cable spur will generate additional traffic that could potentially have an impact on the surrounding road network. There will be very little additional traffic during operation, as the site will be unmanned.

The substation will be accessed directly off Staithes Road which is north of the Hull Road (A1033) junction. During construction of the substation, heavy goods vehicle movements are expected to be generally consistent on an hour by hour basis throughout the day. However, at the start and end of each working day there will be additional traffic comprising staff vehicles accessing and leaving the site, but outside of the peak period for the road network. Increases in traffic associated with the construction of the substation are well within the assessment criteria and therefore **no significant impacts** are predicted.

Construction of the underground cable spur could result in impacts from additional construction traffic. These traffic movements will be generated by the workforce travelling to and from the site, in addition to some heavy goods vehicles when workers leave the site in the evening. However, the nature of the area and the surrounding road network means that the maximum percentage increase in traffic



movement over the baseline traffic is well within the assessment criteria and outside of the peak period for the road network. **No significant impacts** are therefore predicted. A haul road will be constructed along the cable spur, which will provide access for vehicles up and down the working width.

Other potential impacts associated with traffic were examined, including disruption resulting from temporary road closures, closures of other public rights of way, increases in road traffic accidents and traffic impacts during operation. There will therefore be **no significant impacts** associated with these issues. A number of good practice mitigation measures will be implemented including the use of a Construction Traffic Management Plan, close liaison with East Riding of Yorkshire Council and notification to residents.

The traffic movements during operation of the substation and cable spur will be limited to annual routine operations and maintenance activities. This small and intermittent increase in traffic during operation will result in **no significant impacts**.

Ecology and nature conservation

The project could potentially result in a range of impacts on ecology and nature conservation. These may include potential impacts on habitats, birds and protected species. The selection of the substation site and the cable spur route has taken into account ecological sensitivities identified during the field surveys to minimise impacts to these sensitive habitats or species along the route.

No European, national or locally designated sites will be directly affected by the construction work. However, the Humber Estuary SPA and Ramsar site, and the Humber Estuary SSSI are located approximately 1.2km from the substation and cable spur site and are known for their bird populations. Some localised and temporary disturbance may occur to birds which breed, forage or roost in the survey area, due to construction works along the working width, although this is not predicted to be significant. Any disturbance will be minimised by means of the mitigation measures contained in the Environmental Management Plan.

No significant impacts to these European sites or the locally designated sites identified within 500m of the substation and cable spur sites (Withernsea – Marfleet (disused railway line) SINC and Meadow Area 4 SINC) will occur during construction, operation or decommissioning of the substation or cable spur.

No significant impacts are anticipated to habitats by the construction, operation and decommissioning of the substation and cable spur.

It's likely that some disturbance to bird species will occur whilst construction is ongoing. However, the mitigation measures designed to avoid impacts to nesting birds will ensure that this will be temporary and short-term, and there will be **no significant impact**. The removal of habitat will result in some limited temporary loss of small areas of foraging and roosting habitat for some breeding, resident and wintering species. However, given the small areas of habitat affected and the extensive areas of similar habitat in the surrounding areas, there will be **no significant impacts** to breeding or wintering birds from construction, operation or decommissioning of the substation and cable spur.

No significant impacts are predicted on protected species namely bats, otters, water vole, Great Crested Newt or badgers from the construction, operation and decommissioning of the substation. Any identified foraging routes for bats, otters or badgers across the cable spur working width (including across any open trenches) will be maintained and additional mitigation measures for Great Crested Newts will ensure that there will be **no significant impacts** on protected species from the construction, operation and decommissioning of the cable spur.

Water resources and flood risk

There are several aspects of the works that could result in impacts to surface water and groundwater quality and physical characteristics, water resource availability and users, flooding and flood storage capacity. These impacts are construction of the infrastructure, dewatering activities, management of stockpiles of excavated material and backfilling, directional drilling, watercourse crossings, operation and any associated maintenance and decommissioning.

Potential impacts on watercourses arising from crossing them in the construction of the cable spur will be minimised by using trenchless methods of installation at particularly sensitive crossings and therefore **no significant impacts** will occur. Where open cut methods are required, crossing points will be selected to avoid the most sensitive areas and, where possible, crossings will be carried out at times of low flow. Despite this, some **minor temporary significant impacts** may occur during the construction of the cable spur.

Additional sediment generated during excavation at the substation and cable spur could impact water quality. This will be minimised by limiting the excavation area that is open at any one time,

together with the application of standard mitigation measures. Consequently, **no significant impacts** are predicted. In addition, this could be exacerbated in the event of serious flooding and the existing contamination in this mobilised sediment could result in **temporary minor significant impacts**. These impacts will be minimised by the application of the mitigation measures detailed in the Environmental Management Plan.

There is potential for impacts to surface and groundwater quality from contamination from construction of the substation and cable spur. However, embedded mitigation measures and the fact that the groundwater is protected along the majority of the substation and cable spur by a substantial layer of impermeable deposits will result in **no significant impacts**.

Dewatering required during excavation at the substation and cable spur could result in drawdown of groundwater levels. However, this is localised and will normalise rapidly on cessation of pumping and therefore **no significant impacts** to drainage or groundwater flow are predicted.

Potential disturbance to other water users, such as utility supplies and connections, has been minimised through consideration of these during substation and cable spur siting and provision to undertake a specialist utility survey prior to construction. Therefore **no significant impact** is anticipated to water resource availability and users with the exception of local water use for agricultural purposes on the cable spur, where **minor temporary significant impacts** are predicted. Impacts to land drainage arising from the construction and operation of the substation and cable spur will be minimised through pre-works condition surveys and agreements to restore drainage systems to their current existing status. However, despite these measures, **temporary minor significant impacts** are anticipated during construction of the cable spur. **No significant impacts** are anticipated during either the operation or decommissioning of the substation and cable spur.



Comprehensive Flood Risk Assessments (FRAs) have been carried out for the substation and cable spur. The FRAs show that these sites are both located entirely in Flood Zone 3 and are therefore considered to be at high risk of flooding. The FRAs have demonstrated that the substation site and cable spur route pass both the Sequential Test and the Exception Test as required by Planning Policy Statement 25: Development and Flood Risk (PPS25). The flood risks at the substation site will be fully mitigated by ensuring that the substation is constructed at least 1.1m above existing ground level. No mitigation measures are required for the cable spur as it will be constructed underground. As a result of these mitigation measures, **no significant impacts** to flooding and flood risk are anticipated from the substation or cable spur during construction, operation or decommissioning.

Mitigation measures undertaken during construction, such as containment provisions for the transformers at the substation, and good site practices and maintenance during operation, will ensure **no significant impact** from operation of the substation or cable spur on water resources and flood risk.



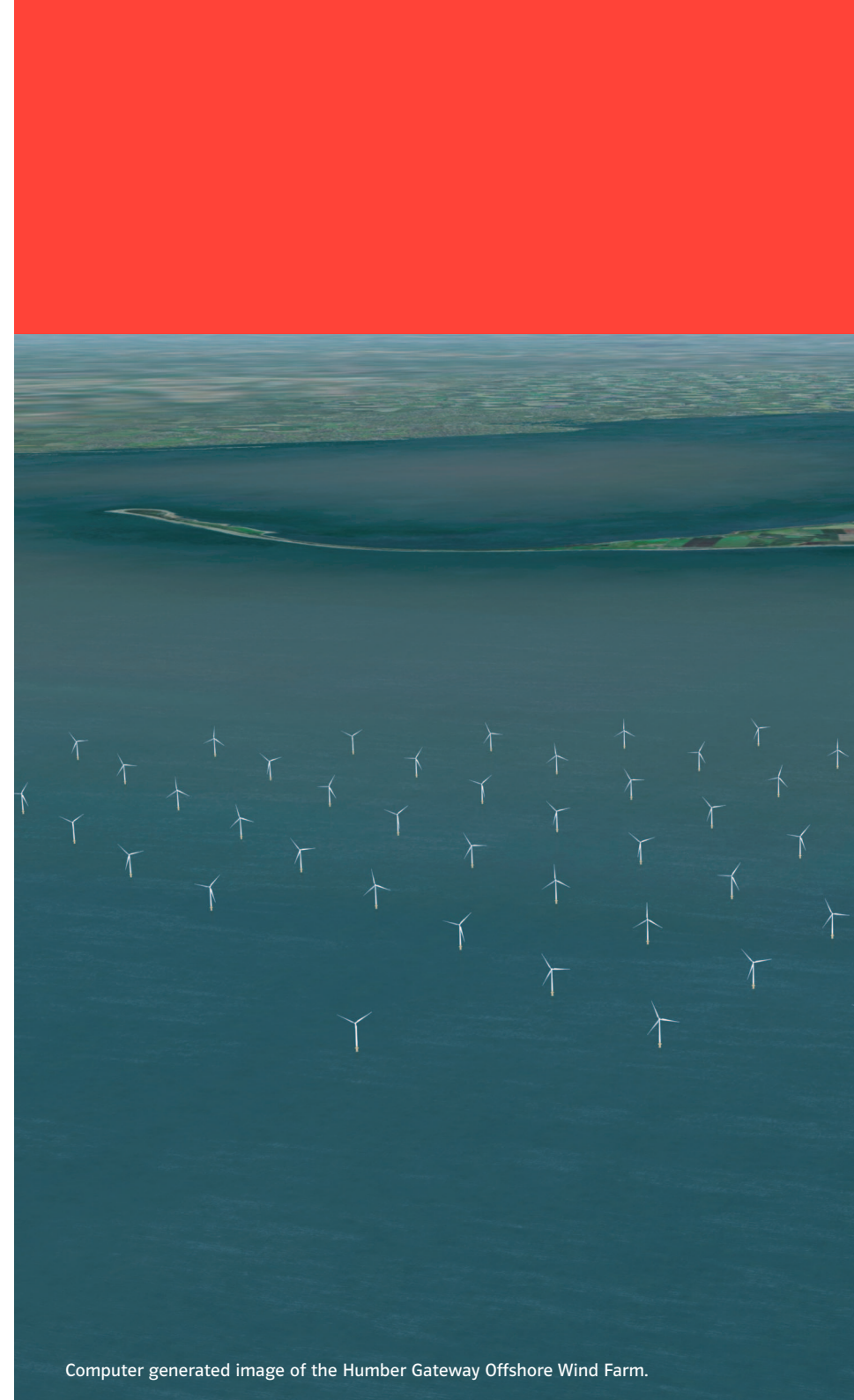
Cumulative and aggregate impacts

A number of other projects are planned in the area of the underground cable route. However, none of these are likely to be built at the same time as the onshore substation and cable spur and there will therefore be **no significant cumulative impacts**.

The substation and cable spur will be constructed at the same time as the majority of the onshore cable route that was included in the April 2008 planning application. It's possible that some of the impacts described in this ES may have an enhanced magnitude due to their interaction with similar aspects resulting from the remainder of the overall onshore cable route. These are referred to as aggregate impacts. However, due to the phasing of the works and the fact that any impacts identified are localised, **no significant aggregate impacts** are anticipated.

In addition, this ES has also identified those effects described in the April 2008 Humber Gateway Onshore Cable Route ES that will no longer occur as a result of implementing the cable spur instead of the equivalent section of cable route. Therefore the following resources will not be affected.

- An area of meadow, located at Salt End, which is a site designated for its local nature conservation importance.
- The Jubilee Copse Site of Importance for Nature Conservation.
- A small area of semi-natural broadleaved woodland east of Paul Road at the western end of the route identified as having potential to support roosting bats.
- A number of watercourses, including the Hedon Haven watercourse, near Salt End, which could potentially support water voles, otters and red list bird species.
- Badgers, which have been observed within 20m of the route to the east of the Salt End works.



Computer generated image of the Humber Gateway Offshore Wind Farm.

Summary

A comprehensive EIA has been carried out, assessing the impacts on the physical, biological and human environment. Where significant adverse impacts are predicted, mitigation measures have been identified wherever possible to reduce these impacts.

Following mitigation, significant impacts are predicted in the following areas:

- The construction, operation and decommissioning of the substation will result in **minor significant impacts** on the visual environment.
- Construction works for the cable route will result in **minor significant impacts** on landscape and the visual environment which could continue until any vegetation that has been removed can re-establish itself.
- The construction phase of the substation and cable spur will potentially give rise to positive benefits to the local economy over the two year construction period, primarily as a result of additional employment. This will benefit the local economy to some degree and is considered to be a **minor temporary positive significant impact**.
- Minor, temporary impacts to water quality and secondary impacts to associated habitats, flora, fauna and other users from sediment or contaminants in watercourses could occur during the crossings of smaller watercourses using open cut methods. Where this is required, crossings points for the cable route will be selected to avoid the most sensitive areas and will be timed, where possible, to coincide with periods of low flow, but despite this a **temporary minor significant impact** is predicted for construction of the cable spur.
- Impacts to land drainage and the availability of local water for agricultural purposes will be minimised through pre-works condition surveys and agreements to restore drainage systems to their current existing status. However, **temporary minor significant impacts** are anticipated for construction of the cable spur.
- Impacts to surface water and groundwater quality are possible in the event of serious flooding in the area during the construction of the substation and cable spur. This could result in a substantial amount of soil being washed from the stockpiles into surface watercourses. However, although this could result in **temporary minor significant impacts**, the magnitude of such impacts is difficult to predict.



Mixed Sources

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