



**SCOTTISHPOWER  
RENEWABLES**

# **East Anglia ONE North Offshore Windfarm**

## **Appendix 29.2** LVIA Methodology

### **Environmental Statement Volume 3**

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## Glossary of Acronyms

AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
EIA	Environmental Impact Assessment
ETG	Expert Topic Group
ES	Environmental Statement
LVIA	Landscape and Visual Impact Assessment
NSIP	Nationally Significant Infrastructure Projects
OS	Ordnance Survey
SLVIA	Seascape, Landscape and Visual Impact Assessment
SNH	Scottish Natural Heritage
SPR	Scottish Power Renewable
ZTV	Zone of Theoretical Visibility

## Glossary of Terminology

Applicant	East Anglia ONE North Limited.
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to the EIA and the information required to support HRA.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.

Mitigation areas	Areas captured within the onshore Development Area specifically for mitigating expected or anticipated impacts.
National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia ONE North project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia ONE North project from landfall to the connection to the national electricity grid.

Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre-planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia ONE North project.
SuDS – Sustainable Drainage System	Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) biodiversity (wildlife and plants) and amenity
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.



## 29.2 LVIA Methodology

### 29.1 Introduction

1. This methodology describes the scope and methodology taken to the assessment of the landscape and visual effects arising from the onshore infrastructure of the proposed East Anglia ONE North project. The Landscape and Visual Impact Assessment (LVIA) predicts, describes and assesses the likely significant effects that the onshore infrastructure will have on the landscape and visual resource, covering effects on landscape elements, landscape character, visual effects and cumulative effects. It builds upon the information provided within the East Anglia ONE North Scoping Report (SPR, 2017) and discussion at consultation meetings with the LVIA Expert Topic Group (ETG) (comprising representatives from Suffolk County Council, East Suffolk Council<sup>1</sup>, Norfolk County Council, Great Yarmouth Borough Council, the Broads National Park, Suffolk Coast and Heaths AONB unit, Natural England and Historic England).
2. A preliminary assessment and detailed technical assessment of the landscape and visual effects of the proposed East Anglia ONE North project is set out in technical appendices, as follows:
  - **Appendix 29.3 Landscape Assessment;**
  - **Appendix 29.4 Visual Assessment;** and
  - **Appendix 29.5 Cumulative Assessment.**
3. These appendices assess, in full technical detail, the likely significant effects of the proposed East Anglia ONE North project onshore infrastructure on those landscape and visual receptors with potential to undergo significant effects or significant cumulative effects. **Chapter 29 Landscape and Visual Impact Assessment** provides a summary of the significant effects identified in the technical assessments.
4. This LVIA Methodology appendix is structured as follows:
  - Introduction;
  - Types of effects;
  - Overview of approach to LVIA;
  - Defining Impact Significance – Landscape;
  - Defining Impact Significance – Visual Effects;

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<sup>1</sup> East Suffolk Council was formed in April 2019 from the merger of Suffolk Coastal District Council and Waveney District Council. These councils were represented during ETG meetings prior to April 2019

- Defining Impact Significance – Cumulative Effects;
- Nature of Effects;
- Potential Effects;
- Visual Representations; and .
- References.

### 29.1.1 Matters scoped out of the EIA

5. The Planning Inspectorate has provided comments in their Scoping Opinion (Planning Inspectorate, 2017) on matters that can be scoped out of the Environmental Impact Assessment (EIA) and has agreed that the following landscape and visual matters can be scoped out of the assessment:
  - Landscape and visual effects of the landfall during operation; and
  - Landscape and visual effect of the onshore cable route during operation (with the exception of the removal of woodland at the Aldeburgh Road crossing (woodland north of Fitches Lane) which is assessed as an operational effect).
6. In both cases, following remediation works, the underground infrastructure at the landfall and within the onshore cable route is unlikely to result in significant effects and these matters can be scoped out of the assessment, as agreed with the Planning Inspectorate. These matters are not assessed any further in the technical assessments in **Appendix 29.3 – 29.5** or in **Chapter 29 Landscape and Visual Impact Assessment**.
7. Transboundary effects have been scoped out of the LVIA since there is no potential for transboundary landscape and visual effects to arise as a result of the proposed East Anglia ONE North project onshore infrastructure.
8. The LVIA includes a ‘Preliminary Assessment’ which identifies through an initial assessment, those aspects of the landscape and visual resource that do not have potential to experience a significant effect as a result of the proposed East Anglia ONE North project. These aspects of the landscape and visual resource are then scoped out of further detailed technical assessment.

### 29.1.2 Impact Assessment Scenarios

9. The LVIA provides a project alone assessment of the landscape and visual impact of the proposed East Anglia ONE North project onshore infrastructure i.e. the impact of the onshore substation, National Grid infrastructure and onshore cable route. The landscape and visual effects of the onshore substation and National Grid substation are assessed together in the LVIA and are referred to as the onshore substation location.

10. Cumulative impact assessment scenarios of the proposed East Anglia ONE North project and proposed East Anglia TWO project are assessed separately in **Appendix 29.5** in two scenarios:
  - Scenario 1 – East Anglia ONE North and TWO projects are constructed at the same time i.e. the impact of the East Anglia ONE North and TWO onshore substations together, the National Grid Substation and onshore cable route/ducts for both projects.
  - Scenario 2 – East Anglia ONE North project is built entirely and land is reinstated, then East Anglia TWO project is constructed.
11. The operational phase cumulative landscape and visual impact will be the same irrespective of the construction scenario and assesses the impact of the operation of the proposed East Anglia ONE North substation, proposed East Anglia TWO substation and National Grid substation.
12. A further cumulative assessment scenario is also assessed – the effects of the proposed East Anglia ONE North project and proposed East Anglia TWO project with Sizewell C New Nuclear Power Station, EDF Energy's proposals for a new nuclear power station.

### 29.1.3 Whole Project Effects

13. ES **Chapter 28 Seascape, Landscape and Visual Impact Assessment** and **Chapter 29 Landscape and Visual Impact Assessment** provide a whole project assessment of the seascape, landscape and visual effects of the proposed East Anglia ONE North project i.e. of both the construction and operation of the offshore infrastructure (including windfarm site, offshore platforms, offshore export cable corridor) and the onshore infrastructure (i.e. onshore substation, onshore cable route, landfall and National Grid infrastructure).
14. The effect of the construction and operation of the offshore infrastructure on specific offshore receptors (coastal viewpoints, seascape character areas etc) is assessed in **Chapter 28 Seascape, Landscape and Visual Impact Assessment**. The effect of the onshore infrastructure on specific onshore receptors (inland viewpoints, landscape character types etc) is assessed in **Chapter 29 Landscape and Visual Impact Assessment** and **Appendices 29.2 – 29.4**. **Chapter 28 Seascape, Landscape and Visual Impact Assessment** refers primarily to effects of the offshore infrastructure, while **Chapter 29 Landscape and Visual Impact Assessment** refers primarily to effects of the onshore infrastructure and should be read together as the de-facto whole project assessment of the proposed East Anglia ONE North project. A further

assessment of inter-related effects in **section 28.10** of **Chapter 28 Seascape, Landscape and Visual Impact Assessment** assesses any areas where the offshore infrastructure and onshore infrastructure combine, or inter-relate, to have an effect e.g. on views from the coastal area near the landfall (between Sizewell and Thorpeness) and the combined effects of the offshore development area and onshore infrastructure on the character of the Suffolk Coast and Heaths AONB.

#### 29.1.4 Overall Approach

15. The objective of the assessment is to predict the likely significant effects on landscape character and visual amenity resulting from the onshore infrastructure associated with the proposed East Anglia ONE North project and cumulatively with the proposed East Anglia TWO project, as well as other relevant cumulative developments.
16. The significance of effects is assessed through a combination of two considerations, the sensitivity of the landscape or visual receptor and the magnitude of change that would result from onshore infrastructure of the proposed East Anglia ONE North project. In accordance with the Landscape Institute's 'Guidelines for Landscape and Visual Impact Assessment Third Edition' (GLVIA 3), the LVIA methodology requires the application of professional judgement, but generally, the higher the sensitivity and the higher the magnitude of change the more likely it will be for a significant effect to arise.
17. The LVIA determines whether the nature of the effects is beneficial, neutral or adverse in accordance with defined criteria.
18. The effects of the onshore infrastructure of the proposed East Anglia ONE North project will be of variable duration, and would be assessed as short-term or long-term, permanent or temporary, and reversible or irreversible.

#### 29.1.5 Guidance

19. This methodology has been specifically devised by OPEN and accords with GLVIA3. The following publications have been used for guidance and reference in preparation of the LVIA:
  - The Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope;
  - Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3);
  - Landscape Institute (2017) Visual Representation of Development Proposals;
  - Landscape Institute Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment (LI, 2001);

- Landscape Institute (March 2017). LI Technical Guidance Note 02/17, Visual Representation of Development Proposals;
  - Natural England (2014) An Approach to Landscape Character Assessment; and
  - Scottish Natural heritage (SNH) (2017) Visual Representation of Wind Farms, Guidance (Version 2.2) (herein referred to as 'SNH Visual Representation').
20. Whilst some of these guidance documents have been prepared by SNH for projects in Scotland, in the absence of alternative guidelines they have become best practice across the UK. The preparation of visual representations that accord with SNH guidance has been agreed with stakeholders as part of the SLVIA ETG consultations.
21. OPEN's LVIA methodology generally accords with the guidance set out in the GLVIA3. Where it diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows. These are not new divergences and follow practice established on other Nationally Significant Infrastructure Projects (NSIP) such as:
- East Anglia THREE;  
(<https://infrastructure.planninginspectorate.gov.uk/projects/eastern/east-anglia-three-offshore-wind-farm/>);
  - Norfolk Vanguard;  
(<https://infrastructure.planninginspectorate.gov.uk/projects/eastern/norfolk-vanguard/>); and
  - Thanet Extension;  
<https://infrastructure.planninginspectorate.gov.uk/projects/south-east/thanet-extension-offshore-wind-farm/>.
22. GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. OPEN considers that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of development. For example, a high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a potentially significant effect would be overlooked if effects are diluted down due to their limited geographical extents and / or duration or reversibility.

23. OPEN has chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and not significant effects occur, and then describing the geographical extent of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.
24. OPEN's assessment methodology utilises six scales of magnitude of change – high, medium-high, medium, medium-low, low and negligible, which are preferred to the 'maximum of five categories' suggested in GLVIA3 (3.27), as a means of clearly defining and summarising magnitude of change judgements.

## 29.2 Types of Effects

25. The LVIA predicts, describes and assesses the likely significant effects of the onshore infrastructure associated with the proposed East Anglia ONE North project on the landscape and visual resource, and covers the following types of effect:
  - **Effects on landscape character** – arising from the introduction of new elements that either physically effect landscape elements or alter the existing pattern of elements that define character. Visibility of the proposed East Anglia ONE North project may affect the way in which the pattern of elements is perceived. Landscape effects of the proposed East Anglia ONE North project are assessed on physical landscape features, LCTs and landscape designations.
  - **Visual effects** - assessment of how the introduction of the proposed East Anglia ONE North project will affect the views available to people and their visual amenity. Visual effects of the proposed East Anglia ONE North project are assessed on principal visual receptors (i.e. groups of people, such as within settlements, using transport routes or recreational trails) and representative viewpoints in the study area.
  - **Cumulative effects** - arise where the study areas for two or more projects overlap so that all are experienced at a proximity where they may have a greater incremental effect, or where projects may combine to have a sequential effect. In accordance with guidance (SNH 2012), the LVIA assesses the overall effect arising from the combination of projects, in this case, the proposed East Anglia ONE North and TWO projects.

### 29.2.1 Overview of Approach to LVIA

26. The LVIA assesses the effects of changes resulting from the onshore infrastructure associated with the proposed East Anglia ONE North project on landscape as a resource, the views available to people and their visual amenity. The LVIA will be undertaken using the following steps:

- The features of the onshore infrastructure associated with the proposed East Anglia ONE North project that may result in landscape and visual effects are described;
- The overall scope of the assessment is defined, including the LVIA study area and range of possible landscape and visual effects, through the scoping report/process and through stakeholder consultation meetings with the LVIA ETG (Suffolk County Council, East Suffolk Council, Norfolk County Council, Great Yarmouth Borough Council, the Broads National Park, Suffolk Coast and Heaths AONB unit, Natural England and Historic England);
- The landscape baseline is established using landscape character assessment and the ZTV of the onshore infrastructure associated with the proposed East Anglia ONE North project, to identify landscape receptors that may be affected and their key characteristics and values;
- The visual baseline is established by identifying the extent of possible visibility (ZTV), identifying the people who may be affected and identifying visual receptors and selecting viewpoints;
- A preliminary assessment is undertaken of landscape and visual receptors using site study, desk based study and ZTV analysis, to identify which landscape and visual receptors are and are not, likely to be significantly affected by the onshore infrastructure of the proposed East Anglia ONE North project, and therefore require to be assessed in full;
- Interactions are identified between the onshore infrastructure associated with the proposed East Anglia ONE North project and landscape and visual receptors, to predict potentially significant effects arising and propose measures to mitigate effects;
- An assessment of the susceptibility of landscape and visual receptors to specific change and the value attached to landscape receptors and views is undertaken, combining these judgements to assess the sensitivity of the landscape and visual receptors to the onshore infrastructure of the proposed East Anglia ONE North project;
- An assessment of the size and scale of landscape effect, the degree to which landscape elements are altered and the extent to which the effects change the key characteristics of the landscape is undertaken, combining these judgements to assess the magnitude of change on the landscape receptor;

- An assessment is undertaken of the size and scale of visual effect, the extent to which the change would affect views, whether this is unique or representative of a wider area, and the position of the onshore infrastructure associated with the proposed East Anglia ONE North project in relation to the principal orientation of the view and activity of the receptor. These judgements are combined to assess the magnitude of change on the visual receptor; and
  - The assessments of sensitivity to change and magnitude of change is combined to assess the significance of landscape and visual effects.
27. The magnitude of change is then assessed with mitigation (at 15 years post planting) as presented in **section 29.3.4** which results in the assessment of residual impact significance.
28. The LVIA is conducted for the proposed East Anglia ONE North project as a standalone project, with the proposed East Anglia TWO project being considered within the cumulative assessment.

#### 29.2.1.1 Policy

29. The assessment of potential effects on the landscape and visual receptors has been made with reference to relevant National Policy Statements (NPS), as discussed in **Chapter 3 Policy and Legislative Context**. The relevant NPSs to this assessment are:
- Overarching NPS for Energy (NPS EN-1 July 2011);
  - NPS for Renewable Energy Infrastructure (NPS EN-3 July 2011); and
  - NPS for Electricity Networks Infrastructure (NPS EN-5 July 2011).
30. The assessment of potential effects on the landscape and visual receptors has been made with reference to relevant local plans. Those relevant to this assessment are:
- Suffolk Coastal Development Plan (2013) Core Strategy & Development Management Policies;
  - Suffolk Coastal District Local Plan (2017) Site Allocations and Area Specific Policies; and
  - Suffolk Coast & Heaths AONB (2013) Suffolk Coast & Heaths AONB Management Plan 2013 – 2018.



#### 29.2.1.2 Desk Based Review

31. The LVIA is initiated through a desk study of the LVIA study area. This study has identified legislation, policy and guidance of relevance to the LVIA and aspects of the landscape and visual resource that may need to be considered in the LVIA, including landscape-related planning designations, landscape character areas and types, and views from settlements and routes.

#### 29.2.1.3 Data Sources

32. Data has been gathered from official, reliable and the most up-to-date sources. This includes Ordnance Survey map-based data, as well as data on landscape characterisation, landscape designations and other Governmental and local authority data of relevance, including:

- EDF Energy, Suffolk Coast and Heaths AONB Partnership, Suffolk County Council, Suffolk Coastal District Council and Waveney District Council (2016) Suffolk Coast and Heaths AONB - Natural Beauty and Special Qualities Indicators.
- LDA Design (2018) Suffolk, South Norfolk and North Essex Preliminary Seascape Character Assessment.
- Ordnance Survey (2017) Terrain 50 DTM; Terrain 5 DTM; 1:50,000 scale colour raster.
- Suffolk Coast & Heaths AONB (2013) Suffolk Coast & Heaths AONB Management Plan 2013 – 2018.
- Suffolk Coast and Heaths AONB (2012) Touching the Tide Landscape Character Assessment.
- Suffolk County Council (2011) Suffolk Landscape Assessment.
- Waveney District Council (2008) Waveney District Landscape Character Assessment.

33. The desk study also utilises Geographic Information System (GIS) software to explore the potential visibility of the onshore infrastructure associated with the proposed East Anglia ONE North project. The resultant ZTV diagrams provide an indication of which landscape and visual receptors are likely to be key in the assessment.

#### 29.2.1.4 Field Survey

34. Field survey work has been undertaken during periods of clear visibility between January 2017 and August 2018. Viewpoints have been agreed for the LVIA as part of the SLVIA ETG consultations. This has allowed the landscape character and visual amenity of the study area to be experienced in a range of different

conditions and seasonal variation. Field surveys are carried out throughout the study area, although the focus is on the substation area shown on the ZTV, with viewpoints and specific visual receptors selected from where theoretical and actual visibility of the proposed East Anglia ONE North project will occur. The field survey allows the assessors to judge the likely scale, distance, extent and prominence of the onshore substation and onshore infrastructure directly.

35. The landscape of the study area was assessed for any features that contribute to the landscape character of the site or are important to the wider landscape setting. In particular, the form and pattern of the landscape was assessed from the site and surrounding area to better understand its character and to take these qualities into account in the siting and design of the proposed East Anglia ONE North project. The landscape character areas for the study area were reviewed and the key characteristics of the landscape were identified. The field surveys provided an experience of the character areas of the study area and verification of how these areas might be affected by the proposed East Anglia ONE North project.
36. The visual amenity of the study area was surveyed including both static and sequential views, from receptors representative of the range of views and viewer types likely to experience the proposed East Anglia ONE North project. Views from a variety of distances, aspects, elevations and extents were included. Receptor types include properties and settlement; main transport routes; main visitor locations; areas of cultural significance; a range of landscape character areas within the study area. The position of other onshore infrastructure projects in the study area (**section 29.2.1.5**) was reviewed in combination with the proposed East Anglia ONE North project.
37. The field survey is essential to informing the sequential assessment, through the experience of each of the routes under consideration, to provide an understanding of the essential characteristics, and how these are likely to be affected by the proposed East Anglia ONE North project.

#### 29.2.1.5 Defining Study Area

38. The LVIA study area extends to a 3km buffer beyond the edge of the onshore development area and is shown in **Figure 29.1**. This study area has been agreed for the LVIA as part of the SLVIA ETG consultations and submission of the Scoping Report (SPR 2017). The LVIA study area defines a limit, based on professional judgement, beyond which it is considered unlikely for significant effects of development within the LVIA study area to arise. This judgement is based on knowledge of similar projects, an understanding of the character of the local landscape and the scale of the construction and development proposed within the onshore study area.

### 29.2.1.6 Operational Energy Development Baseline

39. The LVIA considers the effects of the proposed East Anglia ONE North project in combination with a baseline of operational projects and energy developments, as listed in **Table A29.1**. The LVIA focuses on the effects resulting from the proposed East Anglia ONE North project in conjunction with operational offshore windfarms and energy projects (as identified in **Table A29.1** and shown in **Figure 29.5**), which form part of the baseline for the landscape and visual effects assessments in **Appendices 29.2 to 29.4**. Cumulative effects with other proposed projects (including the proposed East Anglia TWO project) are assessed in **Appendix 29.5**.

**Table A29.1. Projects Considered as part of the Baseline**

Project	Status	Distance (km) from coastline	Number of wind turbines	Wind turbine blade tip height (m)	Wind turbine rotor diameter (m)
Greater Gabbard	Operational	24.8 km (from Orford Ness)	140	170	130
Galloper	Operational	28.9 km (from Orford Ness)	56	180.5	164
Sizewell A and B Nuclear Power Station	Operational	Onshore	N/A	N/A	N/A
Sizewell to Bramford 400kv overhead line	Operational	Onshore	N/A	N/A	N/A

## 29.2.2 Defining Impact Significance – Landscape Effects

### 29.2.2.1 Sensitivity of Landscape Receptor

40. The sensitivity of a landscape character receptor is an expression of its ability to accommodate the proposed East Anglia ONE North project as part of its own character or as part of its visual setting or context. This is dependent on the value of the landscape receptor and its susceptibility to change.

#### 29.2.2.1.1 Value of the Landscape Receptor

41. The value of a landscape character receptor is a reflection of the value that society attaches to that landscape. The assessment of the landscape value is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- **Landscape designations:** A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value,

depending on the proportion of the receptor that is covered and the level of importance of the designation; international, national, regional or local. The absence of designations does not preclude value, as an undesignated landscape character receptor may be valued as a resource in the local or immediate environment.

- **Landscape quality:** The quality of a landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which attributes have remained intact. A landscape with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character.
- **Landscape experience:** The experience of the landscape character receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the landscape in its own right, the recreational value of the landscape, and the contribution of other values relating to the nature conservation or archaeology of the area.

#### 29.2.2.1.2 Susceptibility to Change - Landscape

42. The susceptibility of a landscape character receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the proposed East Anglia ONE North project. The assessment of the susceptibility of the landscape receptor to change is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- **The specific nature of the proposed East Anglia ONE North project:** The susceptibility of landscape receptors is assessed in relation to change arising from the specific development proposed, including the specific components and features of the proposed East Anglia ONE North project, its size, scale, location, context and characteristics.
- **Landscape character:** The key characteristics of the existing landscape character are considered in the evaluation of susceptibility, as they determine the degree to which the receptor may accommodate the influence of the proposed East Anglia ONE North project. A landscape that is of a particularly wild and remote character may have a high susceptibility to the influence of development, due to the contrast that it would have with the landscape, whereas a developed, industrial landscape, where built elements and structures are already part of the character may have a lower susceptibility.
- **Landscape association:** The extent to which the proposed East Anglia ONE North project will influence the character of the landscape receptors across

the study area, relates to the associations that exist between the landscape receptor within which the proposed East Anglia ONE North project is located and the landscape receptor from which the proposed East Anglia ONE North project is being experienced. In some situations, this association will be strong, where the landscapes are directly related, and in other situations weak where the landscape association is weak.

### 29.2.2.1.3 Sensitivity Rating - Landscape

43. An overall sensitivity assessment of the landscape receptor is made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. An overall level of sensitivity is applied for each landscape receptor - high, medium-high, medium, medium-low and low - by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table A29.2** below.

**Table A29.2. Sensitivity to Change – Landscape Receptors**

Criteria tending towards higher or lower sensitivity		
Value	Higher	Lower
	<p>Designated landscapes with national policy level protection or defined for their natural beauty.</p> <p>Higher quality landscapes with consistent, intact and well-defined, distinctive attributes.</p> <p>Rare or unique landscape character types or features.</p> <p>Aesthetic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to landscape character.</p> <p>Evidence that the landscape is valued or used substantially for recreational activity.</p> <p>Landscape with perceptual qualities of wildness, remoteness or tranquillity.</p> <p>Landscape with strong cultural associations that contribute to perceptions of scenic quality.</p>	<p>Landscapes without formal designation.</p> <p>Despoiled or degraded landscape with little or no evidence of being valued by the community.</p> <p>Lower quality landscapes with indistinct elements or features that detract from its inherent attributes.</p> <p>Widespread or 'common' landscape character types or features.</p> <p>Limited or no wildlife, ecological or cultural heritage features, or limited contribution to landscape character.</p> <p>No evidence that the landscape is used for recreational activity.</p> <p>Landscape with inherent character has been changed by human activity.</p> <p>Landscape with few cultural associations.</p>

Criteria tending towards higher or lower sensitivity		
Susceptibility to change	Higher	Lower
	<p>Landscape which is likely or liable to be influenced by the proposed East Anglia ONE North project.</p> <p>Landscape vulnerable or fragile to change through the loss or addition of features that would alter key landscape characteristics.</p> <p>Landscape which lacks the ability to resist or accommodate the change that is likely to occur as a result of the proposed East Anglia ONE North project.</p> <p>Aesthetic or perceptual aspects of landscape are susceptible to changes associated with features of proposed development.</p> <p>Strong or direct association between proposed development and the landscape receptor.</p> <p>Landscape which is directly exposed to the proposed East Anglia ONE North project and has highest degree of exposure.</p>	<p>Landscape which is unlikely or not liable to be influenced by the proposed East Anglia ONE North project.</p> <p>Robust landscape, able to accommodate change or loss of features without altering key characteristics.</p> <p>Landscape which has the ability to resist or accommodate the change that is likely to occur as a result of the proposed East Anglia ONE North project.</p> <p>Aesthetic or perceptual aspects of landscape may accommodate changes associated with features of proposed development.</p> <p>Weak and indirect association between proposed development and the landscape receptor.</p> <p>Landscape which is not directly exposed to the proposed East Anglia ONE North project and has degree of concealment/screening.</p>
Sensitivity to change	High —————>	Medium —————> Low

### 29.2.2.2 Magnitude of Change - Landscape

44. The magnitude of change on landscape receptors is an expression of the scale of the change that will result from the proposed East Anglia ONE North project and is dependent on a number of variables regarding the size or scale of the change. A separate assessment is also made of the geographical extent of the area over which this will occur and the duration and reversibility of such changes. Geographical extent and duration do not form part of the magnitude of change conclusion. The basis for this assessment is made clear using evidence and professional judgement, based on the following criteria.

#### 29.2.2.2.1 Size or Scale of Change

45. This criterion relates to the size or scale of change to the landscape that will arise as a result of the proposed East Anglia ONE North project, based on the following factors:

- The degree to which the pattern of elements that makes up the landscape character are altered by the proposed East Anglia ONE North project, by

removal or addition of elements in the landscape. The magnitude of change will generally be higher if the features that make up the landscape character are extensively removed or altered, and/or if many new components are added to the landscape;

- The extent to which the effect of the proposed East Anglia ONE North project changes, physically or perceptually, the key characteristics of the landscape as identified in the baseline study and which may be important to the distinctive character of the landscape. This may include, for example, the scale of the landform, its relative simplicity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the proposed East Anglia ONE North project in relation to these key characteristics;
- The degree to which landscape character receptors will be changed by the addition of the proposed East Anglia ONE North project to baseline energy developments that are already present in the landscape. If the proposed East Anglia ONE North project is located in a landscape receptor that is already affected by other energy development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the landscape;
- The landscape context in which the proposed East Anglia ONE North project and other energy development are located. If the development is located in a similar landscape context to other energy infrastructure, the magnitude of change is likely to be lower as they relate consistently to key landscape characteristics. If developments are located in different landscape settings, this can lead to a perception that energy development is unplanned and uncoordinated;
- The scale of the landscape, landform and patterns of the landscape. A large-scale landscape can provide a more appropriate receiving environment than a more intimate, small-scale setting where development may result in uncomfortable scale comparisons and increase the magnitude of change;
- The distance between the landscape character receptor and the proposed East Anglia ONE North project. Generally, the greater the distance, the lower the scale of change as the proposed East Anglia ONE North project will constitute a less apparent influence on the landscape character; and
- The amount of the proposed East Anglia ONE North project that will be seen. Visibility of the proposed East Anglia ONE North project may range from one substation to both the substation and the National Grid substation; generally, the greater the extent of the proposed East Anglia ONE North project that can be seen, the higher the scale of change.

#### 29.2.2.2.2 Geographical Extent

46. The geographic extent over which the landscape effects will be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude, but instead expresses the extent of the receptor that will experience a particular magnitude of change and therefore the geographical extents of the significant and non-significant effects.
47. The extent of the effects will vary depending on the specific nature of the proposed East Anglia ONE North project and is principally assessed through analysis of the extent of perceived changes to the landscape character through visibility of the proposed East Anglia ONE North project.

#### 29.2.2.2.3 Duration and Reversibility

48. The duration and reversibility of landscape effects is based on the period over which the proposed East Anglia ONE North project is likely to exist and the extent to which the proposed East Anglia ONE North project will be removed, and its effects reversed at the end of that period. Duration and reversibility will not be incorporated into the overall magnitude of change and are stated separately in relation to the assessed effects. Long-term, medium-term and short-term landscape effects are defined as follows:
  - **Long-term** – more than 10 years;
  - **Medium-term** – 5 to 10 years.
  - **Short-term** – 1 to 4 years.
49. Landscape and visual effects are assessed as either permanent or temporary. Permanent effects are those which are irreversible, such as the permanent or long-term (>10 years) land take as a result of development or the physical removal of existing landscape elements that cannot be reinstated. Temporary effects are those which are reversible, such as short to medium-term (<10 years) effects occurring during construction, or where the physical removal of landscape elements can be reinstated, or a temporary visual effect that occurs over the short to long-term, until it is ultimately mitigated by the growth/height of new woodland planting.
50. OPEN's methodology does not include duration and reversibility as part of magnitude of change, as there is the potential that the reversibility aspect could alter or reduce potentially significant effects even though they are long-term. Duration and reversibility are not incorporated into the assessment of magnitude of change, but are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part



of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.

### 29.2.2.3 Magnitude of Change Rating – Landscape

51. An assessment of the magnitude of change resulting from the proposed East Anglia ONE North project on the landscape receptor is made by assessing the size or scale of change. The geographical extent over which this change takes place will also be assessed. The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined in **Table A29.3**.

**Table A29.3 Magnitude of Change Definitions – Landscape Character**

Magnitude of change	Description/reason
High	The proposed East Anglia ONE North project will result in a major alteration to the baseline characteristics of the landscape, providing the prevailing influence and/or introducing elements that are uncharacteristic in the receiving landscape. The addition of the proposed East Anglia ONE North project will result in a major incremental change, loss or addition to the baseline windfarm context.
Medium	The proposed East Anglia ONE North project will result in a moderate alteration to the baseline characteristics of the landscape, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving landscape. The addition of the proposed East Anglia ONE North project will result in a moderate incremental change, loss or addition to the baseline context.
Low	The proposed East Anglia ONE North project will result in a minor alteration to the baseline characteristics of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape. The addition of the proposed East Anglia ONE North project will result in a minor incremental change, loss or addition to the baseline context.
Negligible	The proposed East Anglia ONE North project will result in a negligible alteration to the baseline characteristics of the landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving landscape. The addition of the proposed East Anglia ONE North project will result in a negligible incremental change, loss or addition to the baseline context.
None	The proposed East Anglia ONE North project will result in no change to the baseline characteristics of the landscape.

52. There may be intermediate levels of magnitude of change, such as medium-high and medium-low, where the change falls between definitions. Criteria that tend towards higher or lower magnitude of change are set out in **Table A29.4** below.

**Table A29.4 Magnitude to Change Criteria – Landscape Receptors**

Criteria tending towards higher or lower sensitivity		
Size or scale of change	Higher	Lower
	<p>Major loss of existing landscape elements which contribute to the landscape character.</p> <p>Major alteration to pattern of elements, or perception of landscape pattern, through removal or addition of new elements.</p> <p>Major change to key characteristics which define the distinctive character of the landscape.</p> <p>The proposed East Anglia ONE North project is located within or close to landscape receptor and results in large scale change to its character.</p> <p>Large amount of the proposed East Anglia ONE North project visible resulting in higher scale of change.</p>	<p>Minor or negligible loss of existing landscape elements.</p> <p>Minor alteration to pattern of elements, or perception of landscape pattern.</p> <p>Minor change to key characteristics, or changes to characteristics which are not part of inherent distinctiveness.</p> <p>The proposed East Anglia ONE North project is located at long distance outside landscape receptor and results in small scale change to its landscape character.</p> <p>Small amount of the proposed East Anglia ONE North project visible resulting in lower scale of change.</p>
<b>Magnitude of change</b>	High —————>	Medium —————> Low

#### 29.2.2.4 Impact Significance – Landscape Effects

53. The objective of the assessment is to predict the likely significant effects of the proposed East Anglia ONE North project on the landscape and visual resource. In accordance with the EIA Regulations, the landscape and visual effects are assessed to be either significant or not significant. The LVIA will not define intermediate levels of significance as the EIA Regulations do not provide for these.
54. The significance of the effect on each landscape character receptor is dependent on all of the factors considered in the sensitivity of the receptor and the magnitude of change resulting from the proposed East Anglia ONE North project. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the proposed East Anglia ONE North project will have an effect that is significant or not significant on the landscape character receptor. An assessment of the factors considered in the evaluation of the sensitivity of each landscape character receptor and the magnitude of the change resulting from the proposed East Anglia ONE North project are presented, in order that the relevant considerations which have informed the significance can be considered transparently. The matrix shown in
55. **Table A29.5** helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

56. A significant effect will occur where the combination of the variables results in the proposed East Anglia ONE North project having a defining effect on the landscape character receptor, or where changes of a lower magnitude occur on a landscape character receptor that is of particularly high sensitivity.
57. A not significant effect will occur where the effect of the proposed East Anglia ONE North project is not definitive, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant. A major loss or irreversible effect over an extensive area, on elements and/or perceptual aspects that are key to the character of nationally valued seascapes/landscapes are likely to be of greatest significance. Reversible effects, over a restricted area, on elements and / or perceptual aspects that contribute to but are not key characteristics of the character of landscapes that are of lower value, are likely to be of least significance.
58. OPEN's methodology requires the application of professional judgement in accordance with the landscape Institute's GLVIA3. Although it is not reliant on the use of a matrix, the following matrix in **Table A29.5** is included to illustrate how combinations of the ratings for sensitivity and magnitude of change can give rise to significant effects, as well as to give an understanding of the threshold at which significant effects may arise.
59. Effects that are assessed within the red boxes in the matrix are assessed to be significant in terms of the requirements of the EIA Regulations. Those effects that are assessed within the orange boxes may be significant, or not significant, depending on the specific factors and effect that is assessed in respect of a particular landscape or visual receptor. In accordance with the GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned justification presented in respect of the findings in each case.

**Table A29.5 Impact Significance Matrix – Landscape Effects**

		Magnitude of change					Negligible
		High	Medium-high	Medium	Medium-low	Low	
Sensitivity	High	Significant	Significant	Significant	Significant or not significant	Not significant	Not significant
	Medium-high	Significant	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant
	Medium	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant
	Medium-low	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant	Not significant
	Low	Significant or not significant	Not significant	Not significant	Not significant	Not significant	Not significant

### Defining Impact Significance – Visual Effects

60. The assessment of visual effects is an assessment of how the introduction of the proposed East Anglia ONE North project will affect the views available to people and their visual amenity. The assessment of visual effects is carried out in two parts:
- An assessment of the effects that the proposed East Anglia ONE North project will have on a series of viewpoints that have been selected to represent the views available to people from representative or specific locations within the study area; and
  - An assessment of the effects that the proposed East Anglia ONE North project will have from principal visual receptors, including residents of settlements, motorists using roads and people using recreational routes, features and attractions throughout the study area.
61. The objective of the assessment of effects on visual receptors is to determine what the likely effects of the proposed East Anglia ONE North project will be on the people experiencing views across the study area, and whether these effects will be significant or not significant. The methodology for the assessment of visual effects involves the evaluation of sensitivity, magnitude of change and an assessment of the significance of effects.

#### 29.2.2.5 Sensitivity of Visual Receptor

62. The sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change that the proposed East Anglia ONE North project will have on the view.

##### 29.2.2.5.1 Value of the View

63. The value of a view or series of views is a reflection of the recognition and the importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:
- **Formal recognition:** The value of views can be formally recognised through their identification on Ordnance Survey or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view

will be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape.

- **Informal recognition:** Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited or used by a large number of people will generally have greater importance than one gained by very few people.
- **Scenic quality:** The value of the view is a reflection of the scenic qualities gained in the view. This relates to the content and composition of the landscape, whereby certain patterns and features will increase the scenic quality and others will reduce the scenic quality. The value of the view will also be increased if the condition of the landscape is near to the optimum for its type.

#### 29.2.2.5.2 Susceptibility to Change

64. Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the proposed East Anglia ONE North project. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, as follows:

- **Nature of the viewer:** The nature of the viewer is described by the occupation or activity which they are engaged in at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on trains will tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views.
- **Experience of the viewer:** The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the proposed East Anglia ONE North project may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a settlement is aligned directly

towards the proposed East Anglia ONE North project, the experience of the visual receptor will be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the proposed East Anglia ONE North project.

### 29.2.2.5.3 Sensitivity rating – Views and Visual Receptors

65. An overall level of sensitivity is applied for each visual receptor or view – high, medium-high, medium, medium-low, low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table A29.6** below.

**Table A29.6 Sensitivity to Change – Visual Receptors**

Criteria tending towards higher or lower sensitivity		
Value	Higher	Lower
	Specific viewpoint identified in OS maps and/or tourist information and signage. Facilities provided at viewpoint to aid the enjoyment of the view. View afforded protection in planning policy. View is within or overlooks a designated landscape, which implies a higher value to the visible landscape. View has informal recognition and well-known at a local level, as having particular scenic qualities. View or viewpoint is recognised through references in art or literature. View has high scenic qualities relating to the content and composition of the visible landscape.	Viewpoint not identified in OS maps or tourist information and signage. No facilities provided at viewpoint to aid enjoyment of the view. View is not afforded protection in planning policy. View is not within, nor does it overlook, a designated landscape. View has no informal recognition and is not known as having particular scenic qualities. View or viewpoint is not recognised in references in art or literature. View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility to change	Higher	Lower
	Viewer who is likely or liable to be influenced by the proposed East Anglia ONE North project.	Viewer who is unlikely or not liable to be influenced by the proposed East Anglia ONE North project.

Criteria tending towards higher or lower sensitivity		
	<p>Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings.</p> <p>Residents that gain static, long-term views of the proposed East Anglia ONE North project in their principal outlook.</p> <p>Viewpoint is visited or used by a large number of people.</p> <p>A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.</p> <p>A view of an undeveloped landscape with little or no built development and/or human influence.</p> <p>Existing elements, features or patterns in view that will contrast with the proposed East Anglia ONE North project.</p>	<p>Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation.</p> <p>Viewers whom are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration.</p> <p>View is visited or gained by very few people.</p> <p>Open views with no specific point of interest.</p> <p>A view of a developed, industrial landscape where built elements and structures are present.</p> <p>Existing elements, features or patterns in view that may assist with integration of the proposed East Anglia ONE North project.</p>
Sensitivity to change	High	Low

### 29.2.2.6 Magnitude of Change – Views/ Visual Receptors

66. The magnitude of change on views is an expression of the scale of the change that will result from the proposed East Anglia ONE North project and is dependent on a number of variables regarding the size or scale of the change. A separate assessment is also made of the geographical extent of the area over which this will occur and the duration and reversibility of such changes. Geographical extent and duration do not form part of the magnitude of change assessment but are considered as part of overall considerations on significance, to allow a final judgement to be made on whether each effect is significant or not significant.

#### 29.2.2.6.1 Size or Scale of Change

67. An assessment is made about the size or scale of change in the view that is likely to be experienced as a result of the proposed East Anglia ONE North project, based on the following criteria:

- The distance between the visual receptor/viewpoint and the proposed East Anglia ONE North project. Generally, the greater the distance, the lower the magnitude of change, as the proposed East Anglia ONE North project will constitute a smaller scale component of the view;
- The amount and size of the proposed East Anglia ONE North project that will be seen. Visibility may range from a small amount of the proposed East

Anglia ONE North project visible to all of the proposed East Anglia ONE North project being visible. Generally, the larger the proposed East Anglia ONE North project appears in the view, and the more of the proposed East Anglia ONE North project that can be seen, the higher the magnitude of change;

- The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition;
- The field of view available and the proportion of the view that is affected by the proposed East Anglia ONE North project. Generally, the more of a view that is affected, the higher the magnitude of change will be. If the proposed East Anglia ONE North project extends across the whole of the open part of the outlook, the magnitude of change will generally be higher as the full view will be affected. Conversely, if the proposed East Anglia ONE North project covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the proposed East Anglia ONE North project will not affect the whole open part of the outlook;
- The scale and character of the context within which the proposed East Anglia ONE North project will be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, luminance and motion;
- The consistency of image of the proposed East Anglia ONE North project in relation to other developments. The cumulative magnitude of change of the proposed East Anglia ONE North project is likely to be lower if its scale, arrangement and layout design are broadly similar to other developments in the landscape, as they are more likely to appear as relatively simple and logical components of the landscape;
- The uniformity of appearance of the proposed East Anglia ONE North project in different views. If the proposed East Anglia ONE North project appears relatively uniform and consistent in appearance from different viewpoints and viewing angles, in a similar setting and familiar form, this tends to reduce the magnitude of change. If, on the other hand, it appears inconsistent in image, scale and appearance, or from a variety of different angles, and is seen in a different form and setting, the magnitude of change is likely to be higher as it will be a variable and less familiar component of views; and
- The extent of the developed skyline. If the proposed East Anglia ONE North project will add notably to the developed skyline in a view, extending the lateral spread of development or increasing the perceived connection between other developments, the magnitude of change will tend to be higher.

#### 29.2.2.6.2 Geographical Extent

68. The geographic extent over which the visual effects will be experienced is also assessed, which is distinct from the size or scale of effect. The extent of the



effects will vary depending on the specific nature of the proposed East Anglia ONE North project and is principally assessed through analysis of the extent of visibility of the proposed East Anglia ONE North project from visual receptors, to assess the geographical extent of the receptor that will be affected, based on the following criteria:

- The extent of the visual receptor (a road, footpath or settlement for example) that will experience changes through visibility of the proposed East Anglia ONE North project; and
- The extent to which the change affects views, whether this is unique to the viewpoint or if similar changes occur over wide areas represented by the viewpoint.

#### 29.2.2.6.3 Duration and Reversibility

69. The duration and reversibility of visual effects are based on the period over which the proposed East Anglia ONE North project is likely to exist and the extent to which the proposed East Anglia ONE North project will be removed, and its effects reversed at the end of that period. Duration and reversibility will not be incorporated into the overall magnitude of change and are stated separately in relation to the assessed effects.

70. Long-term, medium-term and short-term visual effects are defined as follows:

- **Long-term** – more than 10 years;
- **Medium-term** – 5 to 10 years.
- **Short-term** – 1 to 4 years.

71. OPEN's methodology does not include duration and reversibility as part of magnitude of change, as there is the potential that the reversibility aspect could alter or reduce potentially significant effects even though they are long-term. The duration and reversibility of the effects are instead determined separately and recorded alongside significance rather than being a factor of it. Geographical extent and duration do not form part of the magnitude of change assessment but are considered as part of overall considerations on significance, to allow a final judgement to be made on whether each effect is significant or not significant.

#### 29.2.2.6.4 Magnitude of Change Rating – Views/ Visual Receptors

72. An assessment of the magnitude of change resulting from the proposed East Anglia ONE North project on each visual receptor and viewpoint is made by assessing the size or scale of change. The geographical extent over which this change takes place will also be assessed. The basis of the assessment is made

clear using evidence and professional judgement. The levels of magnitude of change that can occur on views are defined in **Table A29.7**.

**Table A29.7 Magnitude of Change – Visual Effects**

Magnitude of change	Visibility level	Magnitude of Change Definition
High	The proposed East Anglia ONE North project will be the prevailing feature in the view and will form the major focus of visual attention due to its large vertical scale and lateral spread, filling a large proportion of the field of view. Contrasts in form, line, colour, texture, luminance or motion may contribute to the prevailing influence. Moving objects associated with the proposed East Anglia ONE North project may contribute substantially to drawing viewer attention. The visual prominence of the proposed East Anglia ONE North project will detract noticeably from views of other landscape elements.	The proposed East Anglia ONE North project will result in a high level of alteration to the existing view, forming the prevailing influence and/or introducing elements that are substantially uncharacteristic in the baseline view. The addition of the proposed East Anglia ONE North project will result in a major incremental change, loss or addition to the baseline view.
Medium-high	The proposed East Anglia ONE North project will strongly attract the visual attention of viewers, either due to its large vertical scale or lateral spread in the view, or due to contrasts in form, line, colour, or texture, luminance, or motion. Moving objects associated with the proposed East Anglia ONE North project may contribute substantially to drawing viewer attention. Will form a major-moderate focus of visual attention, drawing viewer attention immediately and tending to hold that attention. The visual prominence of the proposed East Anglia ONE North project interferes noticeably with views of nearby landscape elements.	The proposed East Anglia ONE North project will result in a medium-high level of alteration to the existing view, forming a prominent influence and/or introducing elements that are uncharacteristic in the baseline view. The addition of the proposed East Anglia ONE North project will result in a moderate to major incremental change, loss or addition to the baseline view.
Medium	Plainly visible, so will not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size. The proposed East Anglia ONE North project is obvious and will have sufficient size to contrast with other landscape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's field of view.	The proposed East Anglia ONE North project will result in a medium level of alteration to the baseline view, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the receiving view. The addition of the proposed East Anglia ONE North project will result in a moderate incremental change, loss or addition to the baseline view.
Medium-low	The proposed East Anglia ONE North project will be visible after a brief glance in its general direction and is unlikely to be missed by casual observers. Will be easily detected after a brief look and will be visible to most casual observers, but without	The proposed East Anglia ONE North project will result in a medium-low level of alteration to the existing view, forming an apparent influence and/or introducing elements that may be characteristic in the baseline view. The addition of the proposed East Anglia ONE North

Magnitude of change	Visibility level	Magnitude of Change Definition
	sufficient size or contrast to compete with the main landscape elements in the view.	project will result in a medium-low incremental change, loss or addition to the baseline view.
Low	The proposed East Anglia ONE North project will be visible when scanning in its general direction; otherwise it may be missed by casual observers. Very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected and sometimes noticed by casual observers; however, most people would not notice it without some active looking.	The proposed East Anglia ONE North project will result in a low level of alteration to the baseline view, providing a slightly apparent influence and / or introducing elements that are characteristic in the receiving view. The addition of the proposed East Anglia ONE North project will result in a low incremental change, loss or addition to the baseline view.
Negligible	Visible only after extended viewing. The proposed East Anglia ONE North project is near the limit of visibility. It would not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, it can be seen only after looking at it closely for an extended period.	The proposed East Anglia ONE North project will result in a negligible alteration to the existing view, forming a barely discernible influence and/or introducing elements that are substantially characteristic in the baseline view. The addition of the proposed East Anglia ONE North project will result in a negligible incremental change, loss or addition to the baseline view.
None	The proposed East Anglia ONE North project is not visible.	The proposed East Anglia ONE North project will result in no change to the existing view or its baseline characteristics.

73. There may be intermediate levels of magnitude of change, such as medium-high or medium-low, where the change falls between the definitions. Criteria that tend towards higher or lower magnitude of change are set out in **Table A29.8**.

**Table A29.8 Magnitude of Change – Views/Visual Receptors**

Criteria tending towards higher or lower sensitivity		
Size or scale of change	Higher	Lower
	<p>Large scale change in the view resulting from loss and/or addition of features and changes in its composition.</p> <p>Proposed development located in close proximity to the viewpoint and will form large scale component of the view.</p> <p>All or majority of the proposed East Anglia ONE North project will be visible in the view.</p>	<p>Small-scale change in the view resulting from loss and/or addition of features and changes in its composition.</p> <p>The proposed East Anglia ONE North project is located at long distance from the viewpoint and will form small scale component of the view.</p> <p>Limited amount of the proposed East Anglia ONE North project will be visible in the view e.g. extremity of blade tips.</p>

	<p>The proposed East Anglia ONE North project affects a large proportion of available field of view.</p> <p>The proposed East Anglia ONE North project has a high degree of contrast or low degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture.</p> <p>The proposed East Anglia ONE North project appears inconsistently, in a different setting and/or form each time it is visible.</p>	<p>The proposed East Anglia ONE North project affects a small proportion of available field of view.</p> <p>The proposed East Anglia ONE North project has a low degree of contrast/ high degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture.</p> <p>The proposed East Anglia ONE North project appears consistent, in a similar setting and/or form each time it is visible.</p>
<p>Magnitude of change    High —————&gt; Medium —————&gt; Low</p>		

### 29.2.2.7 Impact Significance - Visual Effects

74. The significance of the effect on each view is dependent on all of the factors considered in the sensitivity of the view and the magnitude of change resulting from the proposed East Anglia ONE North project. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the proposed East Anglia ONE North project will have an effect that is significant or not significant on the visual receptor. The matrix shown in **Table A29.9** helps to inform the threshold of significance when combining sensitivity and magnitude to assess the significance of effect.
75. A significant effect will occur where the combination of the variables results in the proposed East Anglia ONE North project having a defining effect on the view or where changes of a lower magnitude occur on a view or visual receptor that is of particularly high sensitivity.
76. A not significant effect will occur where the appearance of the proposed East Anglia ONE North project is not definitive, and the view continues to be defined principally by its baseline characteristics or where the small-scale of change experienced by a high sensitivity receptor is such as to be considered not significant.
77. Irreversible, long-term effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant, as are effects on people at recognised viewpoints with high scenic quality. Large-scale changes which introduce new, non-characteristic or discordant elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

78. The assessment of visual effects assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. Viewing conditions and visibility tend to vary considerably and therefore the likelihood of effects resulting from the proposed East Anglia ONE North project will vary greatly dependent according to the prevailing viewing conditions

**Table A29.9. Impact Significance Matrix – Visual Effects**

		Magnitude of change					
		High	Medium-high	Medium	Medium-low	Low	Negligible
Sensitivity	High	Significant	Significant	Significant	Significant or not significant	Not significant	Not significant
	Medium-high	Significant	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant
	Medium	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant
	Medium-low	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant	Not significant
	Low	Significant or not significant	Not significant	Not significant	Not significant	Not significant	Not significant

### 29.2.3 Defining Impact Significance – Cumulative Effects

#### 29.2.3.1 Introduction

79. In GLVIA3 (Landscape Institute and IEMA, 2013, p120) the guidelines define cumulative landscape and visual effects as those that *‘result from additional changes to the landscape and visual amenity caused by the proposal in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.’*

80. SNH’s guidance, Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012) is widely used across the UK to inform the specific assessment of the cumulative effects of windfarms. Both GLVIA3 and SNH’s guidance provide the basis for the methodology for the cumulative LVIA undertaken in this ES for the proposed East Anglia ONE North onshore infrastructure. The SNH (2012) guidance defines:

- *Cumulative effects as ‘the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments taken together’ (SNH, 2012: p4).*
- *Cumulative landscape effects are those effects that ‘can impact on either the physical fabric or character of the landscape, or any special values attached to it’ (SNH, 2012, p10); and*

- *Cumulative visual effects are those effects that can be caused by combined visibility, which ‘occurs where the observer is able to see two or more developments from one viewpoint’ and/or sequential effects which ‘occur when the observer has to move to another viewpoint to see different developments’ (SNH, 2012, p11).*

81. In line with guidance (SNH, 2012), the LVIA focuses on the key cumulative effects which are likely to influence decision making, rather than assessing every potential cumulative effect.

#### 29.2.3.2 Scope of the Cumulative Assessment

82. Cumulative impact assessment scenarios of the East Anglia ONE North and TWO projects are assessed separately in **Appendix 29.5** in two scenarios:

- Scenario 1 – East Anglia ONE North and TWO projects are constructed at the same time i.e. the impact of the East Anglia ONE North and TWO onshore substations together, the National Grid Substation and onshore cable route /ducts for both projects.
- Scenario 2 – East Anglia ONE North project is built entirely and the land is reinstated, then East Anglia TWO project is constructed.

83. The operational phase cumulative landscape and visual impact will be the same irrespective of the construction scenario and assesses the impact of the operation of the proposed East Anglia ONE North substation, proposed East Anglia TWO substation and National Grid substation.

84. A further cumulative assessment scenario is also assessed – the effects of the proposed East Anglia ONE North project with Sizewell C New Nuclear Power Station.

85. In accordance with guidance (SNH, 2012), the cumulative LVIA undertaken in this ES assesses the combined effect of a set of developments taken together. The focus of the cumulative LVIA is on the combined effect of the proposed East Anglia ONE North project with the East Anglia TWO project. The cumulative effects assessment in **Appendix 29.5** focuses on the combined (or total) effect of the proposed East Anglia ONE North and TWO projects since the applications for both projects are being submitted at the same time and it is the combined effect of both projects that is likely to be of interest to stakeholders (rather than the additional/incremental effect of the proposed East Anglia ONE North project being assessed, on top of a baseline with the other project).

86. **Table A29.10** identifies those projects that have been scoped in to the cumulative landscape and visual assessment.

**Table A29.10 Projects Considered in the Cumulative LVIA**

Project	Status	Distance (km) from East Anglia ONE North onshore development area	Scoped in (✓) or scoped out (x)	Rationale
<b>Projects considered as part of the cumulative impact assessment (assessed in <i>Appendix 29.5</i>)</b>				
East Anglia TWO onshore infrastructure	Pre-application	Within	✓	East Anglia TWO is included in the cumulative assessment for the proposed East Anglia ONE North offshore windfarm due to its proximity and potential for cumulative effects on receptors in the LVIA study area.
Sizewell C New Nuclear Power Station	Scoping	0.49km	✓	EDF Energy's proposals for a new nuclear power station to north of Sizewell B are within the onshore study area and may have cumulative effect interactions with the onshore infrastructure associated with the proposed East Anglia ONE North project. Cumulative effects assessed in the Onshore LVIA <b>Chapter 29 Landscape and Visual Impact Assessment</b> of the ES and <b>Appendix 29.5</b> .

### 29.2.3.3 Types of Cumulative Effect

#### 29.2.3.3.1 Cumulative Landscape Effects

87. Cumulative development within a particular area may build up to create different types of landscape effect. The significance of the cumulative landscape effects of the addition of the proposed East Anglia ONE North project is assessed as follows:

- If the proposed East Anglia ONE North project forms a separate isolated feature from other developments within the landscape, too infrequent and of insufficient significance to be perceived as a characteristic of the area, then the cumulative landscape effect of the proposed East Anglia ONE North project is unlikely to be significant.
- If the combination of the proposed East Anglia ONE North project and other projects results in energy generation/ transmission developments forming a key characteristic of the landscape, exerting sufficient presence as to establish or increase the extent of a 'landscape with energy generation/

transmission development', then the cumulative landscape effect of the proposal may be significant or not significant, depending on the sensitivity of the receptor and magnitude of the change.

- If the combination of the proposed East Anglia ONE North project and other projects results in energy generation/ transmission development forming the prevailing characteristic of the landscape, seeming to define the landscape as an 'energy generation landscape character type', then the cumulative landscape effect of the proposed East Anglia ONE North project is likely to be significant.

#### 29.2.3.3.2 Cumulative Visual Effects

88. Cumulative visual effects consist of combined and sequential effects:

- **Combined visibility** occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 'in combination', where several developments are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various developments. The cumulative visual effect of the proposed East Anglia ONE North project may be significant or not significant depending on factors influencing the cumulative magnitude of change, such as the degree of integration and consistency of image with other developments in combined views; and its position relative to other developments and the landscape context in successive views.
- **Sequential visibility** occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect is more likely to be significant when frequently sequential.

#### 29.2.3.4 Cumulative Sensitivity of Landscape and Visual Receptors

89. In evaluating cumulative sensitivity in the cumulative LVIA (**Appendix 29.5**), the sensitivity to change of seascape, landscape and visual receptors are retained from the main assessment in **Appendices 29.3 - 28.5**.



### 29.2.3.5 Cumulative Magnitude of Change

90. The cumulative magnitude of change is an expression of the degree to which landscape and visual receptors will be changed by the addition of the proposed East Anglia ONE North project in combination with other developments. The cumulative magnitude of change is assessed according to a number of criteria, described below:

- **The location, position and visual relationship of the proposed East Anglia ONE North project with the proposed East Anglia TWO project.** Depending on the viewpoint/viewing angle, the proposed East Anglia ONE North and TWO projects may be viewed adjacent to one another, covering a wider lateral spread; they may form one grouping or could be viewed separately as two projects (separated by space); or could be viewed with one project being 'behind' the other project. The overall magnitude of change will vary depending on this visual relationship at different viewpoints, and is likely to be higher when the two projects are viewed adjacent to each other over a wider lateral spread; and lower when one project is viewed behind the other project.
- **The location of the proposed East Anglia ONE North and TWO projects in relation to other developments.** If the proposed East Anglia ONE North and TWO projects are seen in a part of the view or setting to a landscape receptor that is not affected by other development, this will generally increase the cumulative magnitude of change as it will extend influence into an area that is currently unaffected by development. Conversely, if the proposal is seen in the context of other sites, the cumulative magnitude of change may be lower as development is not being extended to otherwise undeveloped parts of the outlook or setting. This is particularly true where the scale and layout of the proposal is similar to that of the other sites as where there is a high level of integration and cohesion with an existing site the various developments may appear as a single site;
- **The extent of the developed skyline.** If the proposed East Anglia ONE North and TWO projects will add notably to the developed skyline in a view, the cumulative magnitude of change will tend to be higher as skyline development can have a particular influence on both views and seascape/ landscape receptors;
- **The number and scale of developments seen simultaneously or sequentially.** Generally, the greater the number of clearly separate developments that are visible, the higher the cumulative magnitude of change will be. The addition of the proposed East Anglia ONE North and TWO projects to a view or landscape where a number of smaller developments are apparent will usually have a higher cumulative magnitude of change than one or two large

developments as this can lead to the impression of a less co-ordinated or strategic approach;

- **The scale comparison between developments.** If the proposed East Anglia ONE North and TWO projects are of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change will generally be lower as it will have more integration with the other sites and will be less apparent as an addition to the cumulative situation;
- **The consistency of image of the proposal in relation to other developments.** The cumulative magnitude of change of the proposed East Anglia ONE North and TWO projects is likely to be lower if their appearance, arrangement and design are broadly similar to other developments in the landscape, as they are more likely to appear as relatively simple and logical components of the landscape;
- **The context in which the developments are seen.** If projects are seen in a similar landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If projects are seen in a variety of different settings, this can lead to a perception that energy development is unplanned and uncoordinated, affecting a wide range of landscape character and blurring the distinction between them; and
- **The magnitude of change of the proposed East Anglia ONE North project as assessed in the project alone assessment.** Where the proposed East Anglia ONE North project is assessed to have a negligible or low magnitude of change on a view or seascape/landscape receptor, there is more likely to be a low cumulative effect.

91. Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:

- **High**, where the magnitude of change arising from the combination of the proposed East Anglia ONE North and East Anglia TWO projects will result in a high cumulative change, loss or addition to the landscape receptor or view;
- **Medium**, where the magnitude of change arising from the combination of the proposed East Anglia ONE North and East Anglia TWO projects will result in a medium change, loss or addition to the landscape receptor or view;
- **Low**, where the magnitude of change arising from the combination of the proposed East Anglia ONE North and East Anglia TWO projects will result in a low change, loss or addition to the landscape receptor or view.
- **Negligible**, where the magnitude of change arising from the combination of the proposed East Anglia ONE North and East Anglia TWO projects will result

in a negligible incremental change, loss or addition to the landscape receptor or view; and

- **None**, where the magnitude of change arising from the combination of the proposed East Anglia ONE North and East Anglia TWO projects will result in no change, loss or addition to the landscape receptor or view.

92. There may also be intermediate levels of cumulative magnitude of change - medium-high and medium-low - where the change falls between two of the definitions.

#### 29.2.3.6 Significance of Cumulative Effects

93. The objective of the cumulative assessment is to determine whether any effects that the proposed East Anglia ONE North project will have on landscape and visual receptors, when seen or perceived in combination with other projects, will be significant or not significant. Significant cumulative landscape and visual effects arise where the addition of the proposed East Anglia ONE North project, leads to energy developments becoming a prevailing landscape and visual characteristic of a receptor that is sensitive to such change. Cumulative landscape effects may evolve as follows:

- A small scale, single development will often be perceived as a new or 'one-off' landscape feature or landmark within the seascape. Except at a local site level, it usually cannot change the overall existing landscape character, or become a new characteristic element of a landscape;
- With the addition of further development, it can become a characteristic element of the landscape, as they appear as elements or components that are repeated. Providing there was sufficient 'space' or undeveloped landscape between each development, or the overlapping of several developments is not too dense; they would appear as a series of developments within the landscape/ seascape and would not necessarily become the dominant or defining characteristic of the seascape nor have significant cumulative effects; and
- The next stage would be to consider larger scale developments and/or an increase in the number of developments within an area that either overlap or coalesce and/or 'join-up' along the skyline. The effect is to create a landscape where the energy generation/ transmission element is a prevailing characteristic of the landscape. The result would be to materially change the existing landscape character resulting in a significant cumulative effect. A landscape characterised by energy generation or transmission development may already exist as part of the baseline landscape context.

94. Less extensive, but nevertheless significant cumulative landscape and visual effects may also arise as a result of the addition of the proposed East Anglia ONE North project where it results in a landscape or view becoming defined by the presence of more than one energy generation/ transmission development, so that other patterns and components are no longer definitive, or where the proposal contrasts with the scale or design of an existing or proposed development. Higher levels of significance may arise from cumulative landscape and visual effects related to the proposed East Anglia ONE North project being in close proximity to other developments when they are clearly visible together in views, however provided that the proposal is designed to achieve a high level of visual integration, with few notable visual differences between developments, these effects may not necessarily be significant. In particular, the effects of an extension to an existing development are often less likely to be significant, where the effect is concentrated, providing that the design of the developments are compatible and that the overall capacity of the landscape is not exceeded.
95. The capacity of the landscape or view may be assessed as being exceeded where the landscape or visual receptor becomes defined by a particular type of development, or if the proposed East Anglia ONE North project extend across landscape character types or clear visual/topographic thresholds in a view. More substantial cumulative effects may result from developments that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of development on a skyline, or the creation of multiple, separate energy generation/ transmission defined landscapes.

#### 29.2.4 Nature of Effects

96. The nature of effects refers to whether the landscape and/or visual effect of the proposed East Anglia ONE North project is positive or negative (herein referred to as 'beneficial' and 'adverse').
97. The EIA Regulations 2017 state that the Environmental Statement (ES) should cover *'the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development'*.
98. Guidance provided by the Landscape Institute in GLVIA3 on the nature of effect (i.e. beneficial or adverse) states that *'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity'*, but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

99. In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of large-scale energy infrastructure are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.
100. Generally, in the development of 'new' energy infrastructure, a precautionary approach is adopted by OPEN, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment are considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations, for example through new landscape planting, and are stated in the assessment where relevant, based on the following definitions:
- **Beneficial effects** contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
  - **Neutral effects** occur where the development fits with the existing landscape character or visual amenity. The development neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, nor where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and
  - **Adverse effects** are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

### 29.2.5 Potential Effects

101. A range of potential effects on the landscape and visual resource is assessed during the construction, operation and decommissioning of the proposed East Anglia ONE North project, as described in the following sections.

#### 29.2.5.1 Potential Effects during Construction

102. The potential effects during construction will occur in relation to the construction of the proposed East Anglia ONE North project. These include potential effects on physical landscape features, landscape character and visual amenity of the development area and its surroundings. The effects relate principally to the construction process, and presence of associated plant, materials, infrastructure and temporary structures, as well as the presence of emerging structures, where they would be visible above ground.
103. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, secured under the requirements of the draft DCO. The onshore substation will be likely removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.
104. The landscape and visual effects that could arise as a result of the proposed East Anglia ONE North project during construction and decommissioning are identified as follows:
- **Temporary effects on landscape character**, including direct effects on physical landscape elements and changes to the physical pattern and perception of landscape character areas and landscape designations. Changes to the perceived landscape character are likely to occur primarily as a result of visibility of the onshore infrastructure and changes associated with the proposed East Anglia ONE North project installation during construction within terrestrial landscape character areas and landscape designations, primarily as a result of visibility of the construction of the onshore infrastructure; and
  - **Temporary visual effects on views**, primarily as a result of visibility of the proposed East Anglia ONE North project installation during construction, including installation of the substation, onshore and offshore export cable corridors and wind turbines, experienced by visual receptors (groups of people) with visibility of the construction of the onshore infrastructure, on specific views and on their visual amenity/experience of the landscape.

- Temporary landscape and visual effects are assessed on the basis of the proposed construction programme sequence and timing. The approach to the assessment of construction stage effects considers the landscape and visual effects of the construction of the onshore infrastructure over the construction period, weighing up the effects of relatively short 2-3 month duration bursts of particular construction activity during several periods of the construction phase, along with periods with limited construction activity, as a realistic worst-case based on the construction programme sequence and timing. This approach is adopted based on the proposed construction sequence, as it is clear that the particular construction activities will not be experienced by receptors throughout the construction period but will instead be experienced over several much shorter periods within the overall 3-year construction period.

#### 29.2.5.2 Potential Effects during Operation

105. The potential effects during operation would relate principally to the presence of the proposed East Anglia ONE North project. Potential effects on landscape character and visual amenity are assessed, with particular consideration of sensitive receptors such as valued landscapes, residents, recreational users of the countryside and road-users.
106. The landscape and visual effects that could arise as a result of the proposed East Anglia ONE North project during operation are identified as follows:
- Long-term effects on landscape character, within terrestrial landscape character areas and landscape designations, as a result of changes arising from physical pattern of elements and perceived character of the landscape. Changes to the perceived landscape character occur primarily as a result of visibility of the operation of the onshore infrastructure, particularly the operation of the onshore substation and National Grid substation; and
  - Long-term visual effects on views, primarily as a result of visibility of the proposed East Anglia ONE North project during operation, experienced by visual receptors (groups of people) with visibility of the proposed East Anglia ONE North project, on specific views and on their visual amenity/experience of the landscape.

#### 29.2.5.3 Frequency and Likelihood of Visual Effects – Weather Conditions

107. The judgements made in the LVIA are based on optimum ‘very good’ to ‘excellent’ visibility of the proposed East Anglia ONE North project. This assumption is assessed as the worst-case scenario, but in reality, the degree and extent of visual effects arising from the proposed East Anglia ONE North project is a combination of several different factors, including the prevailing weather

conditions. The prevailing visibility weather can determine changes in character and visibility, with varied wind, light and the clarity or otherwise of the atmosphere. Collectively, these will combine to reduce the number of days upon which views of the proposed East Anglia ONE North project will be available, or to inhibit views, rendering them more visually recessive within the wider landscape. Viewing conditions and visibility have been found to vary in the study area, and the effects of the proposed East Anglia ONE North project will vary greatly according to the weather. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. The influence of weather conditions is more pertinent in the assessment of the construction and operation of the offshore infrastructure, than the onshore infrastructure, given its distance offshore.

## 29.2.6 Visual Representations

### 29.2.6.1 Production Methods

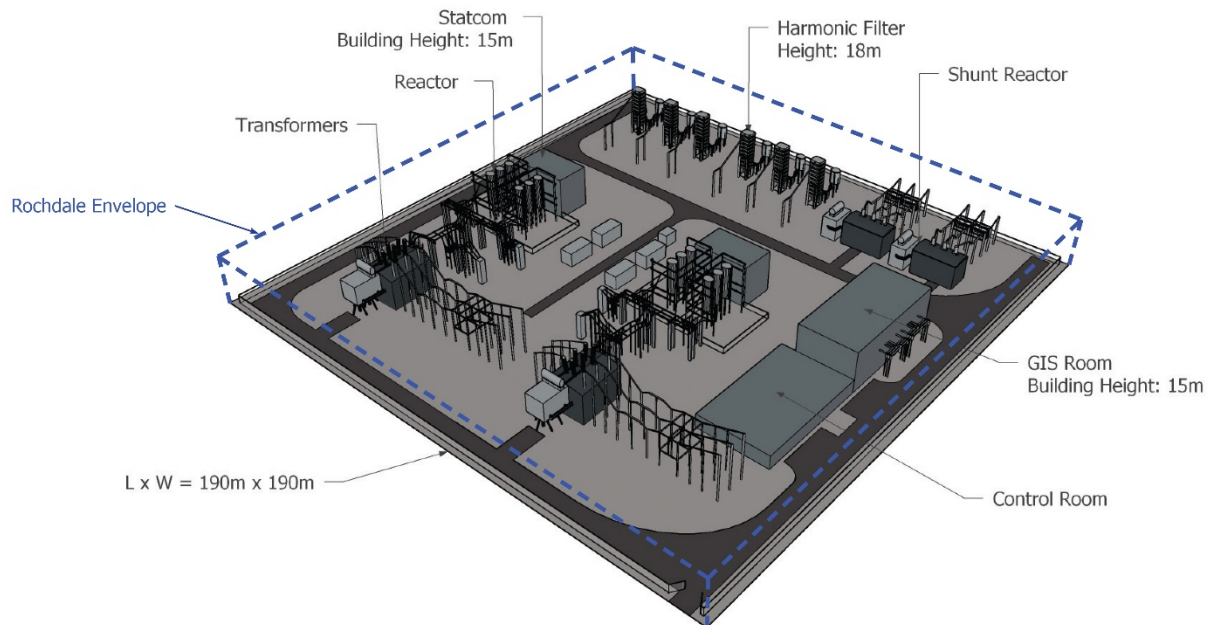
108. Photomontages have been produced in accordance with SNH Visual Representation of Windfarms Guidance (SNH, February 2017), the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3) (Landscape Institute and IEMA, 2013) and Landscape Institute guidance on visual representation of development proposals (Landscape Institute, 2017).
109. A photomontage is a visualisation which superimposes an image of a proposed development upon a photograph. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.
110. The photographs used to produce the photomontages have been taken using Canon EOS 5D and 6D Digital SLR cameras, with a fixed lens and a full-frame (35mm negative size) CMOS sensor. The photographs are taken on a tripod with a pano-head at a height of approximately 1.5m above ground.
111. To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree view but appears essentially as a flat plane. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.
112. The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5 degree field of view



- photomontages. In some views, more than one 53.5 degree field of view panorama is shown to accommodate the full width of the onshore infrastructure.
113. 3D model representations that illustrate the proposed East Anglia ONE North and East Anglia TWO onshore substations and National Grid substation, set within a computer-generated image of the landform are used in the assessment to predict their theoretical appearance. These are produced with a combination of Autodesk 3D Max and Visual Nature Studio and are based on a terrain model with a 2m data grid (2m Lidar data). There are limitations in the accuracy of DTM data so that landform may not be represented precisely and may result in differences in visibility, however, the use of 2m Lidar data minimises these limitations.
  114. Fully rendered photomontages have been produced for viewpoints identified in **Chapter 29 Landscape and Visual Impact Assessment** to provide a photorealistic image of the appearance of the onshore substation and National Grid substation. 3D model representations are combined with the baseline view photographs to create a photorealistic rendered photomontage image.
  115. The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree field of view (or in some cases up to 360-degree), which accords with SNH guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.
  116. The 53.5 degree field of view photomontages are prepared using a planar projected image to be viewed flat at a comfortable arm's length. These images are each printed on paper 841 x 297mm which provides for a large-scale image.
  117. The photomontages of the onshore substation and National Grid substation in **Figures 29.13 – 29.26** show, from each viewpoint, the existing baseline panorama, photomontage 'without mitigation' and photomontages 'with mitigation'. Photomontages are provided to show both the onshore substation and National Grid substation, and the cumulative scenario showing the East Anglia ONE North onshore substation and National Grid substation together with the East Anglia TWO onshore substation.

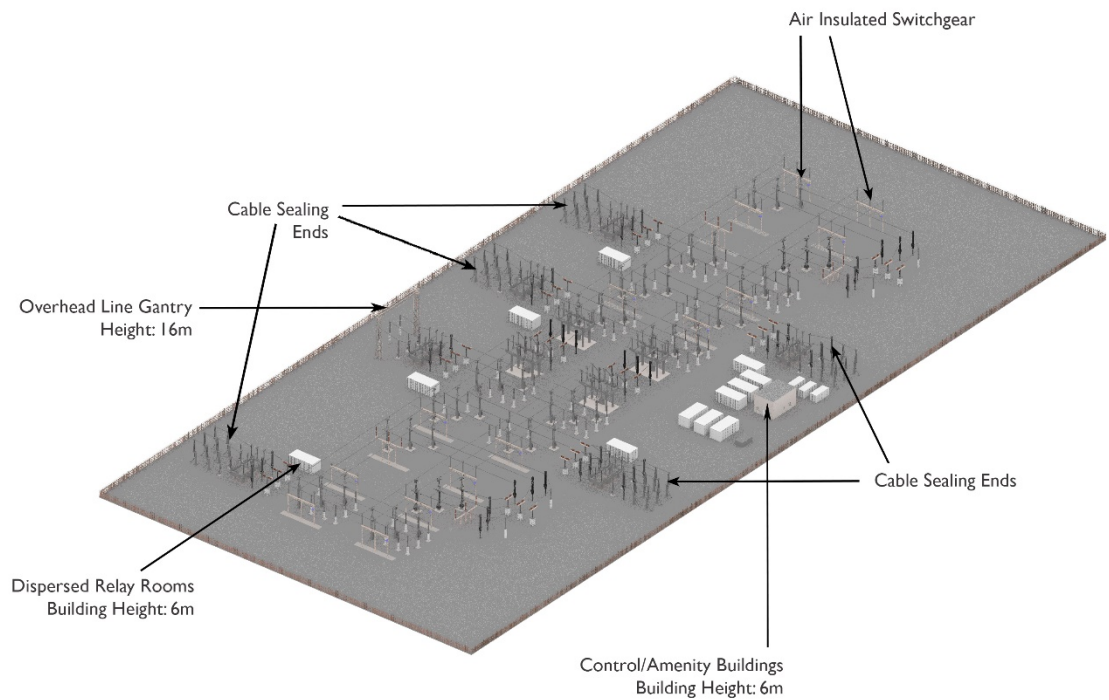
#### 29.2.6.2 Rochdale Envelope shown in Visualisations

118. The onshore substation assessed in the LVIA (and shown in the visualisations in **Figures 29.13 – 29.26**) is based on a Rochdale Envelope defined by a realistic worst-case 3D model, as shown in **Plate A29.1**. The Rochdale Envelope and assessments are also informed by the maximum parameters of the electrical infrastructure (18m), as represented by a dashed line in **Plate A29.1**. The same 3D model is used for both the East Anglia ONE North and East Anglia TWO onshore substations in the cumulative assessment presented in **section 29.7 of Chapter 29 Landscape and Visual Impact Assessment**. In addition, lightning masts (up to 25m) have also been included in the visualisations.



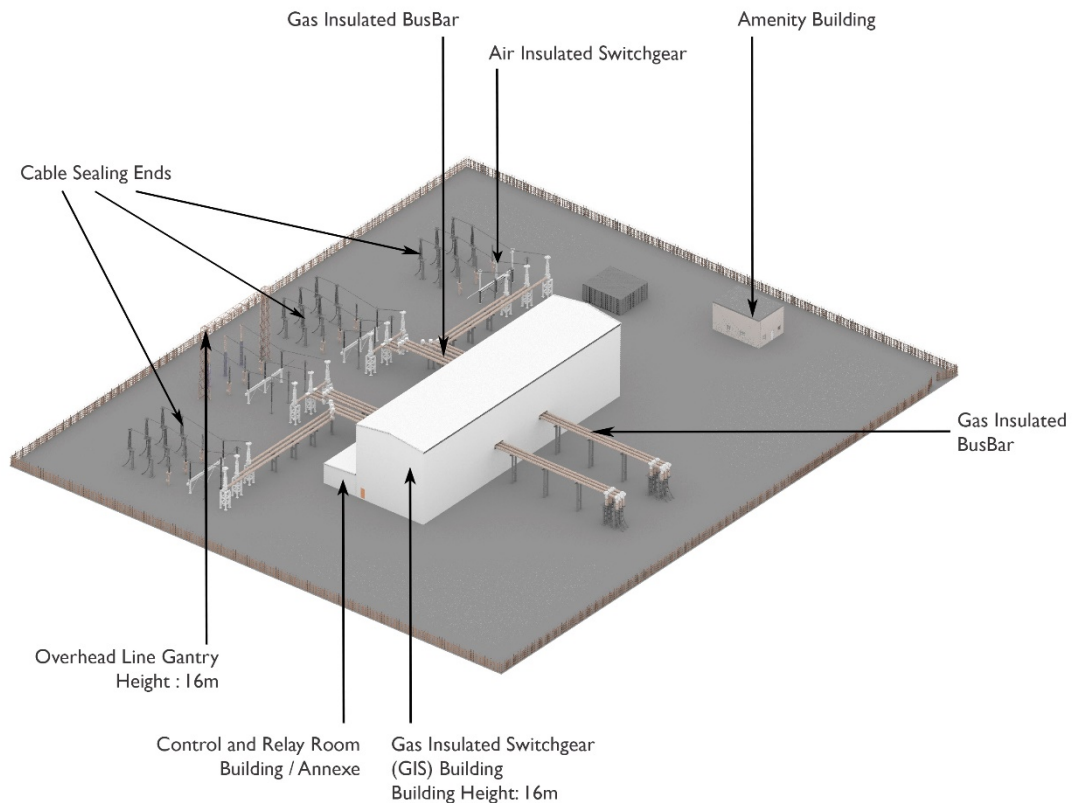
**Plate A29.1 East Anglia ONE North and East Anglia TWO Onshore Substation Rochdale Envelope 3D Model**

119. The National Grid substation shown in the photomontage visualisations **Figures 29.13 – 29.26** and assessed in the LVIA is based on a Rochdale Envelope defined by a realistic worst-case 3D model representation of the National Grid substation with Air Insulated Switchgear (AIS), as shown in **Plate A29.2**, which has a footprint of 310m x 145m.



**Plate A29.2 National Grid Substation Rochdale Envelope AIS 3D Model**

120. The option of a National Grid substation with GIS electrical infrastructure up to 16m in height is deemed not to be the worst case due to the reduced footprint (120m x 140m) (with a 24m x 60m building) compared to the larger footprint of the AIS electrical infrastructure (310m x 145m), as shown in **Plate A29.3**. For comparison, a set of visualisations with the National Grid substation with GIS electrical infrastructure have been produced in **Figures 29.33 - 29.45**. These are for information purposes only to enable comparison of National Grid substation options.



**Plate A29.3 National Grid Substation GIS 3D Model**

121. The photomontage visualisations in **Figures 29.13 – 29.26** also show the proposed National Grid overhead line re-alignments based on a 3D model of the overhead line provided by National Grid. This is representative of the worst-case for the National Grid overhead line realignment works and involves the permanent realignment of the existing overhead lines; constituting of reconstruction or replacement of up to three existing overhead pylons in proximity to the National Grid substation and the addition of up to one new pylon in close proximity to existing overhead pylons.

#### 29.2.6.3 Assumptions on Woodland Planting shown in Visualisations

122. Photomontage visualisations in **Figures 29.13 – 29.26** show the predicted view of the onshore substations and National Grid infrastructure with recently planted trees, in the first year of planting as the ‘without mitigation’ scenario.

123. The photomontages also include a visual representation of the ‘with mitigation’ scenario with proposed woodland mitigation planting at approximately 15 years post planting. They assume that fully established trees will be generally retaining

good vigour and starting to achieve good height with tree crowns spreading and are expected to provide notable screening of the onshore substations and National Grid infrastructure. Woodland mitigation planting shown in the visualisations accords with the proposed planting shown in the Outline Landscape Mitigation Plan (OLMP) (**Figure 29.11a-b** and **Figure 29.12**). The landscape and visual effects of the onshore substation and National Grid substation are assessed in the LVIA with the OLMP as an embedded part of the project design, at the first year of the operational phase and at 15 years post construction.

124. There are four types of woodland planting proposed, as shown in **Figure 29.11a**, consisting of a core native woodland, native edge woodland, native wet woodland and native screening woodland. At 15 years post-planting, trees within the proposed woodland planting areas (**Figure 29.11a**) are assumed to be within the following height ranges:

- Core native woodland (W1). Taller trees assumed to have heights between 6.5m – 7.8m and smaller trees/shrubs are assumed to have heights of 2m – 4m to form an understory.
- Native edge woodland (W2). Trees assumed to have heights between 2m – 5m.
- Native screening woodland (W3). Taller trees assumed to have heights between 6.5m – 8.4m and smaller trees/shrubs are assumed to have heights of 2m – 4m to form an understory
- Native wet woodland (W4). Taller trees assumed to have heights between 6.5m – 7.8m and smaller trees/shrubs are assumed to have heights of 2m – 4m to form an understory.

125. These tree heights are assumed for the ‘with mitigation’ impact assessments in this impact assessment (at 15 years post-planting) and are shown in the Year 15 ‘with mitigation’ photomontages in **Figures 29.13 – 29.26**. These photomontages are produced using a 3D model which accurately shows the height and extent of woodland areas. A range of tree heights within the upper and lower height ranges are shown in the photomontages and are assumed for the ‘with mitigation’ impact assessments in **section 29.6** of this ES chapter. This provides for a representation of likely differences in growth and a more realistic appearance of the woodland areas in the photomontages, than if the trees are all shown at the same height. Trees at the upper end of the height range, for example 7.8m for core woodland, are only applied for a minority proportion of the overall mix as represented in the photomontages, with a range of tree heights shown to represent the range of likely growth of different trees within the planting mixes proposed.

126. Heights of taller trees at 15 years post-planting are based on an assumption of planting 60cm cell-grown plants, with an average annual growth rate of 30cm per year for the first 5 years and 50cm per year for the next 10 years, based on relevant guidance (IEMA 2019), research of relevant published literature (Skinner, 1987) and plant nurseries, and are comparable to precedents established by other NSIP projects. A variation tolerance of +10% to -10% has been applied to allow for some variation in growth, above and below the average, and to provide differences in canopy height in the photomontage visualisations.

#### 29.2.6.4 Information on Limitations of Visualisations

127. The photomontage visualisations used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.

128. The photomontage visualisations of the onshore substation and National Grid infrastructure (and any development proposal) have a number of limitations when using them to form a judgement on visual effect. These include:

- Photomontages of the onshore substations (**Figures 29.13 – 29.26**) are based on a Rochdale Envelope defined by a realistic worst-case 3D model, as shown in **Plate A29.1**. This 3D model represents the size and height of features within the onshore substation as a Rochdale Envelope for this impact assessment, but does not show the final design of the onshore substation. Photomontages of the National Grid infrastructure are based on the 3D models provided by National Grid (**Plate A29.2** and **Plate A29.3**).
- Photomontages (**Figures 29.13 – 29.26**) show the National Grid overhead line re-alignments based on a 3D model of the overhead line provided by National Grid.
- A visualisation can never show exactly what a development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image.
- The images provided give a reasonable impression of the scale and the distance to the onshore substation and National Grid substation but can never be 100% accurate to the as constructed effect.
- A static image cannot convey movement or reflection from the sun.
- The viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations.
- To form the best impression of the effects, these images are best viewed at the viewpoint location shown.

- The images must be printed and viewed at the correct size (841mm x 297mm).
- Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression.
- It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression.
- There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day. The photographs shown in the visualisations show the most favourable weather conditions available during photographic survey work undertaken in Suffolk in February 2018, with the times and dates of all photographs shown in the onshore substation visualisations in **Figures 29.13 – 29.26**.

#### 29.2.6.5 Weather Conditions

129. GLVIA3 para 8.22 states – *'In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*
- *Representative of those generally prevailing in the area; or*
  - *Taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible'*.
130. In preparing photomontages for the LVIA, photographs have been taken in favourable weather conditions. Weather conditions shown in the viewpoint photographs of the East Anglia ONE North and TWO onshore substations have been taken during periods of 'very good' or 'excellent' visibility conditions during winter, seeking to represent a maximum visibility scenario (when trees are not in leaf). All of the photomontages have been produced using photographs taken during winter (in February 2018) to represent the worst-case/maximum visibility scenario when trees are not in leaf and provide less screening than in the summer months.
131. Viewpoint photography has also been undertaken from all of the onshore substation viewpoints during summer, in July 2018, including from six additional viewpoints requested by Suffolk County / Suffolk Coastal District Council. These viewpoints (Aldringham Court; Footpath T junction at GR425611; Footpath T junction at GR426606; Footpath road junction at GR421627; Footpath T junction at GR39862 and Sloe Lane at GR399600) are included in the ES as illustrative viewpoints with baseline view panoramas presented in **Figures 29.33 – 29.45**.

132. Rendering of the onshore substation and National Grid substation in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There is some variation in the appearance and visibility between the viewpoints, as they are rendered to suit the conditions shown in each of the different viewpoint photographs, which have some unavoidable degree of variation in terms of lighting and weather conditions. The key requirement is that the East Anglia ONE North and TWO onshore substations have been rendered with sufficient contrast against the skyline backdrop to illustrate their maximum visibility scenario in each image. The full suite of viewpoint photomontages should be viewed to gain an impression of the likely visual effects of the proposed East Anglia ONE North project.

#### 29.2.6.6 Zone of Theoretical Visibility

133. The ZTV of the East Anglia ONE North and TWO substations has been generated using GIS software (ESRI ArcGIS Version 10.5) to demonstrate the amount of the East Anglia ONE North and TWO substation locations that may theoretically be seen from any point in the study area. The ZTVs, shown in **Figures 29.7 – 29.10**, show the amount of the East Anglia ONE North and TWO substation locations that are theoretically visible around the study area (based on the Rochdale Envelope).

134. There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV:

- The ZTV has been calculated using 2m lidar data with surface features. It therefore does take into account the screening effects of vegetation, buildings, or other surface features that may prevent or reduce visibility (insofar as they are represented in the Lidar data).
- The ZTVs are based on theoretical visibility from 2m above ground level.
- The ZTV shows higher to lower visibility based on the amount of the onshore substation and National Grid substation visible as represented by a grid of data points representing the 3D model of the onshore substation and National Grid substation.
- The ZTV does not indicate the decrease in visibility that occurs with increased distance from the proposed East Anglia ONE North offshore development area. The nature of what is visible from 3km away will differ markedly from what is visible from 500m away, although both could be indicated in the ZTV as having the same level of visibility.
- The ZTV includes existing woodlands within the calculation of visibility, based on OS Vectormap data.



135. These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the East Anglia ONE North and TWO substation locations will theoretically be visible, the information drawn from the ZTV is checked in the field, to ensure that the assessment conclusions represent the visibility of the East Anglia ONE North and TWO substation locations a reasonably accurately.

### 29.3 References

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