

Norfolk Boreas Offshore Wind Farm

Chapter 29

Landscape and Visual Impact Assessment

Environmental Statement

Volume 1

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Glossary of Acronyms

AONB	Area of Outstanding Natural Beauty
CA	Conservation Area
CIA	Cumulative Impact Assessment
DCO	Development Consent order
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ETG	Expert Topic Group
ES	Environmental Statement
GIS	Geographical Information System
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HDD	Horizontal Directional Drilling
HE	Historic England
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LCA	Landscape Character Assessment
LCT	Landscape Character Types
LCU	Landscape Character Units
LI	Landscape Institute
LVIA	Landscape and Visual Impact Assessment
MA	Mobilisation Area
NCA	National Character Areas
NP	National Park
NPS	National Policy Statement
OLEMS	Outline Landscape and Ecology Management Strategy
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PRoW	Public Rights of Way
RPG	Registered Park and Garden
SEO	Statements of Environmental Opportunity
LSA	Landscape Sensitivity Assessment
SNH	Scottish Natural Heritage
SoS	Secretary of State
WCA	Worst Case Assumption
ZTV	Zone of Theoretical Visibility

Glossary of Terminology

Cable logistics area	Existing hardstanding area to allow the storage of cable drums and associated materials and to accommodate a site office, welfare facilities and associated temporary infrastructure to support the cable pulling works.
Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
Ducts	A duct is a length of underground piping, which is used to house electrical and communication cables.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to the EIA and information to support the HRA.
Indicative mitigation planting	Areas identified for mitigation planting at the onshore project substation, Necton National Grid substation extension and the A47 junction.
Jointing pit	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	Where the offshore cables come ashore at Happisburgh South.
Landfall compound	Compound at landfall within which HDD drilling would take place.
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing low voltage electrical earthing links.
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
National Grid new / replacement overhead line tower	New overhead line towers to be installed at the National Grid substation.
National grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid overhead line temporary works area	Area within which the work will be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
National Grid temporary works area	Land adjacent to the Necton National Grid substation which would be temporarily required during construction of the National Grid substation extension.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard.
Norfolk Boreas site	The Norfolk Boreas wind farm boundary. Located offshore, this will contain all the wind farm array.
Norfolk Vanguard	Norfolk Vanguard offshore wind farm, sister project of Norfolk Boreas.
Offshore export cables	The cables which transmit power from the offshore electrical platform to the landfall.
Onshore 400kV cable route	Buried high-voltage cables linking the onshore project substation to the Necton National Grid substation.
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation.

Onshore infrastructure	The combined name for all onshore infrastructure associated with the project from landfall to grid connection.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Onshore project substation temporary construction compound	Land adjacent to the onshore project substation which would be temporarily required during construction of the onshore project substation.
Overhead line	An existing 400kV power line suspended by towers.
Running track	The track along the onshore cable route which the construction traffic would use to access workfronts.
The Applicant	Norfolk Boreas Limited.
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Transition pit	Underground structures that house the joints between the offshore export cables and the onshore cables.
Trenchless crossing compound	Pairs of compounds at each trenchless crossing zone to allow boring to take place from either side of the crossing.
Trenchless crossing zone (e.g. HDD)	Areas within the onshore cable route which will house trenchless crossing entry and exit points.
Workfront	A length of onshore cable route within which duct installation works will occur, approximately 150m.

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29 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

29.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the Landscape and Visual Impact Assessment (LVIA) for the proposed Norfolk Boreas project (herein ‘the project’). The chapter provides an overview of the existing environment where the onshore project area is proposed, followed by an assessment of the potential impacts and associated mitigation for the onshore area of the project during the construction, operation and decommissioning phases.
2. The assessment has been undertaken by Optimised Environments Ltd (OPEN) on behalf of Norfolk Boreas Limited. The assessment has been prepared in accordance with National Policy Statements (NPSs) with specific reference to the Overarching NPS for Energy (NPS EN-1) (July 2011).
3. Vattenfall Wind Power Limited (VWPL) (the parent company of Norfolk Boreas Limited) is also developing Norfolk Vanguard, a ‘sister project’ to Norfolk Boreas. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking to obtain consent to undertake enabling works for both projects at the same time. However, Norfolk Boreas needs to consider the possibility that Norfolk Vanguard may not proceed to construction.
4. The Environmental Impact Assessment (EIA) will therefore be undertaken using the following two alternative scenarios (further details are presented in Chapter 5 Project Description) and an assessment of potential impacts will be undertaken against each scenario:
 - **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
 - **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.
5. The assessment also considers cumulative impacts of other proposed projects. The methodology adhered to for the LVIA and Cumulative Impact Assessment (CIA) is outlined in section 29.4.2 and presented in detail in Appendix 29.1.
6. The focus of the chapter is on the landscape character and visual amenity. The seascape assessment of the offshore electrical transmission works has been scoped out of the LVIA owing to the distance of these works offshore. This approach has been agreed with the Secretary of State (SoS) via the Scoping Opinion in November 2016. The scope of the assessment is presented in section 29.5.

7. A detailed description of the onshore project area is presented in Chapter 5 Project Description and a summary of the worst case assumptions relating to the LVIA is presented in 29.7.3.
8. Owing to the close association between landscape character, visual amenity, heritage, ecology and recreation, this chapter should also be read in conjunction with the other related ES chapters (and their appendices and supporting documents). The relevant chapters are:
 - Chapter 22 Onshore Ecology;
 - Chapter 28 Onshore Archaeology and Cultural Heritage; and
 - Chapter 30 Tourism and Recreation.

29.2 Legislation, Guidance and Policy

9. There are a number of pieces of legislation, policy and guidance applicable to landscape and visual receptors. The following sections provide detail on key pieces of international and UK legislation, policy and guidance which are relevant to this chapter.

29.2.1 Guidance

10. The assessment takes account of the methods outlined in the following best practice guidance documents:
 - The Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition (GLVIA 3);
 - Natural England and the Department for Environment, Food and Rural Affairs (2014). Landscape and Seascape Character Assessments;
 - Natural England (2014). An Approach to Landscape Character Assessment;
 - Scottish Natural Heritage (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
 - Scottish Natural Heritage (February 2017). Visual Representation of Wind Farms: Version 2.2;
 - The Landscape Institute (2011). Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment; and
 - The Landscape Institute (March 2017). Landscape Institute Technical Guidance Note 02/17, Visual Representation of development proposals.

29.2.2 National Policy Statements

11. The assessment of potential impacts on the landscape and visual receptors has been made with reference to relevant NPSs, as discussed in Chapter 3 Policy and Legislative Context. The relevant NPSs to this assessment are:
- Overarching National Policy Statement for Energy (NPS EN-1 July 2011);
 - National Policy Statement for Renewable Energy Infrastructure (NPS EN-3 July 2011); and
 - National Policy Statement for Electricity Networks Infrastructure (NPS EN-5 July 2011).
12. The specific assessment requirements for landscape and visual receptors, as detailed in the NPSs, are summarised in Table 29.1.

Table 29.1 NPS assessment requirements

NPS Requirement	NPS Reference	ES Reference
EN-1 Overarching NPS for Energy		
Paragraph 5.9.5 of EN-1 advises that the applicant should carry out a landscape and visual assessment and makes reference to the following documents: Landscape Institute and Institute of Environmental Management and Assessment (2002, 2nd edition): Guidelines for Landscape and Visual Impact Assessment; and Land Use Consultants (2002): Landscape Character Assessment – Guidance for England and Scotland.	Paragraph 5.9.5	‘The Guidelines for Landscape and Visual Impact Assessment’ (GLVIA) (2002, 2nd edition) has been superseded by GLVIA Version 3. Landscape Character Assessment – Guidance for England and Scotland has been superseded by Natural England’s ‘An Approach to Landscape Character Assessment’. This LVIA has been prepared following the updated versions of these documents which are referred to in Appendix 29.1 LVIA Methodology.
“The landscape and visual assessment should include reference to any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project. The applicant’s assessment should also take account of any relevant policies based on these assessments in local development documents in England.”	Paragraph 5.9.5	Published character assessments for the study area and policies are referred to in section 29.6.2 of the LVIA and in Appendix 29.2 Existing Environment.
“The applicant’s assessment should include the effects during construction of the project and the effects of the	Paragraph 5.9.5	The effect on landscape components and

NPS Requirement	NPS Reference	ES Reference
completed development and its operation on landscape components and landscape character.”		landscape character during construction and operation are assessed in section 29.7 of the LVIA.
“The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity.”	Paragraph 5.9.7	The visual effect of the project during construction and operation are assessed in section 29.7 of the LVIA.
“Landscape effects depend on the existing character of the local landscape, its current quality, how highly it is valued and its capacity to accommodate change. All of these factors need to be considered in judging the impact of a project on landscape. Virtually all nationally significant energy infrastructure projects will have effects on the landscape. Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.”	Paragraph 5.9.8	The quality, value and capacity of the landscape to accommodate change are considerations of the landscape assessment. The design of the project has considered the potential impact on the landscape in order to minimise harm by mitigation of landscape effects as presented in section 29.7.1 of the LVIA.
“The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints.’ ... and paragraph 5.9.13 advises ‘The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent.”	Paragraph 5.9.12	The potential for the project to affect the Norfolk Coast Area of Outstanding Natural Beauty (AONB), The Broads National Park (NP) and Registered Parks and Gardens (RPG), has been considered in section 29.6.3 of the LVIA.
“Outside nationally designated areas, there are local landscapes that may be highly valued locally and protected by local designation. Where a local development document in England has policies based on landscape character assessment, these should be paid particular attention. However, local landscape designations should not be used in themselves to refuse consent, as this may unduly restrict acceptable development.”	Paragraph 5.9.14	The value of the local landscape is a consideration within the LVIA and assessed in respect of each landscape receptor in section 29.7.
“The IPC [now the Planning Inspectorate and the Secretary of State] should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to minimise harm to the landscape, including by reasonable mitigation.”	Paragraph 5.9.16	Chapter 4 Site Selection and Assessment of Alternatives of the ES sets out the iterative process that has influenced the design of the project. The mitigation of landscape and visual effects has been

NPS Requirement	NPS Reference	ES Reference
		carefully considered in the LVIA, to minimise 'harm to the landscape' where possible.
<p>"It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors. This may assist the IPC in judging the weight it should give to the assessed visual impacts of the proposed development."</p>	Paragraph 5.9.19	Chapter 5 Project Description includes examples of the type of infrastructure to be used and their likely parameters / dimensions. Figures 29.23-29.46 contain visualisations to simulate the potential view of infrastructure from likely sensitive receptors.
<p>"Within a defined site, adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes, depending on the size and type of the proposed project. Materials and designs of buildings should always be given careful consideration."</p>	Paragraph 5.9.22	Mitigation through detailed landscape proposals will be a consideration in terms of the mitigation of landscape and visual effects. These are presented in section 29.7.1.
EN-3 NPS for Renewable Energy Infrastructure		
<p>"Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology."</p>	Paragraph 2.4.2	Project design has avoided sensitive features where possible. Embedded mitigation measures are presented in section 29.7.1.
EN-5 NPS for Electricity Networks Infrastructure		
<p>"New substations, sealing end compounds and other above ground installations that form connection, switching and voltage transformation points on the electricity networks can also give rise to landscape and visual impacts. Cumulative landscape and visual impacts can arise where new overhead lines are required along with other related developments such as substations, wind farms and/or other new sources of power generation."</p>	Paragraph 2.8.2	The potential effects of the onshore project substation, National Grid substation extension and overhead line modification have been assessed in the LVIA in section 29.7.

29.3 Consultation

13. Consultation is a key driver of the EIA and is an ongoing process throughout the lifecycle of the project, from the initial stages through to consent and post-consent. To date, consultation regarding landscape and visual receptors has been conducted through the Scoping Report (Royal HaskoningDHV, 2017), the Evidence Plan Process

(EPP), namely the LVIA Method Statement (OPEN, 2018, unpublished) and the Preliminary Environmental Information Report (PEIR) (Norfolk Boreas Limited, 2018). Feedback received during the process to date has been incorporated into this ES.

14. As the majority of the onshore infrastructure for Norfolk Boreas and Norfolk Vanguard is co-located, the pre-application consultation undertaken as part of Norfolk Vanguard is relevant to both projects and has been used to inform the approach to this assessment.
15. The LVIA Method Statement (OPEN, 2018, unpublished) and PEIR (Norfolk Boreas Limited, 2018), produced for Norfolk Boreas, in addition to ETG meetings held for Norfolk Vanguard, have helped formalise agreement on the selection of viewpoints and cumulative scenarios, as well as establish the content and methodology to be applied in the LVIAs for Norfolk Boreas. These provide a useful source of consultee feedback and comments submitted by consultees have been taken into consideration within this ES. Full details of the project consultation are presented within Chapter 7 Technical Consultation.
16. Consultee responses received for Norfolk Boreas are presented in Table 29.2. The response column indicates how the comment has been addressed, with reference to the relevant section of the ES, where required.

Table 29.2 Norfolk Boreas Consultation Responses

Consultee	Document /Date	Comment	Response / where addressed in the ES
SoS	Scoping Opinion June 2017	<p><i>The SoS notes the proposed study areas and that these will be defined by a number of factors as noted in paragraph 1409 of the Scoping Report. The SoS recommends that the Environmental Statement (ES) identifies clearly justified study areas and considers that further justification for their choice - in addition to that within the Scoping Report - could be provided. For example, it is noted that the proposed study areas would be 5km for the substation and 3km for the cable relay station.</i></p> <p><i>The SoS notes these structures would be different maximum heights (25m and 8m respectively), however the Scoping Report does not state whether this has influenced the study areas. Justifications for Scoping Opinion for Norfolk Boreas Offshore Wind Farm study areas should make clear reference to the proposed</i></p>	<p>ZTVs for the onshore project substation and National Grid substation extension combined with knowledge of the wider areas have been used to define the study areas. The justification for the study area extents is presented in section 29.5.1. Information on survey work is presented in section 29.5.2 and on methodology in section 29.4.</p>

Consultee	Document /Date	Comment	Response / where addressed in the ES
		<i>Zones of Theoretical Visibility (ZTVs) and fieldwork to verify actual visibility.'</i>	
SoS	Scoping Opinion June 2017	<i>'Section 4.2.1.7 of the Scoping Report has identified a number of potential visual receptors and states that the LVIA would include a baseline assessment of the relevant principal visual receptors. The SoS advises that principal visual receptors are agreed with relevant consultees. The SoS notes the preliminary viewpoint lists in the Scoping Report and welcomes that the final list of viewpoints would be agreed with statutory consultees.'</i>	All relevant consultees have been consulted regarding the selection of viewpoints and visual receptors through the Norfolk Vanguard and the Norfolk Boreas Evidence Plan Processes (Chapter 7 Technical Consultation).
SoS	Scoping Opinion June 2017	<i>'The Scoping Report proposes to scope out landscape, visual and cumulative impacts of offshore components for all phases of the development given the distance from onshore landscape and visual receptors (72km); the relative sensitivity of the offshore receptors; and the existing influence of other offshore development and shipping vessels. The SoS agrees a significant effect is unlikely and that this can be scoped out of the EIA, but welcomes that the potential temporary impacts from the presence of construction vessels close to the coast will be assessed in respect of onshore receptors. The spatial extent of effects close to the coast should be defined i.e. at what distance from the coast they become indiscernible.'</i>	The assessment of offshore components has been scoped out of this LVIA. Effects of construction vessels on the coastline have been assessed in section 29.7.
SoS	Scoping Opinion June 2017	<i>'The Scoping Report proposes to scope out the potential effects from the landfall and the cable relay station on local landscape character during construction and operation given the small scale of the landfall in respect of the scale of the local landscape character areas; and on landscape designations given the low-lying level of works and distance to designated areas. Given these elements form part of a wider development (including the onshore cable), the SoS considers that impacts on landscape character should be considered for the development as a whole during the construction phase. However, the SoS</i>	The assessment of the operational phase of the landfall and onshore cable route has been scoped out of this LVIA as agreed with the SoS in the Scoping Opinion. Impacts of the landfall construction on landscape character are included in section 29.7.

Consultee	Document /Date	Comment	Response / where addressed in the ES
		<i>agrees to scope this out for the operational phase.'</i>	
SoS	Scoping Opinion June 2017	<i>'The SoS agrees that operational impacts from the landfall and onshore cable route can be scoped out on the basis that consideration will be given to the impact of vegetation loss and the mitigation measures which would take place through replanting.'</i>	Residual effects of vegetation loss associated with the onshore cable route that will carry on into the operational phase have been assessed in section 29.7.
SoS	Scoping Opinion June 2017	<i>'The SoS advises that the ES should make use of photomontages to illustrate the cable relay station and the substation. In producing visualisations, including photomontages and wireframes, views should be verified and visualisations should accord with industry standards.'</i>	The LVIA includes photomontages of the onshore project substation from key viewpoints produced in compliance with industry standards and verified on site. Visualisations are presented in Figures 29.23-29.46. Appendix 29.1 LVIA Methodology describes the process of verification.
SoS	Scoping Opinion June 2017	<i>Table 4.4 of the Scoping Report proposes to scope out cumulative landscape and visual impacts of the landfall for all phases of the Proposed Development and of the onshore cable route for operation and decommissioning. The SoS agrees with this approach for operation and decommissioning; however, as the projects to be considered in the CIA have not yet been determined, the SoS does Scoping Opinion for Norfolk Boreas Offshore Wind Farm not agree that construction phase cumulative impacts can be scoped out at the landfall at this stage. It cannot be certain that other large developments may not be constructed concurrently in proximity to these elements (including the Norfolk Vanguard project).</i>	A list of projects to be assessed in the Norfolk Vanguard ES has been agreed with Norfolk County Council. This list is considered relevant also to Norfolk Boreas and has been used as the basis of the CIA in section 29.8, with particular regard to the Norfolk Vanguard project.
SoS	Scoping Opinion June 2017	<i>The SoS welcomes the consideration of advanced planting to mitigate potential effects. Any proposed mitigation by way of vegetation and planting should be considered within the ecological assessment. The Applicant is advised to submit a draft landscaping plan with their application.</i>	The worst case assumption assumes no advanced planting, although this will be implemented during the construction phase where practicable. Mitigation planting will integrate with ecological management plans. See section 29.7.1 for more information.

Consultee	Document /Date	Comment	Response / where addressed in the ES
SOS	Scoping Opinion June 2017	<i>'The SoS notes the comments of East Rushton and Necton Parish Councils that the EIA should consider, in detail, the potential effects of lighting in and around the onshore infrastructure during both construction and operation. The operational lighting assessment should also be considered in the context of the landscaping strategy as referred to above.'</i>	The effect of lighting in and around the onshore infrastructure during the construction and operational phases has been assessed in section 29.7.
Historic England	Scoping Opinion June 2017	<i>'We also note that heritage specific viewpoints are not considered in Chapter 4.2 (see table 4.1). We recommend that heritage specific viewpoints are an important part of assessing the impact upon the setting of designated heritage assets. Heritage viewpoints would need to be considered and incorporated into the landscape chapter of the ES but cross referenced with the Onshore archaeology and cultural heritage chapters. It would be appropriate to consult Historic England on the list of appropriate heritage viewpoints, once this has been considered.'</i>	Heritage specific viewpoints have been included in Chapter 28 Onshore Archaeology and Cultural Heritage where the assessment focuses on the impacts on the setting of designated assets.
Natural England	Scoping Opinion June 2017	<i>'As the proposed wind farm is evidently near the Norfolk Coast Area of Outstanding Natural Beauty (AONB), consideration should be given to the direct and indirect effects upon this designated landscape. In particular consideration should be given the effect upon its purpose for designation, as well as the content of its management plan.'</i>	The LVIA considers the potential effects on the Norfolk Coast AONB in section 29.6.3.
Natural England	Scoping Opinion June 2017	<i>'The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving,</i>	The relevant Landscape Character Assessments have been used to inform the assessment of effects on landscape character in section 29.7.

Consultee	Document /Date	Comment	Response / where addressed in the ES
		<i>enhancing or regenerating character, as detailed proposals are developed.'</i>	
Natural England	Scoping Opinion June 2017	<i>'Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.'</i>	GLVIA 3 is used as the basis for the LVIA methodology as set out in Appendix 29.1.
Necton Parish Council	Scoping Opinion June 2017	<i>'An assessment of the long-term visual impact on the area, taking into consideration the existing sub-stations at Necton and the wind turbines at South Pickenham and Swaffham. The review must consider the rate of industrialisation of this rural landscape.'</i>	The cumulative impact of energy developments in this area is considered in section 29.8.
Necton Parish Council	Scoping Opinion May 2017	<i>'A detailed landscaping plan, ensuring best use of the existing land features, such as undulations and woodland copses; to include a timetable, begin at pre-construction stage and be applied alongside construction so that when the works are complete, the selected plant-life has matured.'</i>	The worst case assumption assumes no advanced planting, although this will be implemented during the construction phase where practicable. Mitigation planting plans are shown on Figures 29.9, 29.10b, 29.19, 29.20b and 29.21b.
ETG (Norfolk County Council, Breckland Council, Broadland District Council, North Norfolk District Council)	LVIA Method Statement January 2018	Norfolk Coastal Partnership agreed with the proposed Boreas LVIA viewpoints. North Norfolk District Council requested additional and clarification on viewpoints relevant to the cable relay station. Following the subsequent decision to use HVDC technology the CRS is no longer required, therefore no further action required. Natural England were in agreement on guidance, methodology, study area and potential impacts.	No action required.
Norfolk County Council	PEIR October 2018	<i>'We note the "layering" approach which is being employed of proposed hedge, nurse woodland and core woodland, and when combined with existing vegetation and landscaping is likely to create a more natural appearance than large blocks of woodland would otherwise create. Whilst removal of vegetation is not explicitly depicted on the plans, there are areas of</i>	Hedgerows which are temporarily removed to enable the construction of the project will be reinstated where possible. Mitigation planting around the onshore project substation and National Grid substation extension would result in a substantial net

Consultee	Document /Date	Comment	Response / where addressed in the ES
		<i>replacement hedge shown which are minimal.'</i>	increase, despite small area of vegetation removal.
Norfolk County Council	PEIR October 2018	<i>'It is noted that the LVIA has been carried out using methodology by OPEN which accords with the Landscape Institute GLVIA 3 guidance. Where the OPEN methodology diverges from the GLVIA 3 guidance, reasoned justification has been given. This is namely in choosing not to combine the magnitude of change rating for the size or scale of effect, its geographical extent and its duration and reversibility. The choice to not combine seems appropriate for the proposals and is well justified in the methodology. The study area has been defined as 3km radius from the outer edge of the onshore project substation and a 500m strip either side of the cable route and associated access and mobilisation areas. This appears a suitable study area and will be effective in assessing the potential landscape and visual impacts.'</i>	Noted.
Norfolk County Council	PEIR October 2018	<i>'It is understood that two proposals are being considered for the EIA, the first where Norfolk Vanguard proceeds to construction and therefore Norfolk Boreas is able to use infrastructure already installed, and a second where Norfolk Vanguard does not progress and therefore Norfolk Boreas will need to undertake all works as required. The assessment also considers the Cumulative Impacts of potential other projects including the National Grid substation extension and the Hornsea Project. The viewpoint assessment includes a number of visualisations which accord with SNH's Visual Representation of Wind Farms Version 2.2 2017, which is endorsed by the Landscape Institute and considered the preferable guidance.'</i>	Noted.
North Norfolk District Council	PEIR October 2018	<i>'In respect of relevant Local Policy and material planning considerations, in 2018 North Norfolk District Council commissioned two new studies: a) revised Landscape Character Assessment (LCA); and b) a new Landscape Sensitivity Assessment (LSA) (with particularly</i>	The new LCA and LSA documents are referenced at section 29.6.2 and in Appendix 29.2 Existing Environment. The onshore cable route is the only component of the project that would occur within the North

Consultee	Document /Date	Comment	Response / where addressed in the ES
		<p>reference to renewable energy and low carbon development).</p> <p>Both of these documents have been published in final form and represent the most up to date and accurate assessment, based on current best practice. Public consultation on these documents is expected to take place in Feb/Mar 2019 with adoption as SPD in Spring/Summer 2019.</p> <p>Whilst NNDC recognise that much of the work from the Vanguard proposal will likely inform Boreas, reference within the PEIR to the older NNDC Landscape Character Assessment document should be cross referenced against the new LCA and LSA and, if/where there is conflict, then the most up to date evidence should be used to inform the assessment of impacts on landscape character and visual impacts within North Norfolk and to inform appropriate mitigation strategies.'</p>	<p>Norfolk District and owing to the relatively small scale of the construction works, even considering Scenario 2, the change would not be of sufficient magnitude to redefine the character of the landscape character areas which the onshore cable route passes through. In terms of mitigation, the majority of hedgerows removed would be replaced the first winter after construction.</p>
North Norfolk District Council	PEIR October 2018	'Consideration will also need to be given to the timing of enhancement/mitigation works, linked to the two different scenarios in relation to the Vanguard windfarm.'	In respect of Scenario 1, the implementation of the Norfolk Vanguard and Norfolk Boreas mitigation planting would be phased following an integrated approach with advanced planting established where practicable.
Natural England	PEIR October 2018	'Seek confirmation that there will be no temporary closures of ECP (England Coastal Path) during construction, operation or decommissioning.'	There will be no temporary closure of the Coastal Path.
National Grid	PEIR October 2018	'If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.'	All mitigation planting has been kept clear of the wayleaves associated with the existing overhead lines and overhead line modification works.

29.4 Assessment Methodology

29.4.1 Impact Assessment Methodology

17. Chapter 6 EIA Methodology describes the methodology used throughout the EIA. While the LVIA methodology broadly accords with this methodology, it has been developed to assess the potential impacts on landscape and visual receptors relating to energy developments, and therefore presents a more specific methodology relevant to this topic as agreed by relevant stakeholders through consultation on the LVIA Method Statement (OPEN, 2018, unpublished) and the PEIR (Norfolk Boreas Limited, 2018). Appendix 29.1 sets out the full methodology for the LVIA, while a summary of the key approach is presented below.
18. The LVIA assesses the potential impacts of the project on landscape elements, landscape character and visual receptors within the study areas, as described in section 29.5.1. This includes the likely impacts of the onshore components of the landfall, onshore cable route; onshore project substation, National Grid substation extension, National Grid overhead line modifications and other associated infrastructure (e.g. access tracks and mobilisation areas).

29.4.1.1 Project Description and Scenarios

19. As discussed in section 29.1, Vattenfall Wind Power Limited (VWPL) (the parent company of Norfolk Boreas Limited) is also developing Norfolk Vanguard, a 'sister project' to Norfolk Boreas. Norfolk Vanguard's development schedule is approximately one year ahead of Norfolk Boreas. As the two projects are located next to each other, have a shared onshore cable route and both connect to the Necton National Grid Substation, there has been a strategic approach to identifying project infrastructure with the aim of optimising overall design and reducing impacts where practical.
20. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard Limited, as part of their DCO application, are seeking to obtain consent to undertake enabling works for both projects at the same time, which include:
 - Installation of ducts to house Norfolk Boreas cables along the entirety of the onshore cable route from the landfall zone to the onshore project substation;
 - A47 junction works for both projects and installation of a shared access road up to the Norfolk Vanguard onshore project substation; and
 - Overhead line modifications at the Necton National Grid substation, which will accommodate both projects.

21. If both projects secure consent and proceed to construction, it is intended that the enabling works listed above, will be constructed under the Norfolk Vanguard DCO. Thereby minimising the disruption and disturbance caused by the construction of two projects. This is the preferred option and considered to be the most likely, however, Norfolk Boreas needs to consider the possibility that the Norfolk Vanguard may not proceed to construction. In order for Norfolk Boreas to stand as an independent project, this scenario must be provided for within the Norfolk Boreas DCO. Thus, consent will be sought for the following two alternative scenarios within the DCO, and both scenarios have therefore been assessed as part of the Environmental Impact Assessment (EIA):
- **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
 - **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.
22. Appendix 5.1 contains a detailed comparison of what is included in the two different scenarios across all onshore elements of the project.

29.4.1.2 Categories of effects

23. The LVIA has been carried out using a methodology specifically devised by OPEN for the assessment of energy developments, which generally accords with GLVIA 3 guidance. Where it diverges from specific aspects of this guidance, in a small number of areas, reasoned professional justification for this is presented in Appendix 29.1.
24. The potential impacts of the project on the landscape and visual receptors are grouped into four categories: physical effects, effects on landscape character, effects on views, and cumulative effects.
25. Physical effects are restricted to the onshore project area; these are the direct effects on the fabric of the site, such as the removal or addition of trees and alteration to ground cover. The receptors in this case are landscape elements.
26. Effects on landscape character arise either through the introduction of new elements that physically alter the pattern of elements that makes up landscape character, or through visibility of the project, which may alter the way in which the pattern of elements is perceived. The receptors in this case are landscape character receptors, which are landscape character types and designated landscapes.
27. The assessment of effects on views is an assessment of how the introduction of the project would affect the views experienced by people throughout the study areas. The assessment of effects on views is carried out in two parts:

- An assessment of the effects that the project would have on a series of viewpoints that have been selected to represent the views experienced by people, for example, residents, walkers and road-users, throughout the study areas; and
 - An assessment of the effects that the project would have on views from principal visual receptors, which are the notable settlements, routes, features and attractions found throughout the study areas.
28. Cumulative effects arise where the study areas for two or more developments overlap so that multiple developments are experienced at proximity where they may have an incremental effect, or where developments may combine to have a sequential effect, irrespective of any overlap in visibility. CIAs typically include existing developments that make up the baseline, other developments that are under construction and consented, and those for which planning applications have been submitted. Although under Scenario 1, Norfolk Vanguard forms part of the baseline context and is therefore considered in the main assessment, it is also considered in the CIA, to ensure the ‘in combination’ effects of Norfolk Boreas in combination with Norfolk Vanguard are fully assessed.
29. In respect of sites that are at scoping stage, Scottish Natural Heritage (SNH) advice (SNH, 2012) states *‘Occasionally it may be appropriate to include proposals which are in the early stages of development in an assessment, particularly where clusters of developments or ‘hotspots’ emerge.’*

29.4.1.3 Impact significance

30. The broad objective in assessing the effects is to determine, as required by the 2017 EIA Regulations, any predicted significant effects of the project on the landscape and visual resource. In the LVIA, effects will be assessed to be either significant or not significant.
31. The significance of effects is assessed through a combination of two considerations; (i) the sensitivity of the landscape element, landscape character receptor, view or visual receptor, and (ii) the magnitude of change that will result from the introduction of the project.
32. OPEN’s methodology for assessing energy developments is not reliant on the use of a matrix to determine the significance of landscape and visual effects, nor does it define levels of significance. It is, however, considered useful to include a matrix in the methodology to illustrate how combinations of sensitivity and magnitude of change can give rise to a significant effect and to provide an understanding as to the threshold at which significant effects may arise. Table 29.3 below provides this illustration.

33. Chapter 6 EIA Methodology presents Table 6.1 ‘Significance of an impact resulting from each combination of receptor sensitivity and the magnitude of effect’. Table 29.3 below, largely concurs with Table 6.1, with the exception of its reference to ‘significant’ and ‘not significant’ effects, rather than ‘major’, ‘moderate’ or ‘minor’ effects and the use of one table for both adverse and beneficial effects. The nature of effects relating to landscape and visual impacts are likely to be adverse in nature, unless otherwise stated, as described in section 29.4.1.4.

Table 29.3 Impact significance matrix

Sensitivity	Magnitude of change					
	High	Medium/ High	Medium	Medium/ Low	Low	Negligible
High	Significant	Significant	Significant	Significant/ Not significant	Not significant	Not significant
Medium/ High	Significant	Significant	Significant/ Not significant	Significant/ Not significant	Not significant	Not significant
Medium	Significant	Significant/ Not significant	Significant/ Not significant	Not significant	Not significant	Not significant
Medium/ Low	Significant/ Not significant	Significant/ Not significant	Not significant	Not significant	Not significant	Not significant
Low	Significant/ Not significant	Not significant	Not significant	Not significant	Not significant	Not significant

34. In accordance with GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned argument is presented in respect of the findings in each case. Definitions of significance are presented in Table 29.4 Impact significance definitions.

Table 29.4 Impact significance definitions

Impact Significance	Definition
Significant	A significant impact would occur where the project has a defining impact on the landscape receptor or visual receptor.
Not significant	An impact is not significant where the project does not have a defining impact on the landscape receptor or visual receptor.

35. A significant impact occurs where the project would provide a defining influence on a landscape element, landscape character receptor or visual receptor. Impacts which are not significant occur where the impact of the project is not material and

the baseline characteristics of the landscape element, landscape character receptor or visual receptor continue to provide the definitive influence. In this instance, the project may have an influence, but this influence would not be definitive. Significant cumulative landscape and visual impacts arise where the addition of the project to the baseline under consideration leads to this type of development becoming a prevailing landscape and visual characteristic.

36. Where the assessment identifies significant effects on landscape and visual receptors, these will be mitigated during the construction, operation or decommissioning of the project. Embedded mitigation has been developed as part of the overall project design through site selection and detailed design where possible. The iterative design process has involved the consideration of the sensitivity of the landscape and visual receptors with the aim of mitigating the effects on those more sensitive receptors, especially where visual amenity of residents is a concern. For more information on embedded mitigation, see section 29.7.1.

29.4.1.4 Nature of effect

37. The landscape and visual assessment identifies ‘beneficial’ and ‘adverse’ effects by considering these under the term ‘nature of effect’. The nature of effect is defined in relation to specific definitions for beneficial, neutral or adverse effects as follows:
- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, positive attributes. 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 project neither contributes to, nor detracts from the landscape and visual resource, or 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. Neutral effects may arise where the effect of the project is neither overtly beneficial or adverse, where it achieves a suitable relationship with the landscape or view, all things considered; and
 - Adverse effects are those that detract from or weaken the landscape and visual resource through the introduction of elements that contrast with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.
38. Judgements on the nature of effect are based on professional experience and reasoned opinion informed by best practice guidance.

29.4.2 Cumulative Impact Assessment

39. Chapter 6 EIA Methodology presents the general CIA methodology and summarises the different steps of the CIA as applied in this chapter. Appendix 29.1 sets out the more detailed methodology specific to the requirements of the LVIA process.
40. The objective of the CIA for the LVIA is to describe, visually represent and assess the ways in which any additional impacts associated with the project when considered together with other consented or proposed developments, and to identify related significant cumulative impacts arising as a result of the addition of the project. The guiding principle in preparing the CIA is to *'focus on the likely significant impacts and in particular those which are likely to influence the outcome of the consenting process'*, in accordance with SNH guidance.
41. Projects with the potential to contribute to a significant cumulative impact are presented in Table 29.14 along with an initial assessment of their relevance to the cumulative assessment. The onshore project substation, National Grid substation extension and overhead line modifications are the only above ground elements of the project with the potential to give rise to cumulative effects during operation.
42. Under Scenario 1 there is the potential for a significant effect to arise between Norfolk Boreas onshore project substation and National Grid substation extension in combination with Norfolk Vanguard onshore project substation and National Grid substation extension
43. Under Scenario 2 there is the potential for a significant effect to arise between the construction of the Norfolk Boreas onshore cable route (i.e. the installation of ducts which will not be required under Scenario 1) in combination with Hornsea Project Three onshore cable route, in the localised area where the cable routes cross and where construction compounds are located, to the north-east of Reepham.
44. The CIA focuses on the most relevant cumulative sites as recommended in the Planning Inspectorate's advice note nine: Rochdale Envelope (2012).

29.4.3 Transboundary Impact Assessment

45. The scope of this chapter focusses on the onshore elements of the project and so there is no pathway for transboundary impacts and, therefore, no further consideration of this topic within the assessment.

29.5 Scope

29.5.1 Study Area

46. The boundaries of the study areas used in the LVIA generally define a limit beyond which professional judgement considers it would be unlikely for significant landscape and visual impacts to arise. This judgement is based on previous working knowledge of Norfolk Boreas and Norfolk Vanguard and an understanding of the character of the local landscape and scale of the construction and components of the project. In respect of the onshore project substation and National Grid substation extension, Zone of Theoretical Visibility (ZTV) maps have been used to inform this process (Figures 29.5 and 29.6 (Scenario 1) and 29.16 and 29.17 (Scenario 2)).
47. The study area for the landfall extends to a radius of 1km around the outer extent of the landfall site. The study area for the onshore cable route extends to a continuous band of 1,045m. This comprises of 500m on either side of the outer edge of the onshore cable route, which is up to 45m wide. This 1,045m band extends along the 60km length of the onshore cable route. Where mobilisation areas and trenchless crossing (e.g. HDD) compounds occur, the 500m buffer is applied to the outer extent of these areas. The study area is shown on Figures 29.2 and 29.3 (Scenario 1) and 29.13 and 29.14 (Scenario 2).
48. In respect of the onshore project substation, National Grid substation extension and overhead line modification works, a study area of a 3km radius has been applied to both sites. The ZTVs in Figures 29.5 and 29.6 (Scenario 1) and 29.16 and 29.17 (Scenario 2) show how theoretical visibility would largely be contained within this 3km radius. It shows how continuous theoretical visibility would be concentrated within the first 1 to 2km, with visibility to the east especially restricted by intervening woodland. To the north and west, visibility becomes patchier towards the 3km boundary while to the south, visibility is limited through the valley at a range of 2km, but then resumes onto the ridgeline to the south, extending approximately 0.5km beyond the 3km boundary. Site reconnaissance has shown that while there may be the possibility for actual visibility to occur beyond 3km, the separation distance combined with the extent of intervening tree and hedgerow cover would limit the potential for significant effects to arise.

29.5.2 Desk Study and Field Survey

49. The assessment has been initiated through a desk study of the landfall, onshore cable route, onshore project substation, National Grid substation extension and overhead line modification and associated study areas of these onshore components. This study has identified aspects of the landscape and visual resource that will need to be considered in the landscape and visual assessment, including

landscape-related planning designations, landscape character typology, routes (including roads, National Cycle Routes and long-distance walking routes), settlements and cumulative developments.

50. The desk study has also utilised Geographic Information System (GIS) and Visual Nature Studio software to explore the potential visibility of the project. The resultant ZTV diagrams (Figures 29.5 and 29.6 (Scenario 1) and 29.16 and 29.17 (Scenario 2)) and photomontages have provided an indication of which landscape and visual receptors are likely to be important in the assessment.
51. Field surveys have been carried out throughout the study areas, with the focus on the area that covers the site and those areas that are shown on ZTVs to gain theoretical visibility of the project. The field survey has identified relevant landscape and visual receptors and an assessment has been carried out regarding their sensitivity to the project. Representative viewpoints have also been identified and photography undertaken to present the baseline character and form the basis for photo-montages of the onshore project substation, National Grid substation extension and overhead line modification. Field surveys have assisted the iterative process of site selection by highlighting the extents of actual visibility, the prominence of the sites and the relative sensitivity of surrounding receptors.

29.5.3 Data Sources

52. The data sources used to inform the assessment, and the confidence levels associated with each data source, are listed in Table 29.5 below.

Table 29.5 Data sources

Data	Year	Coverage	Confidence	Notes
Ordnance Survey 25,000 Raster from Norfolk Boreas Limited	2016	Mapping information	High	-
Ordnance Survey 250,000 Raster from OS OPEN data	2016	Mapping information	High	-
North Norfolk Landscape Character Assessment	2009	Classification of North Norfolk landscape into character types	High	Based on Countryside Agency Guidelines
North Norfolk Landscape Character Assessment (Draft SPD)	2018	Classification of North Norfolk landscape into character types	High	Based on Natural England Guidelines
North Norfolk Landscape Sensitivity	2018	Assessment of the sensitivity of North	High	Based on LI, Natural England, Scottish

Data	Year	Coverage	Confidence	Notes
Assessment (Draft SPD)		Norfolk's landscape to various types of renewable and low carbon development.		Natural Heritage and Countryside Agency Guidelines
Broadland Landscape Character Assessment	2013	Classification of Broadland landscape into character types	High	Based on Natural England Guidelines
Breckland Landscape Character Assessment	2007	Classification of Breckland landscape into character types	High	Based on Countryside Agency Guidelines
Norfolk Coast AONB	2016	Identification of a landscape of national importance	High	Data downloaded from Natural England
The Broads National Park	2016	Identification of a landscape of national importance	High	Data downloaded from Natural England
Register of Historic Parks and Gardens	2016	Listing of protected Historic Parks and Gardens in England	High	Designation undertaken by Historic England (HE) with process set out on website
Norfolk Boreas Scoping Report and Consultation Comments	2017	Defining scope of Norfolk Boreas	High	Feedback provided by statutory and other consultees on scope of ES
Norfolk Boreas PEIR and Consultation Comments	2018	Setting out content and detail of future ES for DCO submission	High	Feedback provided by statutory and other consultees on content of EA
Consultation with Norfolk County Council	Ongoing	Agreement on issues relevant to Norfolk Boreas LVIA	High	Consultation of issues relevant to LVIA with council officers
Guidelines for Landscape and Visual Impact Assessment	2013	Accepted guidance for the production of LVIA	High	Guidelines setting out methodology and approach for LVIA
Ordnance Survey 25,000 Raster from Norfolk Boreas Limited	2016	Mapping information	High	-

29.5.4 Assumptions and Limitations

29.5.4.1 Zone of Theoretical Visibility

53. The ZTV has been generated using GIS software (ESRI ArcGIS Version 10.5) to demonstrate the extent to which the onshore project substation and National Grid substation extension may theoretically be seen from any point in the study area. These ZTVs are shown in Figures 29.5 and 29.6 (Scenario 1) and 29.16 and 29.17 (Scenario 2).
54. The zones of theoretical visibility are calculated based on the height of the landform relative to the height of the project. They also factor in the potential screening effect of areas of woodland in the study area, to which an average height of 10m has been attributed, which is considered a conservative average. The ZTVs do not take into account the screening effect of smaller groups of trees, hedgerows, hedgerow trees, buildings or other local features. As a result, the ZTVs present a conservative worst case assumption in respect of theoretical visibility and this is highlighted in the limitations set out below.
55. There are limitations in the production of ZTVs, and these should be considered in their interpretation and use:
 - The ZTV illustrates the ‘bare ground’ situation with major woodland blocks reflected, but does not take into account the screening effects of other vegetation, buildings, or other local features that may prevent or reduce visibility;
 - The ZTVs are based on theoretical visibility from 2m above ground level; and
 - The ZTVs are based on 5m data grid (OS Terrain 5).
56. These limitations mean that while the ZTV is a useful as a starting point in the assessment, by providing an indication of locations from where the project would theoretically be visible, the information drawn from the ZTV is checked in the field, to ensure that the assessment conclusions represent the likely actual visibility of the project.

29.5.4.2 Visualisations

57. The viewpoint assessment is illustrated by a range of visualisations, including photographs and photomontages, which accord with SNH’s Visual Representation of Wind Farms Version 2.2 (SNH, 2017). In the absence of detailed guidance on the production of photomontages for non-wind farm developments, the Landscape Institute (LI) in its Advice Note 01/11 makes the following comment:
 - *“Scottish Natural Heritage’s Visual representation of wind farms: good practice guidance states that the guidance may also be applicable to other forms of development or within other locations. The LI endorses this guidance and*

strongly advises members to follow this where applicable in preference to any other guidance or methodology.”

58. SNH’s guidance is accepted as the relevant guidance to be applied in the production of visualisations for major infrastructure developments across the United Kingdom.
59. Chapter 6 EIA Methodology Section 6.4, ‘The Project Design Envelope’, explains how the project EIA will be based on the ‘Rochdale Envelope’ approach, as supported by The Planning Inspectorate Advice Note Nine (The Planning Inspectorate, 2018). For the purposes of this project ‘The Project Design Envelope’ and the ‘Rochdale Envelope’ are synonymous. The Rochdale Envelope presents the parameters of the project which represent the worst case assumption. This ensures the DCO application covers the maximum possible extent of the project. Visualisations in Figures 29.23 to 29.46 therefore present a Rochdale Envelope approach, marked by a blue dashed 3D box around the computer-generated model, indicating the maximum possible extent of the project. This ensures that the LVIA considers the worst case assumption in respect of both the National Grid substation extension and the onshore project substation.
60. In respect of Scenario 1 and Scenario 2, the location of the 250m x 300m footprint of the onshore project substation is fixed. The Rochdale envelope marks this fixed position and the onshore project substation is represented by the model which occupies this envelope.
61. The design of the National Grid substation extension is represented by a computer-generated model, indicating the worst case assumptions in the design of the substation. It is set within the parameters of the Rochdale Envelope marked by a 3D box in the visualisation. This ensures that as modifications and refinements are made to the design , these will occur within the parameters of the worst case assumption assessed.
62. The design of the onshore project substation will be further developed within the parameters set by the Rochdale Envelope The computer-generated model included in the visualisations provides an indicative representation of the worst case assumption within the Rochdale Envelope and this has formed the basis of the LVIA. Those aspects of the design that would not change include the location and footprint of the development (250m x 300m), the maximum height of the buildings (19m), the maximum height of the lightning protection masts (25m) and the general infrastructure of indoor converter halls and outdoor electrical infrastructure. The computer-generated model has been included in the photomontages to give an impression of the general appearance and character of the onshore project substation, set within the parameters of the Rochdale envelope.

63. Visualisations of energy developments have a number of limitations when using them to form a judgement on the effects of this type of development. These include:
- A visualisation can never show exactly what the energy 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 give a reasonable impression of the scale of the energy developments and the distance from the viewpoint and, whilst they have been produced to accord with best practice guidance, can never be 100% accurate;
 - The viewpoints illustrated are representative of views in the area, but cannot represent visibility at all locations;
 - To form the best impression of the impacts of the development these images are best viewed in the field at the viewpoint location shown; and
 - The visualisations must be printed at the right size to be viewed properly (A1 width) and viewed at a comfortable viewing distance.
64. 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.
65. 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. The visualisations should be viewed flat at a comfortable arm's length.
66. 53.5-degree field of view frames have been used to assist interpretation of the likely effects of the project. They show an enlarged image of the development, which is considered authentic in conveying the likely actual scale that would be experienced on site. For some viewpoints two or three 53.5 degree frames have been included to illustrate the full extent of the project. A 90-degree baseline photograph frame has also been included to illustrate the wider context of the views experienced from each viewpoint.
67. These images are each printed on paper 841 x 297 mm (half A1), which provides for a relatively large-scale image. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.
68. 3D model views that illustrate the onshore project substation and National Grid substation extension within a computer-generated image of the landform are used in the assessment to present an indicative appearance of the project. These are

produced with Visual Nature Studio software and are based on the OS Terrain 5 digital terrain model with a 5m data grid (OS Terrain 5). There are limitations in the accuracy of DTM data so that finer elements of landform may not be picked up precisely and may result in parts of the onshore project substation or National Grid substation extension, being more or less visible than is shown, however, the use of OS Terrain 5 minimises these limitations. Where descriptions within the assessment identify the extent of onshore infrastructure visible, this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions. The modifications to the overhead line, which include an additional tower and an incremental change in the location and height of another tower, are included in the photomontages.

69. Photomontages have been produced for all the representative viewpoints, using Adobe Photoshop software, to provide a realistic image of the appearance of the project. For most views, these include the introduction of the onshore project substation, National Grid substation extension and overhead line modifications, as these are the elements that create the greatest change in views and are likely to be most visible from the surrounding area. The location and scale of the computer-generated model has been verified using markers such as the existing transmission towers, the existing substations, church towers and other fixed built features in the landscape.
70. The photographs and photomontages 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.
71. GPS readings and accurate aerial photography have been used to verify viewpoint locations and markers within the OS terrain model, which is referenced to the OS British National Grid co-ordinate system.
72. In respect of the onshore project substation and National Grid substation extension, there are twelve representative viewpoints shown in Figures 29.23 to 29.46. Viewpoints 1 to 8 were agreed with Statutory Consultees involved in the LVIA ETG Meetings for Norfolk Vanguard, while Viewpoints 9 to 12 were added in response to comments raised at these meetings and since agreed through the Norfolk Boreas ETG consultation. For the Norfolk Boreas LVIA, Viewpoint 3 has been micro-sited to allow slightly fuller visibility of the project. Visualisations have been prepared to represent Scenario 1 and Scenario 2.
73. The Scenario 1 figures (Figure 29.23 to 29.34) for each viewpoint show the following;

- Location map of the viewpoint, baseline photograph and computer-generated model;
- Photomontage of Norfolk Boreas and Norfolk Vanguard onshore project substations, National Grid substation extensions and overhead line modifications; and
- Photomontage of Norfolk Boreas and Norfolk Vanguard onshore project substations, National Grid substation extensions, overhead line modifications and mitigation planting relating to Norfolk Vanguard and Scenario 1 Norfolk Boreas.

74. The Scenario 2 figures (Figures 29.35 to 29.46) for each viewpoint show the following;

- Location map of the viewpoint, baseline photograph and computer-generated model;
- Photomontage of Norfolk Boreas onshore project substation, National Grid substation extension and overhead line modification; and
- Photomontage of Norfolk Boreas onshore project substation, National Grid substation extension, overhead line modification and mitigation planting relating to Scenario 2 Norfolk Boreas.

29.5.4.3 Public access

75. The assessment has been carried out from publicly accessible areas. In instances where parts of these areas have been inaccessible, other sources of information have been used and professional judgement has been applied in the interpretation of these sources.

29.6 Existing Environment

29.6.1 Introduction

76. The existing baseline environment associated with the onshore infrastructure of the project are described in Appendix 29.2 Existing Environment and summarised below.

77. This section presents an overview of the different landscape character types, landscape designations and visual receptors in order to 'set the scene' for the assessment. Desk-based studies have been supplemented with on-site observations regarding the local baseline environments in terms of characteristics and features that will be relevant to the detailed assessments.

78. The baseline descriptions, combined with an overview of the sensitivities of receptors to the project, act to identify those receptors that are susceptible to being significantly affected and this assists in defining the scope of the assessment. Further baseline description and evaluation of sensitivity is to be found in the main

assessment in section 29.7 and cumulative assessment in section 29.8, alongside the assessment of the effects on the individual receptors.

29.6.2 Landscape Character

79. The English landscape is classified at the national level by National Character Areas (NCAs). The 159 NCAs, which cover England, were originally identified by the Countryside Agency. This mapping and the associated descriptions have been revised and developed by Natural England into NCA profiles which provide a recognised, national, spatial framework. The locations of the NCAs are shown in Figure 29.2 and 29.13.
80. The study areas for Norfolk Boreas are within the following NCAs:
- Landfall – North East Norfolk and Flegg (79) and The Broads (80);
 - Onshore cable route – Central North Norfolk (78) and Mid Norfolk (84); and
 - Onshore project substation – Mid Norfolk (84).
81. Each of Natural England’s NCA citations includes ‘*Statements of Environmental Opportunity*’ (SEOs). These are of relevance to the LVIA in respect of replacement planting and embedded mitigation, insofar as certain aims and objectives of the SEOs have been accommodated within the landscape mitigation for the onshore project substation and National Grid substation extension. Replacement planting and embedded mitigation are described in section 29.7.1.
82. Local Authorities across England have produced Landscape Character Assessments (LCA) for their administrative areas which subdivide the broader NCAs into more detailed Landscape Character Types (LCTs) and Landscape Character Units (LCUs). The more local scale of landscape characterisation has been used to inform the baseline descriptions. The relevant LCAs in Norfolk include the following;
- North Norfolk Landscape Character Assessment (June 2009);
 - Broadland District Landscape Character Assessment (Sept 2013);
 - Breckland District Landscape Character Assessment (May 2007); and
 - North and South Brecks Landscape Character Assessment (Oct 2013).
83. In addition to these LCAs, North Norfolk District Council has recently published a draft update to its LCA (2018) and also a draft Landscape Sensitivity Assessment (LSA)(2018), with particular reference to renewable energy and low carbon developments. These are intended to be adopted as Supplementary Planning Documents by Summer 2019.
84. The purpose of the LSA is to attribute sensitivity ratings to the LCTs in North Norfolk District, in respect of the potential impacts of generic renewable energy and low carbon developments. The section on ‘Onshore cable routes (for offshore wind

farms)', is relevant to this LVIA, as the landfall and onshore cable route fall within North Norfolk District, with the landfall located south of Happisburgh and the onshore cable route passing from the landfall to the western edge of North Norfolk District near the A140 to the north-east of Aylsham.

85. The LSA attributes a 'moderate to low' sensitivity to 'onshore cable routes' in respect of the Coastal Plains LCT which occurs along the coastal edge and then a 'moderate' sensitivity in respect of the Low Plains Farmland LCT which covers much of this area. A 'moderate to high' sensitivity is attributed to the River Valleys LCT which occur more intermittently. The onshore cable route passes through these three LCTs and complies with guidelines set out in Appendix 3 of the LSA 'Guidance for minimising harm to the landscape', for example, by avoiding landscape designations, areas of woodland and mature trees, and using HDD in sensitive areas. The site selection of the onshore cable route is presented in more detail in Section 29.7.1 Embedded Mitigation.
86. The distribution of the LCTs and LCUs within the potential study areas and described by these LCAs, is shown in Figure 29.2 and 29.13, and described in Appendix 29.2.

29.6.2.1 Summary of landscape character

87. The effects on the LCTs and LCUs which occur in the study area of the onshore project substation and National Grid substation extension are assessed in section 29.7. The assessment considers the sensitivity and the magnitude of change that would arise as a result of the project and whether the resultant effect would be significant or not significant.
88. The effects of the landfall and onshore cable route would be too small in scale and temporary in nature to give rise to significant effects on the broader scale LCTs and LCUs in which they occur and, therefore, these effects are not assessed in section 29.7.

29.6.3 Landscape Designations

89. There are three types of landscape designation which are of relevance to the LVIA and lie within the LVIA study areas.
 - AONBs;
 - National Parks (NPs); and
 - Registered Parks and Gardens (RPGs).
90. The onshore infrastructure of the project lies outside land subject to any international, national or regional landscape designation intended to protect landscape quality as shown in Figure 29.2 and 29.13. This was a key decision in the site selection process for the project.

29.6.3.1 AONBs

91. AONBs are designated by Natural England and collectively represented by the National Association for AONBs. In general, they remain the responsibility of the Local Authority by means of a special committee and a dedicated AONB Officer. Their purpose is to conserve and enhance the natural beauty of the landscape. The National Planning Policy Framework (2012) states that AONBs have the same status as NPs in the planning system when it comes to landscape issues. Management plans set out the key issues and strategy for conservation and enhancement.
92. The Norfolk Coast AONB is the only AONB in the study area, lying approximately 6.8km north-west of the closest edge of the landfall and approximately 1.7km south of the closest edge of the onshore cable route.
93. Site reconnaissance has shown that the potential impact of the project on the AONB would be largely limited by a combination of distance, low landform and intervening built form and vegetation. There is very little possibility that the landfall or onshore cable route would be visible from the AONB, especially when considering the limited vertical scale of these developments. The impact of the project on the Norfolk Coast AONB is therefore not assessed in detail in this LVIA as there would be no potential for significant effects to arise.

29.6.3.2 National Parks

94. NPs are managed by National Park Authorities whose role is to carry out the two main objectives:
 - “To conserve and enhance the natural beauty, wildlife and cultural heritage of the area; and
 - To promote opportunities for the understanding and enjoyment of the parks' special qualities by the public.”
95. The only NP in the study area is The Broads, which lies approximately 4.2km south-west of the closest edge of the landfall and approximately 1.2km south of the closest edge of the onshore cable route. The Broads differs from the other NPs in that it was set up by the separately constituted Broads Authority enabled by a special act of Parliament, with its primary statutory objective being to deal with navigation of the waterways rather than conservation of the landscape.
96. Site reconnaissance has shown that, despite the proximity of the project to the Broads NP, the extent of mature woodland that separates the two sites notably reduces the potential for visibility. In considering the relatively small scale of the works during the construction phase and the fact that the only above ground structures during the operational phase would be the intermittent link boxes, there is no possibility that the landfall or onshore cable route would be visible from The Broads NP, especially taking into account the mature woodland that encloses the

northern tip of the NP. The impact of the project on the Broads NP is therefore not assessed in detail in this LVIA as there would be no potential for significant effects to arise.

29.6.3.3 Register of Parks and Gardens

97. Historic England's Register of Parks and Gardens presents an inventory of all the protected sites in England and Wales. These sites are considered to be of national significance, and most are associated with stately homes, although many parks or cemeteries are also listed.
98. There is one RPG close to the study area associated with the landfall and none in the study area associated with the onshore project substation. Happisburgh Manor is located approximately 500m north of the closest edge of the landfall.
99. The proximity of Happisburgh Manor to the landfall site means that there is the potential for significant effects to arise, despite the relatively enclosed nature of the gardens and the separation between the two by intervening development. The potential impacts on Happisburgh Manor gardens are considered in section 29.7.
100. The onshore cable route does not cross any international, national or regional landscape designations. Parts of Blickling Hall RPG to the north west of Aylsham, and Salle Park to the north east of Reepham, lie within the 1,045m wide study area, although the onshore cable route itself does not extend into these designated landscapes. While mature policy woodland means that a significant effect is unlikely in respect of both RPGs, detailed assessments of the construction impacts on both are included in the LVIA on account of the national importance of these designed landscapes.

29.6.3.4 Summary of designations

101. This section has reviewed landscape designations within the study areas of the landfall, onshore project substation, onshore cable route, National Grid substation extension and overhead line modification in order to understand how these special landscapes are protected and valued and how susceptible they would be to the potential impacts of the project. The landscape designations with potential to be significantly affected by the project include RPGs at Happisburgh Manor Gardens, Salle Park and Blickling Hall.
102. This information informs the assessment of potential impacts on these landscape designations presented in section 29.7. The assessment considers the magnitude of change that would arise as a result of the project and whether the resultant effect would be significant or not significant.

29.6.4 Viewpoints and Principal Visual Receptors

103. The study areas associated with the landfall, onshore cable route, onshore project substation, and National Grid substation extension, span a broad cross section of Norfolk County from the coastal landscapes in the east, to the valley and plateau landscapes in the west. The common feature throughout this broad cross-section is the extent of the cultivated landscape, whereby almost all these landscapes are characterised by arable farmland. Settlements and roads are an integral feature of these farmed landscapes; settlements being typically small in scale and rural in character, occurring as hamlets, villages and towns, dispersed throughout the landscape; and roads being typically narrow, winding and enclosed by hedgerows or embankments. Public Rights of Way (PRoWs) and other footpaths allow access into many of the rural landscapes and along the coastline, adding notably to the experience people have of their local landscapes.
104. Principal visual receptors are shown along the length of the onshore cable route, from the landfall to the onshore project substation and National Grid substation extension, on Figure 29.3 and Figure 29.14.

29.6.4.1 Settlements

105. The coastal settlements are distinct from the landward settlements owing to their typically linear form along the coast and greater extent of modern development, often comprising chalets and caravan parks. Across the landward area, settlement patterns are typically nucleated with an inward-looking character, and growth commonly enveloping the historic core. Some settlements have grown into towns, such as North Walsham and Aylsham, but most have remained as villages. The rural areas are characterised by small hamlets, clusters of dwellings and isolated farmsteads.
106. Happisburgh lies to the north of the landfall and Eccles-on-Sea to the south. The southern residential streets of Happisburgh and northern residential streets of Eccles-on-Sea lie closest to the landfall, making residents of these parts potentially susceptible to the associated effects during construction. Effects on tourists and other visitors to this area are assessed in Chapter 30 Tourism and Recreation.
107. Ivy Todd is a hamlet set to the south of the onshore project substation. There is some visibility towards the onshore project substation from the rear elevations of some properties and gardens on the northern edge of the hamlet, making residents potentially susceptible to the associated effects during construction, operation and decommissioning.
108. Necton is a village located to the south-west of the onshore project substation and west of the National Grid substation extension. Modern development has built up around the historic core marked by All Saints Church, which forms an important

landmark feature across the surrounding rural landscape. The project would be largely screened from the village by intervening landform and buildings, with only residents on the north-east edge being potentially susceptible to the associated effects during construction, operation and decommissioning.

109. Settlements occurring within the 1,045m onshore cable route study area include: Happisburgh, Ridlington, Edingthorpe Green, North Walsham and Banningham within North Norfolk; Aylsham, Silvergate, Southgate, Cawston and Reepham within Broadlands District; and Swanton Morley, Dereham and Necton within Breckland District.

29.6.4.2 Roads and railways

110. The A47 is the main trunk road between Peterborough and Great Yarmouth, via Norwich. The section of relevance to the assessment of the onshore project substation site lies between Little Fransham in the east and Necton in the west. Under Scenario 2, the project includes a new junction from the A47 to provide access to the onshore project substation. This is located close to the Top Farm access and includes a slip road to allow east-bound vehicles to turn into the new access road. This will require minimal removal and replacement of certain areas of the Dudgeon substation mitigation planting as shown in Figure 29.21a.
111. A and B class roads within the onshore cable route study area include, the B1159, B1145 (North Walsham) and A149 within North Norfolk; the B1145 (near Aylsham); B1145 (near Cawston and Reepham), A140 and B1149 within Broadlands District; and A1067, B1146 and A47 within Breckland District.
112. Under Scenario 2, the level of disruption in terms of visual impact would be notably reduced due to the use of trenchless crossings on the A47, A140, A149, B1145 and Old Hall Road. This approach forms an important part of the embedded mitigation for the project and helps reduce the potential effects on landscape and visual receptors. The use of trenchless crossing would mean that roadside vegetation would remain intact and the trenchless drilling compounds and presence and activity of plant, materials, offices and welfare facilities would often be fully or partly screened by adjacent roadside vegetation.
113. Of the other roads which would be intersected by the onshore cable route under Scenario 2, Dereham Road, B1146 (north of Dereham), B1147 (south of Swanton Morley), Lime Kiln Road, A1067 (west of Sparham), B1145 (west of Cawston) and Heydon Road, have the potential for significant visual effects. The others have restricted visibility due to successive layers of intervening roadside or field boundary vegetation within the intervening landscape or where views from the road are orientated away from the onshore cable route limiting the potential for significant effects to occur.

29.6.4.3 PRowS and cycle paths

114. The Norfolk Coastal Path is a long-distance footpath that follows the coastline of Norfolk for over 62.5 miles between Hunstanton and Sea Palling. It is designated as a National Trail, making it of national importance. The section of path between Happisburgh and Eccles on Sea has potential to be affected by the project owing to its proximity to the landfall.
115. Long distance recreational routes within the onshore cable route study area include: Sea Palling to Weybourne National Trail and the Norfolk Coast Cycleway within North Norfolk; Aylsham to Felbrigg Hall Regional Cycle Route 33, Marriott's Way, and National Cycle Route 1 within Broadlands District; and National Cycle Route 13 within Breckland District. There are also a series of shorter circular recreational routes within the onshore cable route study area including Paston's Way within North Norfolk; Weavers Way within Broadlands; and Wensum Way within Breckland. Chapter 30 Tourism and Recreation assesses the impact of the project on PRowS and cycle paths in detail.
116. In the area around the onshore project substation and National Grid substation extension there is very limited access into the landscape. The only route of relevance to the assessment is Lodge Lane, a track leading north to Lodge Farm from the hamlet of Ivy Todd.

29.6.4.4 Summary of principal visual receptors

117. The effects on the visual receptors which occur in the study areas of the landfall, onshore cable route, onshore project substation and National Grid substation extension are assessed in section 29.7. The assessment considers the sensitivity and the magnitude of change that would arise as a result of the project and whether the resultant effect would be significant or not significant. Representative viewpoints have been used in the assessment of the onshore project substation and National Grid substation extension with associated photographs and visualisations presented in Figures 29.23 to 29.46.

29.6.5 Anticipated Trends in Baseline Conditions

118. The baseline character of the landscapes associated with the landfall, onshore cable route, onshore project substation, National Grid substation extension and overhead line modification is likely to change in the future as a result of the effects of climate change, land use policy, environmental improvements and development pressures.
119. Norfolk County Council has produced a summary of the County's climate change strategy, which states 'Climate change is one of the greatest challenges facing Norfolk today. As a low-lying coastal county with a growing population, Norfolk is particularly vulnerable. Higher sea levels, heatwaves, droughts and storms are all more likely as global temperatures rise.' In respect of the study areas associated with

the project, higher sea levels will affect the coast between Happisburgh and Eccleson-Sea, while droughts and flooding will affect agricultural land, woodlands and other semi-natural landscapes, with vegetation being affected both in dry periods and wet periods, with long-term water-logging in low-lying parts presenting a particular problem.

120. It is anticipated that subsidies associated with the European Union Common Agricultural Policy will be retained during a transitional period of three to five years after Brexit, beyond which new subsidies proposed by the current Government will reward farmers who plant woodland and wildflower meadows on their land. This will potentially change the character of the landscape by introducing a greater extent of rural woodland and establishing a greater diversity of habitat.
121. Table 29.14 in section 29.8 includes Planning Applications for future developments that are potentially of relevance to the CIA of the project. These give an indication of the likely trends to be experienced in terms of development pressures across the study areas. Residential development would be likely to remain relatively small scale and infilling within or expanding edges of existing settlements. Improvements along the A47 would potentially give rise to increased traffic flows through the area, with possibly a boost to local businesses and industry. Onshore wind farms are unlikely to be developed owing to the removal of government subsidies and the lack of public support.

29.7 Potential Impacts

122. The construction, operation and decommissioning of the components of the project have the potential to affect the physical elements of the site, as well as the landscape character and visual amenity of the study areas around the site. There is also the potential for cumulative impacts in relation to other proposed developments in the area. A list of other relevant projects to be considered within the cumulative impact assessment is provided in Table 29.14.
123. The EIA is being undertaken for the following two alternative scenarios therefore an assessment of potential impacts has been undertaken for each scenario:
- **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
 - **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.
124. It is anticipated that Scenario 1 will generally have a lesser impact on landscape and visual receptors than Scenario 2. This will be the case, especially in respect of the onshore cable route under Scenario 2. Impacts would potentially be more notable

under Scenario 1 in respect of the combined effect of two onshore project substations and National Grid substation extensions. As such, Scenario 2 is presented first as it would generally present the greater potential for significant effects to arise.

125. In Scenario 1, Norfolk Vanguard forms part of the baseline to the assessment of Norfolk Boreas, (although the in combination effects of these two developments is considered in more detail in the CIA), whilst in Scenario 2 it does not. These two different scenarios will give rise to different potential impacts and different effects on landscape and visual receptors and where relevant a separate assessment is included under each impact heading.
126. In Scenario 1, as some of the transmission infrastructure to be used for Norfolk Boreas would already be constructed by Norfolk Vanguard, the potential impacts would be reduced in the following ways;
- The reduction in construction works as a result of no duct installation being required for the onshore cable route; the reduction in the construction works as a result of reduced works being required for the National Grid substation extension and no modification of the overhead lines being required; and
 - Mitigation planting and earthworks would be implemented through Norfolk Vanguard in advance of Norfolk Boreas construction, which may contribute in the mitigation of effects relating to the construction and operational phases of Norfolk Boreas.
127. In Scenario 1, there would be a combined effect, which is addressed in the cumulative assessment, as the assumption would be that the consented Norfolk Vanguard would be operational and, therefore, form part of the baseline. In Scenario 2, as Norfolk Vanguard would not proceed to construction, it would not form part of the cumulative assessment.
128. Under Scenario 1 and Scenario 2 the potential impacts of the landfall, onshore project substation, and National Grid substation extension have been assessed at the construction stage of the project, while the onshore project substation and National Grid substation extension have also been assessed at the operational stage.
129. Under Scenario 2, the potential impacts of the onshore cable route, overhead line modification and A47 junction have also been assessed at the construction stage as these form part of the Scenario 2, but not the Scenario 1 (see Chapter 5 Project Description). The overhead line modification and A47 junction have also been assessed at the operational stage.
- 130.** The potential impacts are determined through consideration of the worst case assumptions, as presented in

131. Table 29.9 for Scenario 2 and Table 29.8 for Scenario 1, as well as having regard to the mitigation measures embedded in the project as described below.

29.7.1 Embedded Mitigation

132. Norfolk Boreas Limited has committed to a number of engineering designs, construction techniques and modifications as integral parts of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design in this way is a type of primary mitigation in the EIA process.

133. The following sections outline the key embedded mitigation measures relevant for this assessment. These measures are presented in Table 29.6. Where embedded mitigation measures have been developed into the design of the project with specific regard to landscape and visual impacts, these are described in Table 29.7.

Table 29.6 Embedded mitigation

Parameter	Mitigation measures embedded into the project design	Notes
Project Wide		
Commitment to HVDC technology	<p>Commitment to HVDC technology minimises environmental impacts through the following design considerations;</p> <ul style="list-style-type: none"> • HVDC requires fewer cables than the HVAC solution. During the duct installation phase under Scenario 2 this reduces the cable route working width to 35m from the previously identified worst case of 50m. As a result, the overall footprint of the onshore cable route required for the duct installation phase is reduced from approx. 300ha to 210ha; • The width of permanent cable easement is also reduced from 25m to 13m; • Removes the requirement for a cable relay station as permanent above ground infrastructure; • Reduces the maximum duration of the cable pulling phase from three years down to two years; • Reduces the total number of jointing pits for Norfolk Boreas from 450 to 150; and • Reduces the number of drills needed at trenchless crossings (including landfall). 	Norfolk Boreas Limited has reviewed consultation received and in light of the feedback, has made a number of decisions in relation to the project design. One of these decisions is to deploy HVDC technology as the export system.
Site Selection	<p>The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules (for explanation see Chapter 4 Site Selection and Alternatives) for</p>	Constraints mapping and sensitive site selection to avoid a number of impacts, or to reduce impacts as far as possible, is a type of primary mitigation and is an

Parameter	Mitigation measures embedded into the project design	Notes
	<p>onshore project substations and National Grid substation extension and associated infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts.</p> <p>Key design principles from the outset were followed (wherever practical) and further refined during the EIA process, including;</p> <ul style="list-style-type: none"> • Avoiding proximity to residential dwellings; • Avoiding proximity to historic buildings; • Avoiding designated sites; • Minimising impacts to local residents in relation to access to services and road usage, including footpath closures; • Utilising open agricultural land, therefore reducing road carriageway works; • Minimising requirement for complex crossing arrangements, e.g. road, river and rail crossings; • Avoiding areas of important habitat, trees, ponds and agricultural ditches; • Installing cables in flat terrain maintaining a straight route where possible for ease of pulling cables through ducts; • Avoiding other services (e.g. gas pipelines) but aiming to cross at close to right angles where crossings are required; • Minimising the number of hedgerow crossings, utilising existing gaps in field boundaries; • Avoiding rendering parcels of agricultural land inaccessible; and • Utilising and upgrading existing accesses where possible to avoid impacting undisturbed ground. 	<p>inherent aspect of the EIA process. Norfolk Boreas Limited has reviewed consultation received to inform the site selection process (including local communities, landowners and regulators) and in response to feedback, have made a number of decisions in relation to the siting of project infrastructure. The site selection process is set out in Chapter 4 Site Selection and Assessment of Alternatives.</p>
Long HDD at landfall	Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain access to the beach during construction. Norfolk Boreas Limited have also committed to not using the beach car park at Happisburgh South.	Norfolk Boreas Limited has reviewed consultation received and in response to feedback, has made a number of decisions in relation to the project design. One of those decisions is to use long HDD at landfall.
Scenario 1		
Strategic approach to delivering Norfolk Boreas and Norfolk Vanguard	Under Scenario 1, onshore ducts will be installed for both projects at the same time, as part of the Norfolk Vanguard construction works. This would allow the main civil works for the cable route to be completed in one construction period and in advance of cable delivery, preventing the	The strategic approach to delivering Norfolk Boreas and Norfolk Vanguard has been a project

Parameter	Mitigation measures embedded into the project design	Notes
	<p>requirement to reopen the land in order to minimise disruption. Onshore cables would then be pulled through the pre-installed ducts in a phased approach at later stages.</p> <p>In accordance with the Horlock Rules, the co-location of Norfolk Boreas and Norfolk Vanguard onshore project substations, will keep these developments contained within a localised area and, in so doing, will contain the extent of potential impacts.</p>	<p>commitment from the outset of each project.</p>
Scenario 2		
<p>Duct Installation Strategy</p>	<p>The onshore cable duct installation strategy is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) and once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise overall disruption.</p>	<p>This has been a very early project commitment. Chapter 5 Project Description provides a detailed description of the process.</p>
<p>Trenchless Crossings</p>	<p>Commitment to trenchless crossing techniques to minimise impacts to the following specific features;</p> <ul style="list-style-type: none"> • Wendling Carr County Wildlife Site; • Little Wood County Wildlife Site; • Land South of Dillington Carr County Wildlife Site; • Kerdiston proposed County Wildlife Site; • Marriott's Way County Wildlife Site / Public Right of Way; • Paston Way and Knapton Cutting County Wildlife Site; • Norfolk Coast Path; • Witton Hall Plantation along Old Hall Road; • King's Beck; • River Wensum; • River Bure; • Wendling Beck; • Wendling Carr; • North Walsham and Dilham Canal; • Network Rail line at North Walsham that runs from Norwich to Cromer; • Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham; • Trunk Roads including A47, A140, A149; and • Crossing with Hornsea Project Three (if required). 	<p>A commitment to a number of trenchless crossings at certain sensitive locations was identified at the outset. However, Norfolk Boreas Limited has committed to certain additional trenchless crossings as a direct response to stakeholder requests.</p>

Table 29.7 Embedded mitigation for LVIA

Parameter	Mitigation measures for landscape and visual	Notes
No overhead lines	The decision by Norfolk Boreas Limited to use underground cable systems for the onshore cable route, over the approximate 60km route between the landfall and electrical connection point, avoids the requirement to construct new overhead power transmission lines. The mitigation embedded in this approach will lead to notably reduced impacts on landscape and visual receptors during the construction phase and practically no impacts during the operational phase. It also notably reduces the potential for the onshore cable route to contribute to significant cumulative effects. Post construction the onshore cable route will have a negligible impact on landscape and visual receptors as the components will be buried under ground, with the exception of the small scale and intermittent link boxes.	
Commitment to HVDC technology	This removes the requirement for a cable relay station as permanent above ground infrastructure and as a result eliminates all potential landscape and visual effects that would otherwise have been associated with this component of the project, in the relatively open landscape close to the east coast of Norfolk.	
Strategic landscape mitigation	Mitigation measures associated with the onshore project substation, National Grid substation extension and A47 form part of a strategic approach to enhancing landscape character and bio-diversity in the local area. Figure 29.12 and Figure 29.22 show how mitigation planting will contribute to the wider landscape structure of the area and help consolidate green corridors for wildlife. Mitigation planting for the onshore project substation is shown in Figure 29.9 (Scenario 1) and Figure 29.19 (Scenario 2). This has been designed to screen the onshore project substation. Details of the mitigation planting are presented in section 29.7.1. Mitigation planting for the National Grid substation extension is shown in Figure 29.10b (Scenario 1) and Figure 29.20b (Scenario 2). This has been designed to screen the National Grid substation extension in views from Necton. Details of the mitigation planting are presented in section 29.7.1.	See section 29.7.1
Landfall site selection	The selection of the shared landfall site at Happisburgh South followed a number of key design principles where practical, the following being relevant to LVIA; <ul style="list-style-type: none"> • To avoid the Norfolk Coast AONB to the north and The Broads NP to the south; • To avoid populated areas as far as possible; and • To avoid areas of high amenity value. The mitigation is embedded in a site selection which does not affect the nationally important landscape designations to the north and south and which is set back sufficiently from the coastal edge and adjacent residential areas. The location of the transition pits, suitably set back from the coastal cliffs, would reduce visual impacts along the coastline. The location of the transition pits, which would be buried below ground level, would ensure landscape and visual effects would	See section 29.7.4

Parameter	Mitigation measures for landscape and visual	Notes
	only occur during the construction phase and not during the operational phase.	
Onshore cable route site selection	<p>The selection of the shared onshore cable route has followed a number of key design principles, where practical, the following being relevant to LVIA;</p> <ul style="list-style-type: none"> • Wherever possible to locate the onshore cable route through open agricultural land; • To avoid landscape designations including RPGs; • To avoid areas of woodland and trees; • To minimise the number of hedgerow crossings and utilise existing gaps in field boundaries if possible; and • To avoid proximity to residential dwellings and settlements. <p>The mitigation is embedded in the selection of a route which does not affect landscape designations, County Wildlife Sites or woodland, and minimises the effects on hedgerows.</p>	See section 29.7.4
Onshore project substation site selection	<p>National Grid's Guidelines on Substation Siting and Design (The Horlock Rules) have been taken into consideration during the site selection process. Those relevant to the LVIA include the following;</p> <ul style="list-style-type: none"> • To avoid landscape designations including National Parks and AONBs; • To protect areas of local amenity value including ancient woodland and historic hedgerows; and • To take advantage of screening provided by landform and existing features. <p>The Scenario 1 and Scenario 2 sites avoid all international, national, county and local landscape designations. They do not affect any ancient woodland or historic hedgerows and mitigation measures ensure hedgerow loss which would occur is compensated for in new planting around the onshore project substation and National Grid substation extension. The site benefits from existing natural screening provided by the extensive Great Wood to the east, Necton Wood to the north and a series of hedgerows surrounding the site. These landscape features provide screening from the north and east and create a wooded backdrop in views from other directions, and in so doing, contribute to the mitigation of landscape and visual effects.</p>	See section 29.7.4 and 29.7.5
National grid substation extension site selection	The location of Norfolk Boreas and Norfolk Vanguard National Grid substation extensions adjacent to the existing Necton National Grid substation will keep these developments contained within a localised area and, in so doing, will contain the extent of the landscape and visual effects in accordance with the Horlock Rules.	See section 29.7.4 and 29.7.5

Parameter	Mitigation measures for landscape and visual	Notes
Hedgerow crossings	<p>Under Scenario 2 through the selection of a HVDC electrical solution, this has further reduced the maximum width of hedgerow gaps that are required. The maximum size of the hedgerow gap created during the two-year duct installation phase would be 13m to 16.5m. The amount of hedgerow removed during construction of a HVDC design compared to a HVAC design is reduced by over 50%. These reduced widths will reduce the influence of the onshore cable route construction on landscape and visual receptors and reduce the area of hedgerows to be removed.</p> <p>The minimum width assumes that the cable route bisects each hedgerow in a perpendicular fashion. In reality, some hedgerows will be crossed at an angle, therefore increasing the maximum width of the gap required up to a possible 16.5m. Where this is the case for a particular receptor, it is noted within this report.</p> <p>Where hedgerow gaps are required beyond the two-year duct installation phase (i.e. for the duration of the subsequent two-year cable pull phase), the number of gaps required will be minimised as far as possible and the width will be no wider than 6m.</p>	
Lighting	The onshore project substation has been designed so that it does not require permanent operational lighting.	

29.7.1.1 Site Selection Process

134. The site selection process has involved considerable input from the LVIA in order to provide guidance and advice on the potential sites assessed for the landfall, onshore cable route and onshore project substation sites. Site selection can notably reduce the potential for significant effects to arise, for example, by locating infrastructure in areas where there are few close-range visual receptors or where the baseline landscape offers natural screening. Chapter 4 Site Selection presents more detail on the broader site selection considerations.

135. The selection process has given due consideration to the following key criteria:

- The influence of the surrounding landform on the visibility of the site i.e. whether it is exposed or enclosed in the local and wider landscape;
- The ability of the site landform to accommodate a large-scale level platform and associated earthworks that can be integrated within surrounding landform;
- The influence of existing mature vegetation on the visibility of the site, as well as more recent Dudgeon mitigation planting adjacent to the A47 i.e. whether it fully or partly screens the site within the local and wider area;
- The potential opportunities to use mitigation planting and earthworks to reduce potential visual effects;
- The sensitivity of surrounding landscape and visual receptors to the potential impacts of the proposed project, especially designated landscapes and residential receptors; and

- The avoidance of sensitive landscape elements along the onshore cable route, for example woodlands and mature trees.

29.7.2 Landscape Mitigation

136. The onshore project substation site benefits from some substantial existing hedgerows and woodland blocks within the local area. These would provide mitigation of some landscape and visual effects from the outset and would be infilled, where necessary, during the early phases of the proposed project to ensure robust screening. The extent of mitigation planting incorporated into the design is presented on Figures 29.9 and 29.10b (Scenario 1) and 29.19, 29.20b and 29.21b (Scenario 2) and mostly comprises indigenous woodland species. Mitigation planting would be located around the onshore project substation and along the southern edge of the National Grid substation extension. Owing to the dimensions of the onshore project substation site, the National Grid substation extension, and the associated temporary works areas, construction activities would be required to level existing contours. The site benefits from requiring only minimal earthworks to provide a level platform, and any excess material produced could be used to create earthwork bunds. The proposal would be to form subtle earthwork bunds of up to 1.5m height along the western side of the onshore project substation under Scenario 2 and up to 2m high along the western side of the Norfolk Vanguard onshore project substation under Scenario 1. The sensitivity of the western boundary relates to its exposure to the south-west and west, where Ivy Todd Road west and Necton are located, although visibility from both these principal visual receptors would be limited. The earthwork bunds would help to give an incremental increase to the overall height of screening along this boundary, which is not constrained by planting restrictions associated with underground cables.
137. The mitigation planting would be designed to comprise a mix of faster growing 'nurse' species and slower growing 'core' species. Nurse species, such as alder, birch, and pine would grow quicker, with average growth rates of 350mm per annum, so that after 20 years they would be 8m in height (7m growth on top of a 1m base height). They would provide shelter to bring on core species, such as oak, beech and horse chestnut, with average growth rates of 250mm per annum, so that after 20 years they would be up to 6m in height (5m growth on top of a 1m base height). The nurse species would be sufficiently fast growing to provide substantial screening of the onshore project substation after 20 years. The core species would outlive the nurse species and provide a preferred native woodland with a more robust structure. These growth rates are considered conservative and have been used to ensure a worst-case assumption. It is anticipated that the planting would grow at a faster rate.

138. In respect of Scenario 2, in locations where it is possible to achieve advanced planting, this would potentially be implemented at the start of the pre-construction phase in 2021. In respect of Scenario 1, mitigation planting associated with Norfolk Vanguard would potentially be implemented as part of that project in 2020. This would mean these areas would potentially already have had approximately three or four years of growth prior to completion of construction and commencement of operation in 2025. This equates to an additional growth of approximately 1 to 1.4m, with overall heights after 20 years being approximately 7m and 9.4m respectively and after 30 years 9.5m and 12.9m. However, as it is not possible at this stage of the project to confirm in which areas advanced planting would be implemented, the worst case assumption assumes all planting would be implemented at the start of the operational phase in 2025 in respect of Scenario 2 and 2024 in respect of Scenario 1.
139. Mitigation measures are described in more detail in the Outline Landscape and Ecological Management Strategy (OLEMS) (document reference 8.7), with regard to the re-establishment of hedgerows and planting of mitigation landscaping. Mitigation measures will be designed in detail post-consent through the Landscape Management Scheme (DCO Requirement 18 and 19) as part of the discharge of consent conditions.
140. The mitigation measures have taken into account the ‘Statements of Environmental Opportunity’ (SEO’s) as set out in Natural England’s ‘National Character Area Profiles’. As the two largest scale components of the project (the onshore project substation and the National Grid substation extension) are located in the Mid Norfolk NCA, this is where mitigation measures other than replanting hedgerows would occur. The SEOs for this NCA are, therefore, of particular relevance to the mitigation planting and are summarised below.
- ‘SEO1: Work with the local farming community to safeguard future food production, while conserving and enhancing the traditional rural character, long views and strong sense of tranquillity in this area of long settled, ancient countryside. Manage and enhance farmland habitats- including hedgerows and woodland, field margins and pastoral river corridors – to enhance the area for farmland species (including pollinators), improve water quality and availability in the rivers and aquifer, manage soil erosion and quality and address the impacts of climate change.’
 - ‘SEO2: Maintain, enhance and restore priority habitats including woodlands, areas of remnant heathland, and the nationally and internationally important Norfolk Valley Fens and chalk river systems (including the River Wensum), and seek opportunities to connect fragmented sites, improving the area for

biodiversity, geodiversity and recreation, and enhancing landscape character and resilience to climate change.’

- ‘SEO3: Encourage a sympathetic approach to development that maintains traditional Norfolk character and improves sustainable recreational use, while protecting historic assets, geodiversity and biodiversity.’

141. The mitigation plans respond to these objectives through their inclusion of substantial areas of new woodland, species rich grassland and hedgerows, the arrangement of these areas to connect internally on site and connect externally with existing woodlands, grasslands and hedgerows in the surrounding landscape, and the contribution they will make through their design to the enhancement of the local landscape character.

29.7.2.1 Monitoring

142. Post-consent, the final detailed design of the project in line with the OLEMS (document reference 8.7) and Landscape Management Scheme will refine the worst case impacts assessed in this EIA. It is recognised that monitoring is an important element in the management and verification of the actual project impacts. The requirement for and appropriate design and scope of monitoring will be agreed with the relevant stakeholders and included within the Landscape Management Plan commitments prior to construction works commencing.

29.7.3 Worst Case

143. The ‘worst case assumption’ (WCA) includes the parameters for the component parts of the project which would result in the greatest potential impacts upon the landscape and visual receptors described in section 29.7. Reference is also made to embedded mitigation which forms an integral part of the project.

144. Table 29.8 and

145. Table 29.9 present the WCA with regard to LVIA considerations under Scenario 1 and Scenario 2, respectively. Scenario 2 is presented first because the potential impacts are generally greater than those associated with Scenario 1. This approach is also reflected in the assessment tables presented in section 29.7.4 and 29.7.5.

Table 29.8 Worst case assumption for Scenario 1

Parameter	Worst Case Definition	Notes
Construction - landfall		
HDD horizontal length	1,000m	Indicative length. No beach access or works required.
Landfall transition pits maximum footprint	1,500m ²	10m x 15m x 5m deep (2 pits in total)
Temporary landfall compound maximum land take	6,000m ²	Assumes two compounds at 3,000m ² (each 50m x 60m) to support parallel drilling rigs. Compounds secured by 2.4m high fence and surfaced in permeable gravel aggregate.
Landfall access	6m temporary access track width	Track surfaced in either bog-mats, geotextiles or hardstanding.
Maximum temporary works duration	20 weeks	Based on 7am-7pm normal working hours. 7 days a week.
Construction – onshore cable route		
Method	Pulling of cables through pre-installed ducts	Cables will be pulled through the ducts installed by Norfolk Vanguard.
Cable pulling maximum footprint	85,500m ²	Cable pull footprint includes the running track and jointing pits.
Gaps at hedgerow / other crossing points	6m	For running track reinstallation only.
Running track width and length	6m and 12,000m	Up to 20% of the running track utilised by Norfolk Vanguard will need to be reinstalled to facilitate cable pulling.
Permanent jointing pits (maximum number and required dimensions)	Assume 150 at 90m ² (6m x 15m x 2m deep each)	Spaced approximately one per circuit per 800m of cable. 2 pits per location – one for each circuit – therefore 75 jointing pit locations.
Cable logistics area maximum number and required dimensions	Assumes one compound with an area of 4,190m ²	A cable logistics area has been identified for the storage of materials, welfare facilities etc.
Construction programme: Cable pulling works	2026-2027	
Jointing pit / hardstanding areas	10 weeks	The cable pulling and jointing will take approximately five weeks per 1km of cable length, per circuit, however any one joint pit

Parameter	Worst Case Definition	Notes
		may be open for up to 10 weeks to allow its neighbouring joint pit to be opened and the cables pulled from one pit to the next.
Running track	16 weeks	In any one area per annum during the 2 year cable pulling works
Total construction window	2 years	2 years phased cable pulling
Construction – onshore project substation		
Maximum land take for all construction works areas at the onshore project substation	95,000m ²	Operational area for Substation (250m x 300m = 75,000m ²) plus additional temporary construction compound (200m x 100m = 20,000m ²).
Temporary works area for onshore project substation	20,000m ²	Indicative compound 100m x 200m containing plant, materials, welfare facilities, site offices.
Maximum land take for temporary works area at Spicers Corner	10,000m ²	Spicers Corner compound 100 x 100m.
Substation tallest structure	25m	Lightning Protection Masts
Substation largest building	19m	Two Converter Hall buildings required – steel framed with cladding
Access road construction	6m width and approx. 300m extension length	Extension to the existing access road installed by Norfolk Vanguard from the A47 via the new junction at Spicers Corner.
Onshore project substation landscape mitigation	Landscape planting located around onshore project substation. Includes attenuation pond.	Planting to be implemented as early in construction phase as practical.
Number of 400kV HVAC interface cables and indicative length	12 and 1,750m	Up to 4 trenches, 3 cables per trench, total of 12 cables
Maximum duration	30 months Based on 7am-7pm normal working hours.	Indicative construction window 24 months. Perimeter and site lighting will be required during working hours in the winter months and a lower level of lighting will remain overnight for security purposes.
Construction – National Grid substation extension and overhead line modification works		
Maximum land take for construction works at substation extension	95,250m ²	Operational area (135m x 150m) plus temporary compound adjacent to eastern extension site (150m x 200m) and compound adjacent to the Norfolk Vanguard Extension (300m x 150m).

Parameter	Worst Case Definition	Notes
National Grid substation extension outdoor busbars and fencing	15m in height for busbars 4m in height for fencing	Outdoor busbars and landing gantries for 5 AIS bays 2.4m palisade (outer) and 4m electrified (inner)
National Grid substation extension landscape mitigation	Planting located around National Grid substation extension. Attenuation pond to be relocated and extended.	Planting to be implemented as early in construction phase as practical.
Maximum duration	30 months Based on 7am-7pm normal working hours.	Indicative construction window 24 months. Perimeter and site lighting will be required during working hours and a lower level of lighting will remain overnight for security purposes.
Operation		
Onshore cable route permanent link boxes	Assumes 24 at 1.5m x 1.5m if below ground and 1.2m x 0.8m x 1.8m if above ground	Link boxes are required in close proximity (within 10m) to a subset of jointing pit locations. Type of link box and exact locations to be defined during detailed design.
Onshore project substation permanent footprint and access road	75,000m ² (250m x 300m) 25m maximum height of the lightning protection masts 19m maximum height of the two converter hall buildings 1,800m ² maximum land take for new access road 30 year operational period	Enclosed with 2.4m high palisade fence and 1m electrified fence (3.4m in total). Not to be illuminated under normal operating conditions although low level movement detecting security lighting may be utilised for health and safety purposes. Temporary lighting during working hours will be provided during maintenance activities only.
National Grid substation extension permanent footprint	20,250m ² (135m x 150m) 15m maximum height of equipment 30 year operational period	Enclosed with 2.4m high palisade fence (outer) and 1m electrified fence (inner) (3.4m in total). Not to be illuminated under normal operating conditions. Temporary site lighting may be provided during working hours when conducting maintenance activities only.
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore project substation, as it is recognised that industry best practice, rules and legislation change over time. However, the onshore project equipment will likely be removed and reused or recycled. 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. A decommissioning plan will be provided. As such, for the purposes of a worst case assumption, impacts as for the construction phase are assumed.		

Table 29.9 Worst case assumption for Scenario 2

Impact	Parameter	Notes
Construction - landfall		
HDD horizontal length	1,000m	Indicative length. No beach access or works required.
Landfall transition pits maximum footprint	1,500m ²	10m x 15m x 5m deep (2 pits in total)
Temporary landfall compounds maximum land take	6,000m ²	Assumes two compounds at 3,000m ² (each 50m x 60m) to support parallel drilling rigs. Compounds secured by 2.4m high fence and surfaced in permeable gravel aggregate.
Landfall access	6m temporary access track width	Track surfaced in either bog-mats, geotextiles or hardstanding.
Maximum temporary works duration	20 weeks	Based on 7am-7pm normal working hours. 7 days a week.
Construction – onshore cable route		
Onshore cable route open cut trenching maximum working width and length	35m working width over 60km route	Working width to be enclosed with post and wire fencing or similar and stock fencing where necessary.
Onshore cable route hedgerow removal	13m assuming perpendicular crossing, angled crossing up to 16.5m	Land and hedgerows reinstated post construction. Hedgetrees and trees not permitted to be replanted over cable easements with additional 6 to 10m either side.
Onshore cable route running track width and length	6m width over 60km route	Track surfaced in either protective matting, temporary metal road or permeable gravel aggregate. To remain in-situ for up to 2 year period.
Permanent jointing pits maximum number and required dimensions	Assume 150 at 90m ² and 2m deep each	Dimensions 6m x 15m. Spaced approximately one per circuit per 800m cable. 2 pits per location – one for each circuit – therefore 75 joint pit locations.
Mobilisation Areas maximum number and required dimensions	Assumes 14 at 10,000m ² (100 x 100m per mobilisation area)	Mobilisation areas required for duct construction. Includes compound at A47 Spicer's Corner.
Trenchless reception sites maximum number and maximum land take	Assumes 17 pairs at 5,000m ²	Launch and reception sites required for trenchless crossing (e.g. HDD) drilling and pull through. Up to 100m x 50m if stop end employed.
Trenchless launch sites maximum number and maximum land take	Assumes 17 pairs at 7,500m ²	Up to 150m x 50m if stop end employed.

Impact	Parameter	Notes
Cable logistics area maximum number and required dimensions	Assumes one compound with an area of 4,190m ²	A cable logistics area has been identified for the storage of materials, welfare facilities etc.
Onshore cable route construction programme - overall	2021 – 2026 5 years including pre-construction works, duct installation and cable pull through.	Pre-construction works would consist of road modifications, hedge and tree removal, ecological preparations, archaeological survey and pre-construction drainage.
Construction programme - ducting	2 weeks – ducting at any one 150m workfront 8 weeks – trenchless crossing 2 years – running track 2 years - total construction window	Each 150m section would take 1 to 2 weeks to complete. Approximate average, dependent on length of drill.
Construction programme cable pulling works	10 weeks – jointing pit 16 weeks – running track 2 years - total construction window	The cable pulling and jointing will take approximately five weeks per 1km of cable length, however any one joint pit may be open for up to 10 weeks to allow its neighbouring joint pit to be opened and the cables pulled from one pit to the next. 16 week running track construction in any one area per annum during the 2 year cable pulling works.
Construction – onshore project substation		
Maximum land take for all construction works at the onshore project substation	95,000m ²	Operational area for Substation (250m x 300m = 75,000m ²) plus additional temporary construction compound (200m x 100m = 20,000m ²).
Temporary construction compound for onshore project substation	20,000m ²	Indicative compound 100m x 200m containing plant, materials, welfare facilities, site offices.
Substation tallest structure	25m	Lightning Protection Masts.
Substation largest building	19m	Two Converter Hall buildings required – steel framed with cladding.
Construction access road from A47	6m width and approx. 1.8km length	Extension to the existing access road installed by Norfolk Vanguard from the A47 via the new junction at Spicers Corner.
Onshore project substation landscape mitigation	Landscape planting located around onshore project substation. Includes attenuation pond.	Planting to be implemented as early in construction phase as practical.
Onshore project substation A47 junction	Road widening associated with A47 access junction would require removal of	Mitigation planting includes for reinstatement of woodland planting along A47.

Impact	Parameter	Notes
	existing road-side vegetation over an approximate 300m length.	
Number of 400kV HVAC interface cables and indicative length	12 and 1,850m	Up to 4 trenches, 3 cables per trench, total of 12 cables
Maximum duration	30 months Based on 7am-7pm normal working hours.	Indicative construction window 24 months. Perimeter and site lighting will be required during working hours in the winter months and a lower level of lighting will remain overnight for security purposes.
Construction – National Grid substation extension		
Maximum land take for all construction works at the substation extension	97,500m ²	Operational area (200m x 150m) plus temporary compounds (150m x 150m and 300m x 150m).
National Grid substation extension outdoor busbars and fencing	15m in height 4m high fencing	Outdoor busbar and landing gantries for 7 AIS bays. 2.4m palisade fence (outer) and 4m electrified (inner).
National Grid substation extension landscape mitigation	Planting located around National Grid substation extension. Attenuation pond to be extended.	Planting to be integrated with existing Dudgeon mitigation planting
Maximum land take for temporary works area – overhead line	176,310m ²	
Overhead line modification works construction	3 temporary towers at 45m 2 permanent towers at 55m	The existing corner tower will be removed such that the net new number of towers is one.
National Grid substation extension and overhead line modification works construction period	30 months Based on 7am-7pm normal working hours.	Indicative construction window 24 months. Perimeter and site lighting will be required during working hours and a lower level of lighting will remain overnight for security purposes.
Operation		
Onshore cable route permanent link boxes	Assumes 24 at 1.5m x 1.5m if below ground and 1.2m x 0.8m x 1.8m if above ground	Link boxes are required in close proximity (within 10m) to a subset of jointing pit locations. Type of link box and exact locations to be defined during detailed design.
Onshore project substation and access road	75,000m ² (250m x 300m) 25m maximum height of the lightning protection masts	Enclosed with 2.4m high palisade fence and 1m electrified fence (3.4m in total). Not to be illuminated under normal operating conditions although low level movement detecting security lighting may be utilised for

Impact	Parameter	Notes
	19m maximum height of the two converter hall buildings 10,800m ² maximum land take for new access road 30 year operational period	health and safety purposes. Temporary lighting during working hours will be provided during maintenance activities only.
National Grid substation extension	30,000m ² (200m x 150m) 15m maximum height of equipment 30 year operational period	Enclosed with 2.4m high palisade fence and 1m electrified fence (3.4m in total). Not to be illuminated under normal operating conditions. Temporary site lighting may be provided during working hours when conducting maintenance activities only.
Maximum number and height of new overhead line towers	2 towers at 55m	1 new tower and 1 replacement tower.
Maximum permanent land take for new overhead line towers	Up to 1,000m ²	
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore project substation, as it is recognised that industry best practice, rules and legislation change over time. However, the onshore project equipment will likely be removed and reused or recycled. 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. A decommissioning plan will be provided. As such, for the purposes of a worst case scenario, impacts as for the construction phase are assumed.		

146. Chapter 5 Project Description outlines the timings to be assessed in relation to the phasing of the works. In all cases for LVIA; the two phase option, where cables are installed in two consecutive years to facilitate the commissioning of the offshore wind turbines, is assumed to be the worst case. This is due to the increased length of time that receptors will be potentially impacted by the project.

29.7.4 Potential Impacts During Construction

29.7.4.1 Introduction

147. The assessment firstly considers the potential impact of the project during the construction phase, associated with the landfall, onshore cable route, onshore project substation and National Grid substation extension and overhead line modification.

148. Table 29.8 and

149. Table 29.9 set out the worst case assumptions of the project description for Scenario 1 and Scenario 2. Presented below, in respect of each of the four main components of the project, is an assessment of their potential impact on landscape elements, landscape character and visual amenity during the construction phase, in respect of both Scenario 1 and Scenario 2.

29.7.4.2 Potential impacts during construction - landfall

150. The landfall would be located at Happisburgh South, on the section of coast between the settlements of Happisburgh to the north and Eccles-on-Sea to the south. Under Scenario 1 and Scenario 2, the construction works at the landfall would be the same, and the landfall compounds and transition pits would be located in the same area. The commitment to a long HDD means that the majority of the construction works would be offset, inland from the cliffs. No access would be required and no works undertaken on the beach, such that the recreational use and visual amenity of the beach would be protected.

29.7.4.2.1 Scenario 1 and Scenario 2

151. The impact of the landfall during the construction phase for Scenario 1 and Scenario 2 would relate principally to the following features of the construction process:

- The effect on the landscape element of agricultural land owing to the two 3,000m² (60m x 50m) surfaced landfall compounds, the two 150m² (15m x 10m) transition pits (one in relation to each circuit) and the temporary 6m wide running track connecting to Whimpwell Street.
- The effect on landscape character and visual amenity owing to the presence of the temporary, surfaced and fenced landfall compound, associated security and task lighting and the presence of the drilling rig, ducting materials and welfare facilities.
- The effect on landscape character and visual amenity owing to the activity associated with the excavation and construction of the two transition pits, HDD drilling, pulling through of cables and construction of temporary running track.
- The effect on the visual amenity of walkers on the coastal path owing to the concentration of construction vessels close to the shore and construction works onshore.
- The duration of an indicative 20 week construction period for duct installation and up to 10 weeks for cable pulling.
- The reinstatement of ground at the landfall compound and along the running track at the end of construction.

152. Table 29.10 shows the detail of the assessment for each receptor under both Scenario 1 and Scenario 2. These assessments correlate as the construction impacts would be the same for both scenarios and the works located in the same area.

In summary, the landfall construction would not give rise to significant effects on the landscape character of the Bacton to Sea Palling Coastal Plains LCU as a whole, however there would be a short term significant effect in the very localised landscape around the landfall. There would also be a significant effect on the views of walkers on short and localised sections of Norfolk Coastal Path and PRow RB22 and on the views of residents on Lighthouse Lane in the southern extent of Happisburgh. These effects would be most notable during periods of drilling. The landfall construction works would be relatively small in scale and this explains the localised extent of the effects. Furthermore, the construction works of the duct installation would last a maximum of 20 weeks, making the effects short term. Reinstatement of the majority of the agricultural land at the end of this period would make the effects largely reversible.

Table 29.10 Scenario 1 and Scenario 2: Potential impacts during construction - landfall

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Landfall – Landscape receptors					
Coastal cliffs and beach	The coast between Happisburgh and Eccles-on-Sea is characterised by stratified cliffs rising to between 6 to 10m. The cliffs comprise sands, clays and tills making them soft and prone to erosion. They enclose a predominantly sandy beach with occasional loose rocks and outcrops. Old timber groynes extend out into the sea, built to reduce the further effects of onshore drift.	The sensitivity of the coastal cliffs is high , and the sensitivity of the beach is medium to high . The cliffs are a relatively scarce landscape element and a characterising feature of the coastal landscape. They are weak and prone to erosion and would be difficult to reinstate. As the beach comprises already eroded material it is not as sensitive to the effects of the project.	The magnitude of change would be low . The selection of the Long HDD option for duct installation means that there would be no construction works on the beach and drilling would take place from the entry pit on the landward side beneath the cliff and up to 1,000m to the exit point offshore. The effects on the cliffs and beach would be subterranean and so would have no readily apparent effect on the surface of the cliffs or the beach.	Not significant. The combination of the high sensitivity and the low magnitude of change leads to a not significant effect. There would be no effect on the beach owing to the use of the Long HDD option and effects to the cliffs would be subterranean and therefore not affect the surface of the cliffs.	Short term and reversible. 20 week construction period.
Agricultural land	The South Happisburgh landfall comprises arable agricultural land. This is the predominant land cover in the local area and is widespread across the Norfolk landscape. The faint delineations of former field boundaries mark the loss of hedgerow enclosure in this coastal area, where the resultant amalgamation has	The sensitivity of the agricultural land is medium to low . This is a modified landscape in which the intensification of farming practices has led to the loss of hedgerow boundaries and small-scale field pattern. These factors detract from the value of this landscape element and reduce its susceptibility to the landfall	The magnitude of change would be medium in those areas where the agricultural land would be stripped, covered or excavated. There would be a concentrated effect where the two temporary mobilisation areas each of 3,000m ² would be located, each containing one transition pit of 150m ² . The compounds would be contained by a 2.4m fence, surfaced in permeable	Not significant. The combination of the medium to low sensitivity and the medium magnitude of change would lead to a not significant effect. Landfall construction would	Short term and reversible. 20 week construction period for duct installation and 10

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	created a larger field pattern and a predominantly open and exposed landscape. The land is intensively managed and there is very little natural vegetation.	construction because there is no natural vegetation, the vegetation that is present is cultivated, it has no scarcity value and can be easily replaced. The agricultural land would be reinstated post construction.	gravel aggregate and containing plant, materials and welfare facilities. A temporary access road with a temporary surface would link the construction works with Whimpwell Street. The agricultural land would be temporarily altered through its use for construction purposes. While the area would be sizable, it would form only a small proportion of the wider agricultural land as a resource. The storage and relaying of the topsoil, as far as practicable, would ensure reinstatement returns the agricultural land to its baseline condition and this would reduce the overall magnitude of change.	occur in an agricultural area with disturbed land and no natural vegetation. Long term changes would occur below ground surface with good potential for reinstatement without notably damaging the quality of the agricultural land.	weeks for cable pulling.
Coastal Plain LCT: Bacton to Sea Palling LCU	The Bacton to Sea Palling LCU covers an extensive section of the Norfolk coastline and landward interior. The influence of the coast is limited to the narrow coastal strip beyond which visibility of the sea is screened by the undulating landform and enclosure of built form and vegetation. Much of this LCU is characterised by arable farmland, parts of which are enclosed by hedgerows and	The sensitivity of the LCU is medium to high . The value of the LCU is medium – while the coastal edge forms the key feature of this LCU, it is not subject to any landscape designations which would otherwise denote a special value. The loss of hedgerows and amalgamation of fields along the coastal edge has led to the degradation of the historic landscape and character of small scale enclosure. The susceptibility	The magnitude of change would be low to negligible or no effect across most of the LCU and medium to high within the localised part of the LCU in an approximate 150m radius around the landfall site. In the localised part of the site, the landscape character would be changed by the introduction of the running track and mobilisation area, and the presence and activity of plant associated with the landfall construction works. While much of the	Not significant across the majority of the LCU and significant in the approximate 150m radius around the landfall. The combination of the medium to high sensitivity and the medium to high magnitude of change would lead	Short term and reversible. Localised significant effects would occur during the 20 week construction period and then reduce to not

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	tree cover, but most of which has lost the small-scale pattern of enclosure through intensification of farming practices. Settlements and roads are typically small scale and rural. Views typically extend across fore to middle ground, depending on the level of landform and hedgerow enclosure.	of the LCU is medium to high as the landfall would be located in this LCU, albeit in a part that has been modified through cultivation of arable crops and the intensification of farming.	landfall construction would be located on the landward side, it would have an influence on the character of the sensitive coastal edge. The effect would be moderated by the modified nature of the baseline landscape, the medium scale and subterranean location of the construction works and the ease with which effects would be mitigated through reinstatement of the farmland as far as is practicable.	to a significant effect, which would occur between the ridge on which Happisburgh Lighthouse sits in the north and PRow Happisburgh RB22 in the south.	significant during cable pulling and post-construction.
Happisburgh Manor Designed Landscape	Happisburgh Manor is a Grade II Listed Building set in a designed landscape that is listed in Historic England's 'Register of Parks and Gardens.' Landform slopes from north to south and the manor is situated on an elevated knoll such that it affords views east towards the sea and south across the village and adjacent farmland. The garden has been designed to be enclosed and there are no associations drawn with the surrounding landscape or seascape. To the north of the house there is a woodland garden planted to shelter the garden from coastal winds. A circular wall encloses	The sensitivity of Happisburgh Manor designed landscape is medium to high . The value of the garden is high. The Historic England designation denotes the national importance of the RPG, despite the fact that it is not publicly accessible. The susceptibility of the garden to the landfall construction is medium to low. This is due primarily to the enclosed and introverted nature of the garden. While the manor house has been designed to take advantage of key views, the enclosure of much of the garden by woodland, tree cover, walling and summer houses limits the influence that the surrounding landscape has on its character. Tree planting along	The magnitude of change on Happisburgh Manor would be low . Visibility of the landfall construction is unlikely owing to the mature tree cover which lines the southern site boundary and the intervening ridge marked by the location of Happisburgh Lighthouse. The landfall construction would be relatively restricted in terms of the vertical scale of plant and the horizontal spread of the compound, ensuring that it would be effectively screened by the intervening tree cover and landform.	Not significant. The combination of the medium to high sensitivity and the low magnitude of change would lead to a not significant effect. The limited possibility of visibility of the landfall construction occurring from the RPG notably limits any influence on its character.	Short term and reversible. 20 week construction period for duct installation and 10 weeks for cable pulling.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	compartments in a central core around the house, with summer houses integrated into the structure.	the southern boundary limits potential visibility of the landfall construction in this direction.			
Landfall – Visual receptors					
Norfolk Coast Path	The Norfolk Coastal Path is a long-distance footpath that follows the coastline of Norfolk. The section of path between Happisburgh and Eccles on Sea has potential to be affected by the proposed project as it is the only section with potential visibility. This section sits on top of the low cliffs and comprises a narrow dirt path. The sandy beach lies below the crumbling cliffs and is characterised by the old timber groynes that extend out into the sea. On the landward side, the rolling landform is at its highest next to Happisburgh and then dips in the middle before rising towards Eccles-on-Sea. The surrounding land cover is arable farmland which extends right up to the cliff edge and with no hedgerow, the fields appear large and exposed.	<p>The sensitivity of walkers on the coastal path is high.</p> <p>The high value of the Coastal Path relates to its national importance as a long-distance route. Although this designation does not relate directly to scenic value, the Coastal Path does enable walkers to experience attractive coastal views.</p> <p>The susceptibility of walkers on the path is medium to high because their attention is typically focused on the seaward side, although they would come within close range of the landfall construction on the landward side. There would be no construction activity on the beach, and vessels associated with the landfall construction would be visible to walkers.</p>	The magnitude of change on the views of walkers would be medium to high within the short section of coastal path south of Happisburgh and north of Eccles-on-Sea, and with no effect across the remainder of the coastal path. The presence of the two temporary mobilisation areas, each containing a transition pit, would create a focal, if localised, feature in this relatively exposed landscape. The rolling landform would help to provide some screening from parts of the path, while from adjacent parts a clear view would be experienced by walkers. Despite some similar features with existing agricultural practices, the concentration and activity of plant on the landward side and concentration and activity of vessels close to the shore on the seaward side, would appear at variance with the rural character and this would add to a notable effect.	Not significant along Norfolk Coast Path with the exception of the localised section between Happisburgh coastal car park and PRow Happisburgh RB22, where the effect would be significant . The combination of the high sensitivity and medium to high magnitude of change would lead to a significant effect, albeit from a localised section of the Coastal Path, with the majority remaining unaffected.	Short term and reversible. Localised significant effects would occur during the 20 week construction period and then reduce to not significant during cable pulling and post-construction.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Happisburgh	Happisburgh lies to the north of the landfall site. It is a small nucleated village, characterised by two important landmark features, St. Mary's Church in the north of the village and Happisburgh Lighthouse to the south. The historic core of the village is inset from the coastal edge. Village expansion has occurred southwards along Whimpwell Street and Lighthouse Lane, and eastwards along Beach Road. It is these southern parts of the village that would lie closest to the landfall construction and which are most likely to be affected.	<p>The sensitivity of Happisburgh is medium to high.</p> <p>The value of the village is considered to be high on account of its Conservation Area status which denotes its special architectural and historic character.</p> <p>The susceptibility of village residents to the proposed project is limited by its inward-looking nature and the screening effect of mature tree cover along Beach Road and intervening landform adjacent to Happisburgh Lighthouse. While the southern end of Lighthouse Lane comes close to the landfall site, the views of residents are fairly well contained by rear garden boundaries and intervening vegetation. Residents' views are, typically longer in duration than other visual receptors and this raises their susceptibility. The overall susceptibility of residents is considered to be medium.</p>	<p>The magnitude of change on the views of residents would be medium in parts along the southern edge and negligible or no effect across the remainder of the village, where visibility of the landfall construction would be mostly screened by intervening built form, landform and tree cover.</p> <p>The elevation of much of the village is lower than the ridge on which the lighthouse sits, and this intervening landform prevents views from extending to the section of coastline where the landfall would be located. Some visibility may occur from the southern end of Lighthouse Lane although it would be unlikely for views to occur from the properties owing to their orientation east and not south-east in the direction of the site, combined with the enclosure of the rear garden boundary fences and garden vegetation. The limited vertical and horizontal extent of the landfall combined with its separation distance from the village means that it would be unlikely to form a prominent feature in views that do occur.</p>	<p>Not significant for residents of Happisburgh with the exception of residents on Lighthouse Lane on the southern edge of the settlement. The combination of the medium to high sensitivity and the medium magnitude of change would lead to a significant effect from the southern edge of the settlement. Across the remainder of the settlement there would be limited potential for residents to gain visibility of the temporary construction works owing to intervening built form, land form and tree cover.</p>	<p>Short term and reversible. Localised significant effects would occur during the 20 week construction period and then reduce to not significant during cable pulling and post-construction.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Eccles-on-Sea	Eccles-on-Sea lies to the south of the landfall site. It is a more modern settlement than Happisburgh and has developed along the coastline to create a long linear settlement. The houses are typically chalet bungalows set along straight traditional streets with garden grounds but no substantial vegetation. To the north and south, the development spreads further along the coastline as a single row of bungalows facing out towards the North Sea. As the settlement is largely spread along the coastline, it is only the northern strip, on Doggett's Lane, that has potential to be affected by the proximity of the proposed project. This comprises a row of chalet bungalows enclosed by fences and garden vegetation.	<p>The sensitivity of the views of residents on Doggett's Lane is medium to high.</p> <p>The value of the views of residents is medium. Eccles-on-Sea is not covered by any townscape or landscape designations which would otherwise denote a special value. Its value relates to the close relationship between the settlement and the sea, with many of the dwellings set on the coastal edge and affording extensive seascape views.</p> <p>The susceptibility of residents in Eccles-on-Sea to the effects of the landfall is limited by the orientation of the dwellings north-east towards the sea. Furthermore, the single storey nature of the chalets on Doggett's Lane, combined with the enclosure of the rear gardens by boundaries and vegetation, would limit visibility of the landfall site. The proximity of the site to residents on Doggett's Lane would, however, lead susceptibility to be medium to high.</p>	<p>The magnitude of change on the views of residents as a result of the landfall construction would be medium to low.</p> <p>It is unlikely that residents would gain visibility of the landfall construction from their internal living spaces or their garden grounds owing to their single storey structure and boundary enclosures combined with the distance of the construction works and the oblique angle at which they would be located relative to the properties. The landfall would be located a sufficient distance from Eccles-on-Sea and be of a sufficiently small scale, so as not to redefine the character of residents' views.</p>	Not significant to residents on Doggett's Lane and residents in the remainder of the settlement. The combination of the medium to high sensitivity combined with the medium to low magnitude of change would lead to a not significant effect.	Short term and reversible. 20 week construction period for duct installation and 10 weeks for cable pulling.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Whimpwell Green	Whimpwell Green is a hamlet set to the south of the village of Happisburgh, to which it is connected by the extension of Whimpwell Street. The settlement is linear and mostly single-sided with properties set along the north-eastern side of the road, such that they front towards the south-west and back towards the north-east. The landform rises slightly to the north-east, which precludes views to the coast.	<p>The sensitivity of the views of residents at Whimpwell Green is medium.</p> <p>The value of the views of residents is medium. Whimpwell Green is not covered by any townscape or landscape designations which would otherwise denote a special value. Its value relates to the visual amenity of residents which is associated with the frontage onto the street, as well as the rural aspect to the rear.</p> <p>The susceptibility of residents to the effects of the landfall is limited by their distance from the landfall site and the limited scale, in particular the low vertical extent of the construction works, which would moderate its effect on visual amenity. The proximity of the running track to residents in the north of the hamlet would, however, lead susceptibility to be medium.</p>	<p>The magnitude of change on the views of residents as a result of the landfall construction would be medium to low.</p> <p>It is unlikely that residents would gain visibility of the landfall construction from their ground floor living spaces or their garden grounds owing to their boundary enclosures combined with the distance of the construction works. The landfall would be located a sufficient distance from Whimpwell Green and be of a sufficiently small scale with low vertical extents, so as not to give rise to a notable effect. The presence of the running track through the north of the hamlet would have a more notable close-range effect, although would only have intermittent effects on residential visual amenity and therefore would not redefine the character or quality of the views.</p>	Not significant. The combination of the medium sensitivity combined with the medium to low magnitude of change would lead to a not significant effect.	Short term and reversible. 20 week construction period for duct installation and 10 weeks for cable pulling.
PRoW Happisburgh RB22	The Happisburgh RB22 PRoW connects the village of Whimpwell Green with the Norfolk Coastal Path at a point close to the northern end of	<p>The sensitivity of walkers on PRoW Happisburgh RB22 is medium to high.</p> <p>The value of views from PRoW RB22 is medium. This rating is moderated</p>	The magnitude of change on the views of walkers would be medium to high over an approximate 300m section between Whimpwell Green and	Significant. The combination of the medium to high sensitivity and the medium to high	Short term and reversible. Localised significant

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Doggett's Lane. From the Whipwell Green side, intervening landform prevents views of the coast. The views are therefore characterised by open arable farmland with a distinct lack of enclosure and tree cover. From the Doggett's Lane side, views are characterised by the coast and this forms a more interesting feature for walkers.</p>	<p>by the absence of any formal viewpoints or landscape designations covering the area. While the views on the landward side are unremarkable, on the coastal side they are of greater scenic interest.</p> <p>The susceptibility of walkers to the landfall construction is medium to high on account of the proximity of the PRoW to the landfall construction and the activity of walkers in this area.</p>	<p>Larkfield and low or no effect across remaining parts.</p> <p>The location of the PRoW along the southern edge of the landfall means that it would be likely to be diverted during the construction phase. From a diverted route around the landfall construction, walkers would experience close range views of the mobilisation area and site with the associated presence and activity of plant. Although the baseline landscape is already influenced by intensive farming, the landfall construction would appear at variance with the rural character and this would give rise to a notable effect.</p>	<p>magnitude of change would lead to a localised significant effect over an approximate 300m section. This would be primarily on account of the close range from which walkers would experience the visual effects of the landfall construction.</p>	<p>effects would occur during the 20 week construction period and then reduce to not significant during cable pulling and post-construction.</p>

29.7.4.3 Potential impacts during construction - onshore cable route

153. The onshore cable route will connect the landfall at Happisburgh South with the Necton National Grid substation, covering a route of approximately 60km (Figures 29.2 and 29.3 (Scenario 1) and Figure 29.13 and Figure 29.14 (Scenario 2)). It would be routed through the rural area approximately 20km north of Norwich. From the landfall at Happisburgh South, the onshore cable route would cross agricultural land heading north-west and passing the small settlements of Ridlington and Edingthorpe Green, and on to the north of North Walsham. The cable route then would cross the Norwich – Sheringham railway line and A149 before heading south-west past the small settlement of Banningham, crossing the A140 and the river Bure to the north of Aylsham. The onshore cable route would then continue south-west, passing the small settlements of Cawston and Reepham before turning south towards the River Wensum. It would then pass to the south of Swanton Morley before crossing the Mid Norfolk Railway to the north of Dereham and the A47 west of Dereham, finally reaching the onshore project substation at Necton.
154. Under Scenario 1 and Scenario 2, the construction works along the onshore cable route would be different. Under Scenario 1 the ducts for the Norfolk Boreas would already have been installed by Norfolk Vanguard. The construction phase would therefore principally involve the pulling through of the cables and construction of jointing pits. Under Scenario 2, there would be no pre-installation of ducts and therefore, construction works would involve the excavation of trenches, trenchless crossings and the installation of ducts with associated infrastructure, as well as the pulling through of cables and construction of jointing pits. The potential landscape and visual effects of Scenario 2 would therefore be greater than those arising as a result of Scenario 1 and as such Scenario 2 is presented first.

29.7.4.3.1 Scenario 2

155. The impact of the onshore cable route during the construction for Scenario 2 would relate principally to the following features of the construction process:
- The effect on the landscape element of agricultural land owing to the excavation of the 35m wide Norfolk Boreas onshore cable route for two trenches, construction of 6m wide running track and formation of spoil heaps.
 - The effect on the landscape element of agricultural land owing to the presence of the temporary mobilisation areas (100m x 100m or 150m x 100m if combined with trenchless drilling compounds), trenchless drilling compounds (up to 150m x 50m launch and 100m x 50m reception compounds at either end of the drill) and running tracks connecting to the road network.
 - The effect on the landscape element of hedgerows and trees owing to their removal to facilitate excavation for the 13m to 16.5m working width of the onshore cable route in locations where open cut trenching would occur.

- The effect on landscape character and visual amenity owing to the presence of the temporary, surfaced and fenced mobilisation areas, and trenchless drilling compounds, and their content of plant, materials and welfare facilities.
- The effect on landscape character and visual amenity owing to the presence of the fenced 35m wide onshore cable route (13m to 16.5m through hedgerows and trees), including trenches, running tracks and spoil heaps. Open cut trenching would take place in approximately 150m sections, with each section having an indicative construction period of one to two weeks within an overall two year window.
- The effect on landscape character and visual amenity owing to the presence and activity associated with the mobilisation areas, trenchless drilling compounds, trenchless drilling (e.g. HDD) and construction of temporary running tracks.
- The effect on landscape character and visual amenity owing to the activity associated with the cable duct installation, cable pull through and construction of the 150 jointing pits, each 90m². Cable pull through would occur after open cut trenching, in line with proposed project phasing.
- The reinstatement of ground along the onshore cable route, and at the mobilisation areas, trenchless drilling compounds, running tracks and haul roads, with reinstatement of hedgerows and trees occurring at the end of construction.

29.7.4.3.2 Scenario 2 Summary

156. Table 29.11 shows the detail of the assessment for each receptor in respect of Scenario 2.
157. In summary, all agricultural land and the vast majority of hedgerows and trees would not be significantly affected as a result of the onshore cable route construction. In a small number of locations, where notable hedgerows and trees would be removed, localised significant effects would occur. There would be no significant effects on designated landscapes including the RPGs at Blickling Hall or Salle Park. In terms of roads, significant effects would occur within localised sections of the A47, A149, B1146, B1147, A1067, B1145 (west of Cawston), Heydon Road and Lime Kiln Road, while effects would be not significant on all remaining parts of these roads and other roads and railways. The recreational route of the Wensum Way would undergo significant effects, albeit over very localised extents while the effects on all other recreational routes would be not significant. There would be no significant effects on settlements along the length of the onshore cable route.
158. At the end of the construction phase, land over the onshore cable route, mobilisation areas, trenchless drilling compounds and running tracks would be reinstated to agricultural use. Hedgerows would be reinstated in the 13m to 16.5m sections where they would have been removed for open-cut trenching, however hedgetrees and trees would not be permitted to be replanted over a 6m to 10m

wayleave either side of the 13m cable easement, owing to restrictions of tree planting over or close to cables.

159. The majority of the effects would therefore relate to the construction works and be short to medium term with effects mitigated through reinstatement of the land and hedgerows as far as practicable and permissible. Residual impacts would occur in the few instances where trees would be removed and not replaced owing to restrictions over cable easements. These effects would be long term but not irreversible as replanting of hedgetrees and trees could take place following decommissioning and the planting of hedgerows in the interim would offset the loss.
160. The only other residual impact in respect of the onshore cable route would relate to the presence of the link boxes which would be located up to every 5km. These would either be buried to ground level (1.5m x 1.5m per circuit) or above ground as cabinets (1.2m x 0.8m x 1.8m per circuit), set along field boundaries and in accessible locations. Their impact on landscape and visual receptors would be limited by their small scale and the infrequency at which they would occur across the landscape.

Table 29.11 Scenario 2: Potential impacts during construction - onshore cable route

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Physical Effects					
Agricultural land	<p>Arable farmland is the predominant land use along the length of the onshore cable route and is widespread throughout the Norfolk landscape. It is cultivated for crops and as such the land is constantly being disturbed as crops are planted or harvested. The changing appearance of the arable landscape and the activities associated with ploughing fields or planting and harvesting crops are a common and integral characteristic of the agricultural landscape. The presence and activity of farm machinery is also a feature of the arable farmland and on the rural roads.</p>	<p>The sensitivity of agricultural land is considered to be medium to low.</p> <p>The onshore cable route does not cross any designated landscapes and the agricultural land has no special value in relation to its characteristics as a landscape element. The value of the agricultural land is considered to be medium to low.</p> <p>Due to the level of existing disruption as a result of crop cultivation, combined with the widespread occurrence of agricultural land as a landscape element, the susceptibility to the proposed project is considered to be medium to low.</p>	<p>The magnitude of change would be medium to low in those areas where onshore cable route construction would occur and medium where mobilisation areas and trenchless drilling compounds would be located.</p> <p>The vast majority of the onshore cable route construction would take place on arable farmland. It would occur within the context of fields which are regularly modified by agricultural practises. The level of change relating to the cable route trenching, the construction of running tracks, and presence of soil bunds within the 35m width, and temporary fencing along its length, would form a relatively small-scale, short-term and localised disturbance to the agricultural land.</p> <p>After the cable has been laid, the trench would be backfilled and temporary working areas and running tracks removed. The agricultural land would then return to its previous use. Re-instatement is therefore considered relatively</p>	<p>Not significant.</p> <p>The combination of the medium to low sensitivity with the medium to low magnitude of change of the onshore cable route and medium magnitude of change of the mobilisation areas would lead to a not significant effect.</p> <p>This is a result of the absence of natural vegetation, the presently disturbed nature of the land and the ease with which</p>	<p>Short term and reversible in respect of construction of onshore cable route.</p> <p>Cable trenching would take 1 week for each 150m stretch, in the first 2 years.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			<p>straightforward with minimal disruption required to return the land to its previous uses and productivity.</p> <p>Mobilisation areas and trenchless drilling compounds would require a larger land take, although still only occupying a small proportion of the wider agricultural landscape and spaced sufficiently to reduce the potential for sequential effects.</p>	reinstatement would occur.	
Hedgerows and hedgetrees	<p>Hedgerows and hedgetrees are a common feature in the rural landscape in which the onshore cable route crosses, varying in height, continuity and condition. Some hedgerows appear more formally managed, others have a scrubbier form often with a fragmented appearance. Where trees are found within hedgerows they vary in size, age frequency and condition. Although hedgerow removal has occurred extensively in parts of the study area, they still form an important component of the rural and historic landscape character.</p>	<p>The sensitivity of hedgerows and hedgetrees is medium or medium to high.</p> <p>The value is considered to be medium to high as the hedgerows and hedgetrees are of importance to the historical pattern of the landscape and the character of enclosure that typifies this rural landscape.</p> <p>The susceptibility of most hedgerows to the proposed project is medium to low. The sections of hedgerow lost would be reinstated post construction and as this can be achieved with relative ease this reduces their overall susceptibility to the onshore cable route. The susceptibility of hedgetrees and</p>	<p>Careful consideration of cable routeing has sought to reduce the amount of hedgerow and hedgetree removal along the route. An easement of the 35m onshore cable route to a reduced working width of 13m to 16.5m when crossing hedgerows reduces potential losses of this landscape feature. 13m to 16.5m would create a notable gap, which in hedgerows in good condition, continuous and mature, would be apparent, but which in hedgerows which are in poor condition, low and fragmented, would have a limited effect.</p> <p>Reinstatement of lost hedgerows would mitigate the effects by infilling gaps and completing the enclosure, taking 3-5 years for low</p>	<p>Not significant on the majority of hedgerows and hedgetrees. This relates to the medium sensitivity and medium to low magnitude of change.</p> <p>Significant on hedgerows and hedgetrees listed in the sensitivity column owing to their good condition. This relates to the combination of</p>	<p>Medium term or long term and reversible. The significant effect would last 3-5 years for low hedgerows and 5-10 years for high hedgerows, after which the effects would reduce to not significant for the remainder of the project's indicative design life.</p> <p>The loss of hedgetrees would be long</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
		<p>good condition hedgerows is medium to high, as owing to their greater height, their loss would be more apparent and their reinstatement longer term.</p> <p>Those hedgerows most susceptible to the proposed project occur at the following crossing points;</p> <p>Blickling Road, N of Aylsham; Silvergate Lane, NW of Aylsham; Aylsham Road, W of Aylsham; Elsing Road, near River Wensum; B1145, N of Reepham; and B1145, W of Reepham.</p>	<p>hedgerows and 5-10 years for high hedgerows. Restrictions applied to planting over cable easements prevents hedgetrees from being replanted over the 13m easement with an additional 6 to 10m width either side.</p> <p>The magnitude of change would vary. The majority of the hedgerow losses would give rise to a medium to low magnitude of change as they occur in landscapes where hedgerow erosion is common, and hedgerows are either in poor condition, scrubby, low or fragmented. These would be easily replaced.</p> <p>For better condition, taller and complete hedgerows, often with hedgetrees present, the magnitude of change would be medium and would apply to those sections of hedgerows identified in the sensitivity column as being most susceptible.</p>	<p>the medium to high sensitivity and the medium to high magnitude of change.</p> <p>While hedgetrees removed over cable easements could not be replanted, hedgerows could, and while this would offset the loss, the effect would still be significant.</p>	<p>term, lasting the 30 years of the project's indicative design life and reversible following decommissioning</p>
Trees and Woodlands	Individual trees and woodlands, including small groups of trees, larger woodlands and estate woodlands add character to the study area of the onshore	<p>The sensitivity of trees and woodlands to the proposed project is medium to high.</p> <p>The value is considered to be medium to high as the trees and</p>	Careful consideration of cable routeing and inclusion of additional trenchless crossings means that all woodlands and trees across the 60km route would be avoided with the exception of a small number of	Not significant. The medium to high sensitivity combined with the negligible	Long-term and reversible. In the limited number of cases where tree

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>cable route. Larger woodlands typically occur as part of designed landscapes and while some woodland plantations occur, they are not a common feature. Smaller blocks of woodland occur intermittently across the landscape and provide a notable contribution to the character and pattern of the landscape.</p> <p>Trees and woodlands in the area are connected by the frequent hedgerows that line roads and field boundaries and together provide enclosure within an otherwise open agricultural landscape. Built settlement edges and church towers are often seen in the context of mature trees.</p>	<p>woodland are of importance to the historical pattern of the landscape and the character of enclosure that typifies this rural area.</p> <p>The susceptibility of the trees and woodlands to the proposed project is medium to high. There would be a restriction on tree planting over the permanent easement of 13m with an additional restricted section of 6 to 10m on either side. Although quick thorn and blackthorn hedgerows could be planted over the easement, in areas of mature woodland, the lower height and limited form would be readily apparent and give rise to long term effects. Re-establishment of tree or woodland structure beyond this 33m easement would take approximately 20 years for 10m growth and this further heightens the overall susceptibility of this landscape element.</p> <p>Those trees most susceptible to the proposed project occur at the following crossing points; Colby Road, N of Banningham; Minor road near Hackford Hall; and Norwich Road, Swanton Morley.</p>	<p>road-side trees (the removal of hedgetrees is assessed in the assessment of hedgerows and hedgetrees above). The overall magnitude of change would therefore be negligible.</p> <p>Those localised trees susceptible to significant effects are identified in the sensitivity column. In these locations open trenching would be carefully sited so as to minimise the number of trees to be removed, targeting poorer condition specimens or by using existing gaps in the tree line. These trees are generally of reasonable condition and the magnitude of change is therefore considered to be medium to high within these localised locations.</p> <p>Restrictions applied to planting over cable easements prevents trees and woodland from being replanted over the 13m easement with an additional 6-10m width either side.</p> <p>While the overall magnitude of change would be negligible, in respect of the locations listed in the sensitivity column, the magnitude of change would be medium or</p>	<p>magnitude of change would lead to a not significant effect. A significant effect would occur in relation to the removal of trees listed in the sensitivity column owing to their good condition.</p>	<p>removal would occur over the cable easement, replanting of trees would not be permitted and the effects would be long term lasting the 30 years of the project's indicative design life and reversible following decommissioning</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			medium to high, depending on the exact route and subsequent losses.		
Landscape Receptors					
Salle Park	<p>Salle Park is a designated landscape in Historic England's 'Register of Parks and Gardens'. It is located approximately 2km north-east of Reepham and to the immediate north of the B1145 with minor roads to the west and east. The surrounding landscape comprises arable farmland and the landform falls gently from south-west to north-east. The designed landscape is set around Salle Hall, an 18th century Palladian country house, and includes formal gardens and a walled kitchen garden. Historic England's description states '<i>it enjoys a very rural setting and is almost entirely surrounded by dense perimeter plantations.</i>' This enclosure limits the visual association between the designed landscape and the surrounding landscape although the south-east drive</p>	<p>The sensitivity of Salle Park to the proposed project is medium to high.</p> <p>The value of Salle Park is high. Its inclusion in the Register of Parks and Gardens denotes its national importance.</p> <p>The susceptibility of Salle Park to the proposed project is medium. The designed landscape is enclosed by dense woodland such that there is no visibility of the landscape to the east where the mobilisation area would be located and the south-east where the onshore cable route construction would take place. The only potential for visibility would occur from the south-east corner where the gated entrance to the south-east drive occurs, although its recessed location within mature tree cover combined with the hedgerow enclosure along the B1145 would limit any such potential.</p>	<p>The magnitude of change on Salle Park as a result of the construction phase of the proposed project would be low.</p> <p>There would be no visibility of the proposed project from the designed landscape owing to the maturity and density of the perimeter planting along the southern and eastern boundaries. At the south-east gated entrance, the potential for visibility is limited by enclosing tree and hedgerow cover, and if visibility were to occur the construction works would appear relatively small in scale. While the mobilisation area and onshore cable route construction would potentially have an impact on the setting of the designed landscape, from the B1145, where the impacts would occur, the hedgerows would screen much of the construction works with the exception of where a 13m to 16.5m break would be formed at the crossing point. The mobilisation area would be seen to</p>	<p>Not significant.</p> <p>The combination of the medium to high sensitivity and the low magnitude of change would lead to a not significant effect. While the mobilisation area would be seen within the setting of Salle Park on the west-bound approach along the B1145, the limited extent of visibility would moderate the effect.</p>	<p>Short term and reversible in respect of onshore cable route construction (not significant).</p> <p>Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	emerges at the corner closest to the proposed project and gothic cottage, Cawston Lodge, is located on the opposite side of the B1145 to this entrance.		the fore of the mature and dense woodland edge and not in association with the house or any formal parts of the designed landscape.		
Blickling Hall	Blickling Hall is a designated landscape in Historic England's 'Register of Parks and Gardens'. It is located approximately 1km to the north-west of Aylsham. 17 th century Blickling Hall forms the centre-piece around which the formal gardens are set, the main area of which lies to the east. Views from the raised terrace behind the Doric Temple on this eastern side are channelled by the avenue of trees and are described in Historic England's description as ' <i>the main view out of the site.</i> ' Parkland occurs on this eastern side, bounded by a minor road enclosed by hedgerow and intermittent tree cover but with occasional gaps in the cover.	<p>The sensitivity of Blickling Hall to the proposed project is medium to high.</p> <p>The value of Blickling Hall is high. Its inclusion in the Register of Parks and Gardens denotes its national importance.</p> <p>The susceptibility of Blickling Hall to the proposed project is medium to low. The onshore cable route would be located in the arable farmland approximately 200m to the south of the closest RPG boundary, set beyond intervening Flash Pit Farm.</p> <p>The main formal gardens are located on the eastern side of the house, and views from these gardens are contained by hedges and tree cover and do not extend beyond the Doric Temple at the end of the eastern axis. The cable route would be located approximately 500m from the eastern boundary of the parkland.</p>	<p>The magnitude of change on Blickling Hall as a result of the construction phase of the proposed project would be low.</p> <p>There would be no visibility of the proposed project from the ornamental gardens around Blickling Hall owing to the enclosure of mature trees and other vegetation. It would be the southern parkland that would be closest to the onshore cable route construction. Although a more marginal part of the designed landscape, it is from here that views out towards the surrounding landscape can be experienced. Visibility of the construction works to the south of Flash Pit Farm would, however, be limited by intervening hedgerows and intermittent trees and the separation distance of approximately 200m from the southern boundary. Where</p>	Not significant. The combination of the medium to high sensitivity and the low magnitude of change would lead to a not significant effect. While there is the potential for limited visibility to occur from the southern parkland this would not redefine the character of the designed landscape.	Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of hedgerow re-establishment (not significant).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			glimpsed views would occur, the construction works would be seen as a relatively small-scale operation on land previously disturbed by cultivation.		
North Walsham and Dilham Canal	North Walsham and Dilham Canal connects Antingham with the River Ant at Smallburgh. It was originally constructed to transport agricultural products but has been disused since 1934. While attempts have been made to re-open the canal for leisure use, it is still currently disused, although sections have been cleared and some restoration works carried out. The character along the canal is mixed with some sections open and influenced by the surrounding agricultural landscape, and others enclosed by vegetation. The section which is to be crossed by the onshore cable route is located to the north of Little London and the south of Pigney's Wood.	<p>The sensitivity of the canal to the construction of the onshore cable route is medium.</p> <p>The value of the canal is medium. The canal and the surrounding area are not covered by any scenic landscape designations which would otherwise denote a special value. The canal is, nonetheless, of local value and an attractive feature in the local landscape.</p> <p>The susceptibility of the canal is medium to low as the construction of the onshore cable route would not directly affect the canal, due to the use of trenchless techniques under the canal and the location of mobilisation areas in the surrounding landscape.</p>	The magnitude of change on the North Walsham and Dilham Canal would be medium to low . The use of trenchless crossing techniques (e.g. HDD) to install ducts under the canal would mean that the canal and the land adjacent to it on either side would remain unaffected. The presence of the trenchless mobilisation areas would be offset in the fields either side of the canal and although these would not have a direct effect on the canal, there would be a visual influence on the character of the canal which would add to the magnitude of change.	Not significant. The combination of the medium sensitivity and the medium to low magnitude of change would lead to a not significant effect.	Short term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Visual Receptors					
Dereham Road	Dereham Road connects the A47 to the west of Wendling with Dereham to the east. The onshore cable route runs roughly parallel to the A47 and would cross the section between Wendling in the west and Scarning in the east. The character along this straight section of road is rural, with hedgerows and intermittent trees aligning the road-side to the north and south. While the hedgerows are mostly continuous, there are notable gaps, especially close to the junction with Dale Road, where the mobilisation area would be located.	<p>The sensitivity of the views of road-users on this section of Dereham Road is medium.</p> <p>The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. There are no special features visible from this section of Dereham Road and the views from the road are either contained within the short range by hedgerows and hedgetrees or extend some short way into adjacent fields.</p> <p>The susceptibility of road-users is medium. Their views are experienced whilst in transit and at speeds of 40-60mph. The mobilisation area would be located on the north side of Dereham Road, close to the Dale Road junction, which would be partly visible to road-users and this increases their susceptibility to the proposed project.</p>	<p>The magnitude of change as a result of the onshore cable route construction phase would be medium within an approximate 120m section and low or no effect in all remaining sections.</p> <p>The medium magnitude of change would occur as a result of the presence of the mobilisation area in the adjacent agricultural field to the north of Dereham Road. The scale and character of this temporary mobilisation area would form a notable feature on account of the enclosure of the fencing, large surfaced area and content of plant, materials, site offices and welfare facilities, which would appear at variance with the scale and character of the baseline rural landscape. While the effect would be moderated by the intervening hedgerows and trees, there would be sufficient gaps for the mobilisation area to be visible to road-users.</p>	Not significant with the exception of a localised significant effect over an approximate 120m section of the Dereham Road. The combination of the medium sensitivity and the medium magnitude of change would lead to a significant effect within the localised area.	Short term and reversible in respect of the onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).
A47	The A47 is the main road connecting Great Yarmouth in the east with Leicester in the	The sensitivity of the views of road-users on this section of the A47 is medium .	The magnitude of change as a result of the onshore cable route would be medium over an approximate 150m	Not significant with the exception of a	Short term and reversible in respect of the

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>west and forms the main east-west route through Norfolk, linking Norfolk with King's Lynn and Peterborough. It is a busy main road, comprising a mix of single and dual carriageways and passing through, mostly rural, but also urban areas. The onshore cable route crosses the section between Wendling in the west and Dereham in the east, where the road is single carriageway and straight. The character is most strongly influenced by the mature tree cover which encloses much of the road-side with some middle range views opening up over the surrounding farmland.</p>	<p>The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. There are no special features visible from this section of the A47 and the views from the road are either contained within the short range by tree cover or medium range by surrounding field boundaries.</p> <p>The susceptibility of road-users is medium. Their views are experienced whilst in transit and at speeds of 40-60mph. Despite the use of trenchless construction, large mobilisation areas would be located either side of the A47, which would be partly visible to road-users and this increases their susceptibility to the proposed project.</p>	<p>section and low or no effect in all remaining sections.</p> <p>The use of trenchless construction would mean the presence and activity of plant would be recessed from the road edge. This would mean roadside vegetation would not need to be removed and this would reduce the overall impact. The presence and activity associated with the trenchless drilling compound and mobilisation area to the north would be partly visible to road-users over the scrubby hedgerow that aligns an approximate 200m stretch to the north. The trenchless drilling compound to the south would also be partly visible owing to the intermittent breaks in tree cover. While the speed of road-users at 40-60mph, combined with the partial enclosure from hedgerow and trees would moderate the effect, the presence of compounds on either side of the road would add to the overall magnitude of change.</p>	<p>localised significant effect over an approximate 150m section of the A47. The combination of the medium sensitivity and the medium magnitude of change would lead to a significant effect within the localised area.</p>	<p>onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
B1146 (north of Dereham)	<p>The B1146 links Dereham to Fakenham. The cable route crosses this road to the north of Brick Kiln Farm, north of</p>	<p>The sensitivity of the views of road-users on this section of the B1146 is medium.</p>	<p>The magnitude of change as a result of the onshore cable route would be medium to high along an approximate 800m section of the</p>	<p>Not significant with the exception of a localised</p>	<p>Short term and reversible in respect of onshore cable</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	Dereham. A mobilisation area is proposed for the fields to the east of this road. To the south of where the onshore cable route crosses the B1146, mature hedgerow and hedgetrees enclose the western roadside while the eastern roadside is largely open. In the section where the onshore cable route crosses and to the north of this, there are occasional trees, mostly spaced out and stunted, and very fragmented hedgerow on the western and eastern roadside, such that both sides are largely open. The arable fields to the west and east are large and open with only distant enclosure.	<p>This road is not located within any national, regional or local scenic designations or recognised scenic views. There are no special features visible from this section and the value is considered to be medium to low.</p> <p>The national speed limit applies, and susceptibility is influenced by the speed of travel on a relatively straight section of road. The surrounding landscape is open in sections and roadside vegetation is fragmented such that views across the landscape occur where the cable route crosses, but also on approach from the north and south. On balance, susceptibility is considered to be medium.</p>	<p>road and low or no effect in all remaining sections.</p> <p>Potential changes in the views would occur as a result of the location of the mobilisation area and associated cable route construction activities within the open agricultural fields to the east of the B1146. The effect of vegetation removal along the roadside would be moderated by its existing fragmented nature.</p> <p>While the speed of travel would influence the ability of road-users to focus on the details of the mobilisation area, its proximity to the road and extent along the roadside would intensify the construction effects experienced from this road.</p> <p>Replacement hedgerows would be planted, which would take up to 3-5 years to establish.</p>	<p>significant effect over a section of approximately 800m of the B1146, centred on the mobilisation area. The combination of the medium sensitivity with the medium to high magnitude of change would lead to a localised significant effect.</p>	<p>route. Localised significant effects would last for the 2 year construction phase and reduce to not significant post-construction.</p> <p>Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
B1147 (south of Swanton Morley)	The B1147 connects Dereham to the south with Bawdeswell to the north-east. The section of the B1147 relevant to the assessment lies to the south of the village of Swanton	<p>The sensitivity of the views of road-users on this section of the B1147 is medium to high.</p> <p>The value of the views from the road is medium. There are no formal viewpoints and the views</p>	<p>The magnitude of change as a result of the onshore cable route would be medium to high within an approximate 200m section and low or no effect in all remaining sections of the road.</p>	<p>Not significant with the exception of a localised significant effect over an</p>	<p>Short term and reversible in respect of onshore cable route. Localised significant effects</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Morley. The character along this section is typically rural with open fields of arable farmland on either side. While the enclosures along the east-west field boundaries, perpendicular to the road are mature and dense, the enclosure along the road-side has been eroded, such that in the section adjacent to the proposed mobilisation area, there is no enclosure. The landscape is generally flat, and the views largely contained within the close to middle range.</p>	<p>are not representative of a designated landscape. There are no special features visible from this section of Dereham Road and views are typically contained within the medium range.</p> <p>The susceptibility of road-users is medium to high. Their views are experienced whilst in transit and at speeds of 40-60mph. The mobilisation area would be located on the eastern side of Dereham Road, making it completely visible to road-users and this increases their susceptibility to the proposed project.</p>	<p>The medium to high magnitude of change would occur as a result of the presence of the mobilisation area in the adjacent agricultural field to the east of the B1147. The scale and character of this temporary mobilisation area would form a notable feature on account of the enclosure of the fencing, large surfaced area and content of plant, materials, site offices and welfare facilities, which would appear at variance with the scale and character of the baseline rural landscape. While the backdrop of the mature tree cover to the north of the mobilisation area would moderate the effect, the openness of the road-side would ensure the mobilisation area would be visible to road-users over an approximate 200m stretch.</p>	<p>approximate 200m section. The combination of the medium to high sensitivity and the medium to high magnitude of change would lead to a significant effect within the localised area.</p>	<p>would last for the 2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
Lime Kiln Road	<p>Lime Kiln Road is the minor road which connects Dereham Road in the west with Fakenham Road in the east. It is located to the north of River Wensum and its associated wetlands and is surrounded by arable farmland. In the section eastwards from Elsing</p>	<p>The sensitivity of the views of road-users on these sections of Lime Kiln Road is medium.</p> <p>The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. There are no special features visible from</p>	<p>The magnitude of change as a result of the onshore cable route construction would be medium for an approximate 1.2km section and further 0.2km section and low or no effect in all remaining sections of the road.</p> <p>While there would be no mobilisation area along this section</p>	<p>Not significant with the exception of a localised significant effect over localised sections of approximately 1.2km and</p>	<p>Short term and reversible in respect of onshore cable route. Localised significant effects would last for the 2 year construction</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Lane to where the road turns north past Sparham Hole, roadside hedgerows have been removed and only intermittent or small groups of mature trees remain, more so along the southside, with the northside largely open. The views of road-users are characterised by an open rural landscape with limited enclosure and little visible built development. Along the northern section of Lime Kiln Road, bushy and continuous hedgerows largely enclose the road apart from the elevated section which occurs closer towards the A1067.</p>	<p>these sections of Lime Kiln Road and the views from the road are either typical of the wider rural area or enclosed by hedgerows.</p> <p>The susceptibility of road-users is medium along the open section, where the open and clear aspect of the surrounding landscape makes them susceptible to changes in this landscape as a result of the onshore cable route. The susceptibility of road-users is medium to low in the enclosed section, where hedgerows largely enclose the extent of the views with the exception of the more elevated sections, where their susceptibility would also be medium.</p>	<p>of road, the potential for significant effects relates to the proximity of the onshore cable route to Lime Kiln Road along a notably long extent. The onshore cable route would run parallel to the road, and although the scale of the construction works would be relatively small, the openness of the views and proximity to the road would raise the prominence and make the construction works a defining feature in the views of road-users.</p> <p>In the section of the road close to the mobilisation area, the magnitude of change would be medium. Despite the enclosure of the intervening hedgerows, where glimpsed views over or through the hedgerow occurred, the scale and character of the mobilisation area would appear at variance with the baseline rural character in this instance.</p>	<p>further 0.2km section of Lime Kiln Road.</p> <p>The combination of the medium sensitivity and medium magnitude of change would lead to a significant effect.</p>	<p>phase and reduce to not significant post-construction.</p> <p>Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
A1067 (west of Sparham)	<p>The A1067 is the main road between Norwich and Fakenham. The onshore cable route crosses this road to the west of Sparham with a mobilisation area proposed for the fields to the north of</p>	<p>The sensitivity of the views of road-users on this section of the A1067 is medium.</p> <p>This road is not located within any national, regional or local scenic designations or recognised scenic</p>	<p>The magnitude of change as a result of the onshore cable route construction would be medium to high within an approximate 300m section and low or no effect in all remaining sections of the road.</p>	<p>Not significant with the exception of a localised significant effect within a section of approximately</p>	<p>Short term and reversible in respect of onshore cable route. Localised significant effects would last for the</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>the A1067 and south of Well Lane. Grass verges align the north and south sides of the A1067, with some sections of low and fragmented hedgerows, leaving the views of road-users relatively open between the east and west junctions with Well Lane. These views extend across the adjacent arable fields where enclosure is also limited. This is a predominantly rural landscape with some influence from rural villages such as Sparham.</p>	<p>views and value is considered to be medium.</p> <p>The national speed limit applies and for the majority of A1067 road users, views of the surrounding landscape are experienced whilst travelling at speeds of between 40-60mph. Despite this, roadside hedgerows have been badly eroded along this section and the opportunities for views into the surrounding fields are available from relatively long sections of road on approach to the mobilisation area. On balance, susceptibility is considered to be medium.</p>	<p>The medium to high magnitude of change would occur as a result of the presence of the mobilisation area in the adjacent agricultural field to the north of the A1067. The scale and character of this temporary mobilisation area would form a notable feature that would appear at variance with the scale and character of the baseline rural landscape. The mobilisation area would appear notable on account of the fenced enclosure and surfaced compound of the mobilisation area and its content of materials, plant and welfare facilities. The extent of this effect would occur along the section of the A1067 between the west Well Lane junction and the properties close to the east Well Lane junction.</p>	<p>300m of the A1067. The combination of the medium sensitivity and the medium to high magnitude of change would lead to a significant effect.</p>	<p>2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
B1145 (west of Cawston)	<p>The B1145 connects King's Lynn in the west with Mundesley in the east. The onshore cable route crosses the B1145 approximately 1.2km west of Cawston. A mobilisation area would be located to the immediate north of the B1145 and this would lie to the east of Salle</p>	<p>The sensitivity of the views of road-users on this section of the B1145 is medium.</p> <p>The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. Views towards the wooded boundary of Salle Park are evident to west-</p>	<p>The magnitude of change as a result of the onshore cable route would be medium within an approximate 70m section and low or no effect in remaining sections with the exception of the sections assessed west of Reepham and North Walsham.</p> <p>Despite the close proximity of the mobilisation area in the adjacent</p>	<p>Not significant with the exception of a localised significant effect over a 70m section of the B1145. The combination of the medium</p>	<p>Short term and reversible in respect of onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Park. The north side of this section of the B1145 is enclosed by hedgerow. This forms an almost continuous screen to road-users, apart from where a 15m opening occurs, which allows views across the adjacent arable farmland. The vegetation on the south-side is more fragmented with sections of hedgerow and scrubbier vegetation, such that some views into the adjacent young woodland plantation can be gained.</p>	<p>bound road-users and this adds to the value although the designed landscape is screened by the trees.</p> <p>The views are largely enclosed by roadside vegetation, and this reduces the susceptibility of road-users to the proposed project in the adjacent fields. Glimpsed views would, however, be experienced, to reveal the presence of the mobilisation area.</p>	<p>field to the north, the intervening hedgerow would largely screen the mobilisation area apart from the crossing point where a section of hedgerow removal would be required. This would open up views from the B1145 into the mobilisation area which would be seen as a fenced and surfaced compound containing plant, materials and equipment, offices and welfare facilities. The character and scale of the mobilisation area would appear at variance with the character and scale of the baseline rural landscape. The onshore cable route construction to the south would appear comparatively small in scale.</p>	<p>sensitivity and the medium magnitude of change would lead to a significant effect in this instance.</p>	<p>to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>
<p>Heydon Road (east of Aylsham)</p>	<p>Heydon Road is a narrow minor road linking the town of Aylsham in the east with the minor roads leading to Cawston in the west. The section of the road relevant to this assessment occupies a rural area to the west of Aylsham where mobilisation area 7 is located and the onshore cable route crosses the road from north to south.</p>	<p>The sensitivity of the views of road-users on this section of the Heydon Road is medium to high.</p> <p>The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. Views are typical of the wider rural landscape and do not include any special features.</p>	<p>The magnitude of change as a result of the onshore cable route would be medium to high within an approximate 150m section and low or no effect in remaining sections.</p> <p>The close proximity of the mobilisation area in the adjacent field to the south, and the exposed nature of views in this direction would make the mobilisation area a prominent feature in views of road-users. This would be seen as a</p>	<p>Not significant with the exception of a localised significant effect over a 150m section of Heydon Road. The combination of the medium to high sensitivity and</p>	<p>Short term and reversible in respect of onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce to not significant</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	This section is heavily enclosed to the north by a dense and mostly continuous hedgerow, whilst in contrast, to the south there is no enclosure and views extend out over the adjacent large and flat arable farm fields to where field boundaries and woodland provide more distant enclosure. Further west, hedgerows enclose both sides of the road as well as the western aspect of the mobilisation area.	The susceptibility of road-users is medium to high. While the northern side of the road is well enclosed, the southern side is exposed, and road-users would gain clear views of the mobilisation area. The susceptibility is moderated by the limited number of road-users who use this rural road and the enclosure of hedgerows which occurs to the west of the mobilisation area.	fenced and surfaced compound containing plant, materials and equipment, offices and welfare facilities. The character and scale of the mobilisation area would appear at variance with the character and scale of the baseline rural landscape. The onshore cable route construction, extending to the south would appear comparatively small in scale.	the medium to high magnitude of change would lead to a significant effect.	post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).
A149 (north of North Walsham)	The A149 is the main road connecting Great Yarmouth in the south with Cromer in the north. It is a busy and fast road with many B and minor roads connecting into it. The section which the onshore cable route crosses is located to the north of North Walsham. It is long and straight with low hedgerows in the southern part and a mix of low scrubby vegetation in the northern part. This opens up view across the adjacent arable farmland which is	The sensitivity of the views of road-users on this section of the A149 is medium . The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. There are no special features visible from this section of the A149 and the views from the road are either contained within the short range by hedgerows or extend across the adjacent arable farmland. The susceptibility of road-users is medium. Their views are	The magnitude of change as a result of the onshore cable route would be medium over an approximate 400m section and low or no effect in all remaining sections. The use of trenchless construction would mean the presence and activity of plant would be recessed from the road edge. This would mean roadside vegetation would not need to be removed and this would reduce the overall impact. The presence and activity associated with the trenchless drilling compound would, however, be visible to road-users from open	Not significant with the exception of a localised significant effect over an approximate 400m section centred on the A149. The combination of the medium sensitivity and the medium magnitude of change would	Short term and reversible in respect of onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	characterised by large open fields and limited enclosure. To the south, the A149 passes an area of light industry on the northern side of North Walsham and this presents a more urban character.	experienced whilst in transit and at speeds of 40-60mph. Despite the use of trenchless construction, large mobilisation areas would be located either side of the A149, which would be partly visible to road-users and this increases their susceptibility to the proposed project.	section and over lower vegetation. Despite their travel at speeds of 40-60mph, the extent of the compounds along the sides of the A149 would increase the duration of visibility. The compounds would appear at variance with the scale and character of the rural landscape.	lead to a significant effect in this instance.	hedgerow re-establishment (not significant).
Wensum Way	<p>Wensum Way connects Gressenhall in the west with Lenwade in the east. It passes through 12km of rural countryside, following the route of the River Wensum to the west of Lenwade and between Elsing and Swanton Morley. The remaining sections cross rural countryside.</p> <p>The section with greatest potential to undergo significant effects occurs between Elsing Road and the River Wensum. The onshore cable route crosses the Wensum Way on Elsing Road and a trenchless drilling compound occurs where the path connects with River Wensum.</p>	<p>The sensitivity of the views of recreational users on Wensum Way is medium to high.</p> <p>The sections of route within the study area are not located within or overlooking any national, regional or local scenic designations or recognised scenic views which might signify heightened value. The value of views from Wensum Way is medium.</p> <p>The susceptibility of recreational users of the Wensum Way is influenced by the proximity of the onshore cable route where it crosses Elsing Road and the location of the path along the edge of the trenchless drilling compound where it connects with River Wensum. Susceptibility is medium to high in these parts and reduced along the section of Wensum Way</p>	<p>The magnitude of change in the section across Elsing Road would be medium to low and next to River Wensum would be medium to high.</p> <p>The enclosure of hedgerows along Elsing Road would largely preclude visibility of the onshore construction works apart from where the opening of 13m to 16.5m would occur at the crossing point. Hedgerows and trees would be removed from this section, leaving a gap in the existing cover and opening up views, albeit glimpsed, of the adjacent construction works. The screening of much of the works and the limited extent of hedgerow removal would moderate the effect from Elsing Road.</p> <p>Wensum Way would require diversion in the section adjacent to the trenchless drilling compound</p>	<p>Not significant with the exception of a localised significant effect over an approximate 550m section from the northern edge of Penny Spot Beck plantation to the riverside path opposite Old Hall Farm.</p> <p>The remainder and majority of the route would remain defined by the features and characteristics of</p>	<p>Short term and reversible in respect of the onshore cable route. Localised significant effects would last for the 2 year construction phase and reduce to not significant post-construction. Medium term and reversible in respect of the reinstatement of hedgerows (not significant).</p> <p>Long term and reversible in respect of any</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Elsing Road is a narrow rural road with hedgerows and trees enclosing the northern and southern roadsides, such that views are largely contained. While the hedgerow is almost continuous its condition is poor in parts.</p> <p>Tree cover occurs across the river bank where the trenchless drilling compound would be located. This is a pastoral landscape which avoids the cultivation processes of the surrounding arable fields.</p>	<p>which passes behind Penny Spot Beck plantation from where visibility of the construction works would be screened. The expectation of walkers is typically to enjoy the rural landscape and the mobilisation area and onshore cable route construction would appear at variance with this.</p>	<p>next to River Wensum. The magnitude of change would be heightened by the variation in character, whereby this pastoral riverside landscape would be altered by the presence of a large-scale mobilisation area and the associated presence and activity of plant.</p> <p>Replacement planting would infill the gaps post construction although it is anticipated it would take 15 to 20 years for the trees to reach the height of the existing trees, thus giving rise to long term effects.</p>	<p>the baseline landscape.</p>	<p>tree removals lasting the 30 year indicative design life of the project.</p>
Marriott's Way	<p>Marriott's Way connects Norwich and Aylsham along disused railway lines. It passes into the 1,045m wide study area to the west of Aylsham and follows the south-west alignment of the cable route over an approximate 13km stretch, before it passes out of the study area to the west of Reepham. Those sections of relevance to this assessment occur to the west of Aylsham and the west of Reepham,</p>	<p>The sensitivity of the views of recreational users on Marriott's Way is medium to high.</p> <p>Marriott's Way is a long distance recreational route which connects with NCR 1 near Reepham. The sections of route within the study area are not located within or overlooking any national, regional or local scenic designations or recognised scenic views which might signify heightened value. The</p>	<p>The magnitude of change in the section north of Warren Wood would be medium to low. The magnitude of change in the looped section to the west of Reepham would be low.</p> <p>The impact of the onshore cable route construction works to the north of Warren Wood would relate to the presence and activity of plant, and although this would be relatively small in scale, there would be a greater concentration than typically associated with agricultural</p>	<p>Not significant. In respect of the area to the north of Warren Wood the medium to high sensitivity combined with the medium to low magnitude of change would lead to a not significant effect in this instance.</p>	<p>Short term and reversible in respect of the onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>where the onshore cable route comes close or intersects the path.</p> <p>To the west of Aylsham, an approximate 400m section of the onshore cable route runs parallel to the north of Marriott's Way. This section is characterised by the surrounding large fields of open arable farmland and the large mixed mature woodland around Warren House to the south. The path is enclosed by mature trees with intermittent gaps allowing views out over scrubby undergrowth.</p> <p>The looped section of Marriott's Way to the west of Reepham is more enclosed by mature tree cover, often dense in parts and with much fewer opportunities to gain visibility of the surrounding arable farmland, which is also slightly more enclosed in this area. The onshore cable route intersects this loop in the north, east of Brick Kiln Farm</p>	<p>value of views from Marriott's Way is medium.</p> <p>The susceptibility of recreational users of this route to the proposed project is influenced by the potential proximity and level of visibility of the onshore cable route and trenchless crossing (e.g. HDD) compounds.</p> <p>In the section to the north of Warren Wood, the cable route would run parallel to Marriott's Way, over an approximate 400m stretch to the immediate north. Although separated by intervening vegetation, open sections would make users of the path more susceptible to the effects of the proposed project.</p> <p>In the looped section to the west of Reepham, the almost continuous enclosure reduces the susceptibility of recreational users as their views of the proposed project would be limited.</p> <p>The expectations of recreational users of this route would typically be to enjoy the rural landscape and this increases their susceptibility to the construction works, which</p>	<p>practices. The works would occur on arable farmland where the magnitude of change would be moderated by the absence of natural vegetation, limited hedgerow enclosure and the ongoing disturbance of the land through cultivation. Furthermore, enclosing vegetation around the path would limit the extent and clarity of the views of path users.</p> <p>The magnitude of change in the looped section to the west of Reepham would be low. This is largely owing to the use of trenchless crossing (e.g. HDD) under these areas to ensure no tree removals would occur. In both locations, mature trees line the path, and the enclosure of these would limit the potential visibility of the adjacent trenchless crossing (e.g. HDD) compounds in the adjacent fields on either side.</p>	<p>In respect of the two areas to the west of Reepham, the medium to high sensitivity combined with the low magnitude of change would lead to a not significant effect.</p> <p>The remainder of the route would remain unaffected by the project.</p>	

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	and in the south, south of Brick Kiln Farm.	overall is considered to be medium to high.			
Paston Way	<p>Paston Way is a long-distance footpath covering 22 miles between Cromer in the north-west with North Walsham in the south-east. At Cromer, it connects with the Norfolk Coast Path or Weaver's Way, the latter forming a 45 mile circular route back to North Walsham.</p> <p>The short section of Paston Way with potential to undergo significant effects occurs on the northern edge of North Walsham, where it follows the dismantled railway north-east towards the coast. This section is characterised by the scale and enclosure of mature tree cover which surrounds the path and prevents views out towards the surrounding urban edge and arable farmland.</p>	<p>The sensitivity of the views of recreational users on Paston Way is medium in the short section where the onshore cable route crosses the path.</p> <p>The section of the Paston Way which occurs in the study area is not covered by any national, regional or local scenic designations or recognised scenic views which might signify heightened value. The value of views from Paston Way is medium.</p> <p>The susceptibility of recreational users of Paston Way is moderated by the use of a trenchless crossing which means the trees enclosing this section of the path would not be disturbed. The susceptibility of walkers is medium to low owing to the enclosure of the tree cover.</p>	<p>The magnitude of change in the section where the onshore cable route intersects the path would be low.</p> <p>The use of trenchless crossing (e.g. HDD) under this section of the Paston Way would ensure that none of the mature tree cover surrounding it would be removed. The existing trees would screen the trenchless crossing (e.g. HDD) compound to the east, located to the north of London Road, thus reducing the magnitude of change to low.</p>	<p>Not significant.</p> <p>The combination of the medium sensitivity with the low magnitude of change would lead to a not significant effect.</p> <p>The remainder of the route would remain unaffected by the project.</p>	<p>Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>
Norfolk Coast Cycleway	The Norfolk Coast Cycleway passes through the onshore cable route study area	The sensitivity of the views of cyclists on the Norfolk Coast Cycleway is medium .	The magnitude of change on the views of cyclists would be medium	Not significant. In respect of the three crossing	Short term and reversible in respect of

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
(Regional Cycle Route 30)	<p>between Happisburgh Common in the east, to west of Ridlington. The cycle route intersects the onshore cable route on Grub Street, the minor road to Hill Sixty and Ridlington Street.</p> <p>The agricultural landscape that provides the context to the North Norfolk Cycleway is gently undulating and open, with mainly arable fields divided by ditches, banks and broken hedgerows and with groups of trees clustered around settlements. The route follows the quieter rural roads through Norfolk, presenting the more rural and less urban aspects of this County. Views are typically close to middle range owing to the cumulative enclosure of hedgerows and tree cover.</p>	<p>Although recognised as part of a wider cycleway network (Norfolk Coast Cycleway) the section of cycleway within the study area is not located within or overlooking any national, regional or local scenic designations or recognised scenic views which might signify heightened value for this location. Value is therefore considered to be medium.</p> <p>The susceptibility of this cycle route to the proposed project is influenced by the proximity and level of visibility of the onshore cable route where it intersects in three locations. The susceptibility is moderated by the reinstatement of lost hedgerows following the completion of construction. The expectation of cyclists using this route is typically to enjoy the rural landscape and this increases their susceptibility to the construction works, which is considered to be medium.</p>	<p>in localised sections and low or no effect in remaining sections.</p> <p>Potential changes in the view would occur as a result of the cable route construction activities within open agricultural fields and the potential loss of roadside hedgerows.</p> <p>There would be hedgerow removals where the cable route crosses the cycle route which would be most noticeable in views on approach or whilst passing these 13m to 16.5m sections. This would occur on the corner between Grub Street and the minor road to Hill Sixty and again on Ridlington Street. The relatively short sections of hedgerow being removed combined with the fact that they would be reinstated post construction, moderates the effect. The construction of the onshore cable route would appear as a relatively small scale operation in a landscape previously disturbed by farming practices.</p>	<p>points, the combination of the medium sensitivity with the medium magnitude of change would lead to a not significant effect.</p> <p>The remainder of the route would remain unaffected by the project.</p>	<p>onshore cable route construction (not significant). Medium term and reversible in respect of the reinstatement of hedgerows (not significant).</p>
Ridlington / Ridlington Street	Ridlington and Ridlington Street are small villages located at the transition between the Coastal Plain and	The sensitivity of the views of residents of Ridlington and Ridlington Street is medium .	The magnitude of change on the views of residents would be medium .	Not significant. The medium sensitivity combined with	Short term and reversible in respect of onshore cable

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Small Valley LCTs. They are rural villages, with a largely inward-looking pattern and enclosure from tree cover. The onshore cable route would cross 'The Street' to the south of Ridlington and the immediate north of Ridlington Street. While the northern edge of Ridlington Street is enclosed by vegetation, the southern edge of Ridlington is only partially enclosed by tree cover. Open and enclosed sections occur along The Street.</p> <p>A mobilisation area would also be located approximately 500m to the east of Ridlington. There are a small number of properties on the north-eastern side of Ridlington with open views to the east whilst most of the village is enclosed by tree cover or built form.</p>	<p>The value of the views from the villages is medium. There are no formal viewpoints and the views are not representative of a designated landscape. There are no special features visible from this section of The Street or the north-east corner of Ridlington and the views from the village are typically introverted.</p> <p>The susceptibility of residents is medium. Views from the settlements are largely enclosed by surrounding vegetation limiting the extent of views towards the surrounding landscape. The exception occurs in the north-east corner where views across the adjacent arable farmland are much more open.</p>	<p>In respect of the onshore cable route, the potential impacts would relate to the presence and activity of the plant required for construction of the trenches and running track and the loss of hedgerows and hedgetrees where it crosses The Street. The extent of visibility would be limited by the enclosure of both settlements by vegetation, and in respect of Ridlington, its greater separation distance from the construction works.</p> <p>In respect of the mobilisation area to the east of Ridlington the potential impact would relate to the presence and activity of this fenced and surfaced compound containing plant, materials, site office and welfare facilities. The compound and its content would form a relatively low-lying feature in the landscape and the separation distance of 500m from the eastern settlement edge, would mean it would appear as a relatively small scale feature in a wider landscape setting.</p>	<p>the medium magnitude of change would lead to a not significant effect. The extent of enclosure around these settlements combined with the separation distances from the project would ensure that the effects would not redefine the views of residents.</p>	<p>route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
North Walsham	<p>Potential views of the cable route construction are restricted to a suburban area of the settlement between the B1145 and Bacton Road. From this area, the onshore cable route would pass through a field adjacent to the fronts of properties on Mundesley Road and the rears of properties on Swafield Rise. There are a mix of orientations on Wharton Drive and Acorn Road, although with the latter, there is an open aspect towards the north where the construction works would occur, from the hammer head turn for this street. The field is cultivated, and enclosure occurs along the northern boundary with Little London Road.</p> <p>Due to tree, hedgerow and woodland vegetation elsewhere around the edges of the settlement, it would be unlikely that visibility would give rise to potentially significant effects.</p>	<p>The sensitivity of the views of residents on the northern edge of North Walsham is medium.</p> <p>North Walsham is not covered by any townscape or landscape designations which would otherwise denote a special value. Much of the settlement is bounded by trees and woodlands which restrict views of the rural landscape beyond.</p> <p>The susceptibility of the views of residents on Mundesley Road would be medium to low as their principal orientation is towards the east, while the construction works would lie to the south. The susceptibility of other residents in this area would be medium as their rear orientation would potentially be affected, albeit from a greater range and with boundary fences forming some enclosure.</p>	<p>The magnitude of change on the views of residents would be low. Whilst previously cable trenching was proposed through the field to the immediate north, current proposals show trenchless crossing (e.g. HDD) such that there would be no visible components of the construction works located in this field and no loss of trees or hedgerows along London Road. A trenchless crossing (e.g. HDD) compound would be located in the field to the north of Little London Road approximately 330m from the settlement edge. The separation distance combined with the partial screening of tree cover aligning both sides of London Road, would limit the influence this compound would have on the views of residents. There would be no other views of the construction activities from elsewhere in the settlement.</p>	<p>Not significant. The combination of the medium sensitivity and the low magnitude of change would lead to a not significant effect in this instance. This is as a result of the use of trenchless construction in this area.</p>	<p>Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Banningham	<p>Banningham is a small ribbon settlement to the north east of Aylsham. It extends along Colby Road from the historic core in the south to the junction with Banningham Hall in the north. The village is largely enclosed with properties on either side facing in towards Colby Road. The exception occurs in the northern part where the properties on the eastern side experience an open aspect across the arable farmland to the west, where the construction works would be located. Development is typically small in scale and rural in character, with the historic church, village green and traditional pub adding to the character of the settlement. The surrounding landscape is characterised by arable farmland and although enclosure has been eroded, mature tree cover encloses parts of the village.</p>	<p>The sensitivity of the views of residents In Banningham is medium.</p> <p>Banningham is not covered by any townscape or landscape designations which would otherwise denote a special value. There are no formal viewpoints and no special features visible in views from this area. The value of the views relates to the visual amenity of the surrounding rural landscape and although much of the settlement is inward looking, some parts experience an open aspect. The value is considered to be medium.</p> <p>The susceptibility of residents in Banningham to the proposed project is influenced by the proximity and level of visibility of the onshore cable route construction works, which would be located approximately 250 to 300m from the western settlement edge. The proposed project would have an effect on the visual amenity from properties and garden grounds where the views are currently characterised by open farmland. The susceptibility of</p>	<p>The magnitude of change on the views of residents would be medium.</p> <p>The onshore cable route construction works would be located to the west of Banningham. The presence and activity of the onshore cable route construction works would be evident from the fronts of the properties in the north part of the village and the rears of the properties in the centre and south. The construction works would be sufficiently offset from the western edge of the settlement to reduce the scale and prominence of the works. The construction works would not present an entirely unfamiliar feature in views from these properties although there would be a greater concentration and activity of plant. The effect of the proposed project would be moderated by the separation distance from the settlement edge, and the baseline influence of the cultivated landscape.</p>	<p>Not significant.</p> <p>The combination of the medium sensitivity and the medium magnitude of change would lead to a not significant effect in this instance.</p>	<p>Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
		residents would be medium to high.			
Reepham	<p>The onshore cable route passes to the north of Reepham. Intervening hedgerows and trees that border fields along the northern edge of Reepham restrict views of the wider landscape. Potential views of the onshore cable route construction are therefore restricted to the northern edge of the new housing on Oak Drive and Ash Close adjacent to the B1145. The cable route is routed through the arable farm field to the north of the rear gardens of these properties. Intermittent mature tree cover occurs along the north-east edge while the north-west edge is largely open. The development has been designed to be inward looking with no direct association established with the surrounding landscape context.</p>	<p>The sensitivity of the views of residents to the proposed project is medium.</p> <p>The northern part of the settlement, closest to the proposed cable route, is not covered by townscape or landscape designations which would otherwise denote a special value. There are no formal viewpoints and no special features visible in views from this area. The value of views from this northern part of the settlement is considered to be medium.</p> <p>The susceptibility of the views of residents to the proposed project is influenced by the visual amenity of their open and rural aspect and the proximity of the properties to the construction works. Their susceptibility is, however, moderated by the extent of screening, especially along the north-east boundary. Taking these factors into account, the susceptibility is considered to be medium.</p>	<p>The magnitude of change on the views of residents would be medium.</p> <p>While the cable route would pass to the rear of properties on the northern edge of Reepham, it is only from this small area of suburban properties next to the B1145 where the activities associated with the open-cut trenching process would be apparent in views. Views of the construction activities from elsewhere in the settlement would be limited.</p> <p>The onshore cable route construction would occur within the field adjacent to these properties and would be apparent owing to the 35m working width of the onshore cable route and the presence and activity of the associated plant. The cultivated nature of this land means these works would not be an entirely unfamiliar feature, although the concentration of plant would form a more notable feature than typical farm machinery. Although the onshore cable route would be located approximately 50m from</p>	<p>Not significant.</p> <p>The combination of the medium sensitivity and the medium magnitude of change would lead to a not significant effect in this instance.</p>	<p>Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			the closest settlement edge, the properties are not orientated towards the rural aspect, and screening does occur.		
Swanton Morley	Swanton Morley is a small village set on the Dereham Plateau LCU with its south-eastern edge extending into the River Wensum and Tud Tributary Farmland LCU. The onshore cable route would be located close to the southern edge of the village, cutting across Swanton Road and Dereham Road (B1147) to the south of the village. While much of the village is inward looking, the properties along the western end of Dereham Road are orientated south. Properties along Norwich Road, which extends south out of the village towards the onshore cable route, are orientated west and face into mature tree cover.	<p>The sensitivity of the southern edge of the village to the proposed project would be medium.</p> <p>The value of the views is medium. There are no formal viewpoints and no landscape designations which would otherwise raise the value, which largely reflects the local value of the visual amenity experienced by residents.</p> <p>The susceptibility of residents is medium. The properties along the western end of Dereham Road are orientated south across the farmland where the onshore cable route would be located, albeit with some screening from garden vegetation and two complete field boundaries with mature hedgetrees and a notable separation space between of approximately 400m. The properties along Norfolk Road are enclosed by mature tree cover, although the onshore cable route would come close to the end of this road and during the winter months filtered views would potentially be</p>	<p>The magnitude of change on the views of residents would be medium.</p> <p>The mobilisation area would be offset a distance of approximately 200m from the closest southern village edge. In respect of the most susceptible residents on Dereham Road, the screening effect of the intervening vegetation combined with the separation distance of 400m would reduce the prominence of the mobilisation area and onshore cable route in their views. While hedgerow loss would occur in the enclosure of the field boundary between the end of Norwich Road and Dereham Road, this would occur behind the more northerly hedgerow which would largely screen this effect from residents. Visibility from Norwich Road would be limited by the enclosure of mature tree cover, and although some views through the vegetation at the southern end would be possible, especially in the winter,</p>	Not significant. The combination of the medium sensitivity and medium magnitude of change would lead to a not significant effect in this instance.	Short term and reversible in respect of onshore cable route construction (not significant). Medium term and reversible in respect of the re-instatement of hedgerows (not significant).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
		possible at a range of approximately 120m.	the magnitude of change from these properties would be medium to low, owing largely to separation distance and the limited extent of visibility.		

29.7.4.3.3 Scenario 1

161. The impact of the onshore cable route during the construction phase for Scenario 1 would relate principally to the following features of the construction process:
- The effect on landscape character and visual amenity owing to the activity associated with the cable pulling and construction of the 150 jointing pits, each 90m².
 - The cable pulling and jointing process will take approximately five weeks per 1km of cable length, including installing and removing any temporary hard standing and delivering the cables to the joint pits. However, any one jointing pit may be open for up to 10 weeks to allow parallel works at neighbouring jointing pits.
 - The reinstatement of ground at the jointing pits and running tracks at the end of the construction phase.
162. The main impacts associated with the onshore cable route construction under Scenario 2 would not occur under Scenario 1. The mobilisation areas and trenchless drilling compounds, which form the largest footprints of the Scenario 2 construction process, would not be required under Scenario 1. Furthermore, the open cut trenching and associated loss of hedgerows and trees which would be apparent along the onshore cable route under Scenario 2, would not occur as part of Scenario 1.
163. The potential impacts of the cable pull through and construction of intermittent jointing pits on landscape and visual receptors would be limited owing to their small-scale and short-term nature, as well as the very localised extent of the construction works.
164. Under Scenario 1, the jointing pits would be the only component of the onshore cable route requiring construction. They would be constructed at approximately 800m intervals along the onshore cable route length, excavated to a depth of 2m and occupying an area of 90m². Potentially some sections of access track would require reinstatement to facilitate the construction of jointing pits and cable pulling, although the majority of access would be taken from adjacent highways or existing access routes to get the cable drums to the jointing pits. A winch would be used to pull the cable off the drum from one joint pit to another, through the buried ducts. Cable jointing would be conducted once both lengths of cable that terminate within it have been installed. The cable pulling and jointing process would take approximately five weeks per 1km of cable length, although, any one joint pit may be open for up to 10 weeks to allow its neighbouring joint pit to be opened and the cables pulled from one pit to the next.

165. The potential impacts of these works on landscape elements, landscape character and visual amenity would be limited for the following reasons. Firstly, construction works would be limited to small and intermittent areas and this would limit the impact on the landscape element of the agricultural land and the wider character of the rural landscape. Secondly, the excavation of the jointing pits and pulling of cables would involve relatively small scale construction works carried out over a short period of time. These works would occur in a cultivated landscape already influenced by intensive agricultural practices where the presence and activity of farm machinery is a baseline feature. These factors would moderate the potential impacts on the surrounding landscape character. Furthermore, impacts on the visual amenity of residents and road-users would be limited by the limited occurrence of such receptors in these predominantly rural areas and the separation distance between the onshore cable route and these receptors, where they do occur, owing to the considered location of the onshore cable route.
166. This assessment concludes that there would be no significant effects on landscape and visual receptors in respect of Scenario 1 of the onshore cable route construction owing to the very small-scale, localised and short term nature of the works. The effects of Scenario 1 have, therefore, not been assessed further in this assessment.

29.7.4.4 Potential impacts during construction - onshore project substation and National Grid substation extension.

167. Under Scenario 1, the onshore project substation would be located to the immediate east of the Norfolk Vanguard onshore project substation and the National Grid substation extension would be located to the east of the Necton National Grid substation as shown on Figure 29.4.
168. Under Scenario 2, the onshore project substation would be located towards the middle of the footprint for Norfolk Vanguard and Norfolk Boreas onshore project substations under Scenario 1. The National Grid substation extension would be located to the west of the Necton National Grid substation and the National Grid overhead line modification would be located to the north-east as shown on Figure 29.15.

29.7.4.4.1 Scenario 2

169. Under Scenario 2, the impact of the onshore project substation during the construction phase would relate principally to the following features of the construction process:
- The effect of the loss of agricultural land owing to the installation of the 20,000m² (200m x 100m) temporary works area and 75,000m² (250m x 300m) permanent footprint of the onshore project substation.

- The effect of the loss of existing hedgerows and trees in the location of the construction compound and permanent footprint of the onshore project substation, where excavations for cable ingress and egress occur and where the break along the southern side of the A47 occurs, to accommodate the new junction.
- The effect on landscape character and visual amenity owing to the presence of the surfaced and fenced construction compound, and the content of plant, materials and welfare facilities.
- The effect on landscape character and visual amenity owing to the presence of the emerging onshore project substation with electrical infrastructure up to 19m in height for buildings (up to 25m for lightning protection masts) over a 250m x 300m footprint.
- The effect on landscape character and visual amenity owing to the activity associated with the installation of the construction compound, onshore project substation, access track and new junction on the A47.
- The duration of a 24 to 30 month construction period.
- The reinstatement of ground at running tracks, the temporary works area, and reinstatement of hedgerow and trees, at the end of construction.

170. Under Scenario 2, the impact of the National Grid substation extension during the construction phase would relate principally to the following features of the construction process:

- The effect on the loss of agricultural land owing to the installation of the 67,500m² (150m x 150m and 300m x 15m) temporary works areas and 30,000m² (150m x 200m) substation extension permanent footprint and up to 1,000m² area for new OHL towers.
- The effect on landscape character and visual amenity owing to the presence of the surfaced and fenced construction compound, and the content of plant, materials and welfare facilities.
- The effect on landscape character and visual amenity owing to the presence of the emerging substation extension with electrical infrastructure up to 15m in height and temporary OHL towers (3 at 45m) and new towers (2 at 55m).
- The effect on landscape character and visual amenity owing to the activity associated with the installation of the construction compound, substation extension, access road and OHL temporary works.
- The duration of a 24 to 30 month construction period.
- The reinstatement of ground at the construction compound, and reinstatement of hedgerow and trees, at the end of construction.

29.7.4.4.2 Scenario 1

171. Under Scenario 1, the impact of the onshore project substation during the construction phase would broadly relate to the same features of the construction process as described in respect of Scenario 2 above. The key differences of Scenario 1 are, the location of the onshore project substation 127m to the east of the Scenario 2 location and that no works are required for a new A47 junction, as it would have already been completed by Norfolk Vanguard.
172. Under Scenario 1, the impact of the National Grid substation extension during the construction phase would broadly relate to the same features of the construction process as described in respect of Scenario 2 above. The key differences of Scenario 1 are the location of the National Grid substation extension to the east of the Necton National Grid substation and that there is no requirement for overhead line modification works, as they would have already been completed by Norfolk Vanguard.

29.7.4.4.3 Summary

173. Table 29.12 shows the detail of the assessment for each receptor under Scenario 1 and Scenario 2. In respect of a number of landscape receptors, the assessment under Scenario 1 is the same as that assessed under Scenario 2. Where the assessment for Scenario 1 is different from Scenario 2, this is highlighted in the table.
174. In summary, under Scenario 1 and Scenario 2, the effect on the agricultural land and the hedgerows and hedgetrees would be not significant. There would be localised significant effects on landscape character in those parts of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU, close to the project, but not significant effects on the remaining parts and all other LCUs. In respect of the representative viewpoints, significant effects would arise from a section of Lodge Lane to the immediate south of the site, a very localised section of Ivy Todd Road to the south-west and sections of the A47 to the north adjacent to the new A47 junction and the Necton Substation access. These effects would all occur within 1.2km of the onshore project substation, making them localised. There would be no significant effects on the views of nearby residents at Ivy Todd and Necton.
175. At the end of the construction phase, land over the onshore cable route and running track would be reinstated. Hedgerows would be reinstated in the sections where they would have been removed for open-cut trenching, but hedgetrees and trees would not be permitted to be replanted in these sections for 6m to 10m either side owing to restrictions of planting over cables. In respect of the A47 access, the mitigation planting associated with Dudgeon Offshore Wind Farm onshore

substation would be largely retained, with any losses in the young woodland belt replaced, such that only the extent across the access opening would remain open.

176. The majority of the effects would therefore relate to the construction works and be medium term with effects mitigated through reinstatement of the land and hedgerows as far as practicable and permissible. Residual impacts would occur where hedgetrees and trees would have been removed and could not be replaced owing to restrictions over cable easements or at the A47 access. These effects would be long term, but not irreversible, as replanting of hedgerows and trees could take place following decommissioning, with the exception of the small opening in relation to the A47 access.
177. The presence of the onshore project substation and surfaced compound would also have an impact, and this is addressed in the assessment of effects during the operational phase in section 29.7.5.

Table 29.12 Scenario 1 and Scenario 2: Potential impacts during construction - onshore project substation and National Grid substation extension

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Onshore project substation and National Grid substation extension – Landscape Receptors					
Agricultural land	<p>The onshore project substation and National Grid substation extension would be located in an area of arable farmland to the south of the A47. The fields, where the project would be located, are medium in size. While hedgerow loss and field amalgamation are evident, localised enclosure is provided by Necton Wood to the north and vegetation associated with Lodge Farm to the south of the onshore project substation. The fields where the National Grid substation extension would be located are larger in size and with less enclosure. Agricultural land has already been lost to the recent development of Necton National Grid substation and Dudgeon substation, which are located in this area to the south of the A47.</p> <p>The arable farmland comprises single species crops in a landscape that has been modified from its natural state and which is intensively managed. The</p>	<p>The sensitivity of the agricultural land is medium to low.</p> <p>The value of the agricultural land is medium to low. Agricultural land occurs extensively across this landscape and therefore has little scarcity value.</p> <p>The susceptibility of the agricultural land to the construction works is limited as there is no natural vegetation; the land is modified by cultivation and is intensively managed.</p> <p>Furthermore, the agricultural land would be fully reinstated post construction where the temporary works areas would be located, albeit with areas lost longer term where the onshore project substation and National Grid substation extension would be located.</p>	<p>Scenario 1 and 2:</p> <p>The magnitude of change on the agricultural land would be medium.</p> <p>A sizeable area of agricultural land would be lost over the medium term, where the temporary works areas and running tracks would be located, and over the longer term, where the permanent footprints of the onshore project substation and National Grid substation extension would be located. The medium term losses would be reinstated post construction and the agricultural land brought back into production. The long term losses associated with the operational parts of the project would be reinstated post decommissioning. Collectively, the agricultural land lost over the medium term and long term constitutes only a small proportion of the wider agricultural area and the abundance of this landscape element moderates the overall magnitude of change. The agricultural land being lost has no special qualities or characteristics as a landscape element and has been modified from its natural state by intensive arable agricultural practices.</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium to low sensitivity and the medium magnitude of change would lead to a not significant effect.</p>	<p>Scenario 1 and 2:</p> <p>Medium term and reversible in respect of the temporary footprints.</p> <p>Long term and reversible in respect of the permanent footprints.</p> <p>30 month construction period.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	agricultural land contributes to the rural character that typifies the Norfolk landscape.				
Hedgerows	<p>Under Scenario 1, the onshore project substation would be located to the immediate east of Norfolk Vanguard onshore project substation and would give rise to the loss of a section of the west to east hedgerow that runs through the centre of the permanent footprint. Under Scenario 2, the main hedgerows occur to the immediate south, west and north of the site. The southern and western hedgerows would remain unaffected. The eastern half of the northern hedgerow would be lost along with most of the hedgerow which extends north to south through the left half of the permanent footprint.</p> <p>Under Scenario 1, the National Grid substation extension would be located to the immediate east of Dudgeon substation and would give rise to the loss of a section of the north to south hedgerow that runs through the centre of the permanent footprint. Under</p>	<p>The sensitivity of the hedgerows is medium to high.</p> <p>Their value is medium to high as the hedgerows are of importance to the historic pattern of the landscape and the character of enclosure that typifies this rural landscape.</p> <p>The susceptibility of hedgerows to the project is medium. While hedgerow loss is a baseline feature of this local area, they are more abundant in the surrounding rural area. The hedgerows would be fully reinstated post construction for the areas associated with construction, and post decommissioning for the onshore project substation site. Trees would not be permitted to be planted over the permanent easements of the onshore cables and onshore 400kV cable route but are proposed</p>	<p>Scenario 1 and 2:</p> <p>The magnitude of change as a result of the removal of hedgerows would be medium to low.</p> <p>Under both scenarios, sections of hedgerows would be removed to accommodate the permanent footprints of the onshore project substations and National Grid substation extensions. While hedgerows are an important feature of the rural landscape and their loss detracts from the character of the farmland, the sections to be removed are relatively limited in extent and occur within a landscape where the pattern of hedgerows has already been eroded in areas. The quality of the hedgerows is varied with some mature and complete and others less mature and incomplete. The losses would form a small proportion of a much wider resource.</p> <p>Hedgerow re-establishment would take 3-5 years post construction to infill gaps made by removals. Planting over cable easements would be restricted to hedgerow planting, because replacement of trees would not be permitted in these areas. Where hedgerows would be lost owing to the permanent</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium to high sensitivity and the medium to low magnitude of change would lead to a not significant effect. While the gaps created in the medium term as a result of the construction works would be notable, the limited extents being removed, and their reinstatement post construction would moderate this effect.</p>	<p>Scenario 1 and 2:</p> <p>Medium term and reversible for hedgerow loss. Hedgerow re-instatement would take 3-5 years.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Scenario 2, there are few existing hedgerows in this location to the west of the National Grid substation extension and the only one that would be affected follows the field boundary to the south-east of the existing Necton National Grid substation.</p> <p>Further small sections of hedgerows would be lost where trenching would take place to accommodate the 400kV cable route between these two developments and where access to the onshore project substation would be implemented.</p>	<p>across substantial areas of land around the permanent footprints.</p>	<p>footprints, these losses would be long term and only reinstated following decommissioning. Mitigation planting would include substantial sections of new hedgerow planting around the periphery of the permanent footprints which would offset losses on the site.</p>		
<p>Plateau Farmland LCT – Pickenham Plateau LCU</p>	<p>The National Grid substation extension construction would be located in the Pickenham Plateau LCU. This LCU covers an extensive plateau area extending across the north-west of the study area. The National Grid substation extension would occur in the southern most 'spur' which lies to the immediate west of the narrow River Wissey Tributary Farmland. This spur forms a relatively level area of land which has been utilised for the development of Necton National</p>	<p>The sensitivity of this LCU to the project construction is medium.</p> <p>The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure.</p> <p>The susceptibility of the LCU to the construction works is</p>	<p>Scenario 1 and 2:</p> <p>The magnitude of change would be high within the local area, medium within the surrounding area and low or no effect across the wider LCU. While Necton National Grid substation and Dudgeon substation already have a notable influence on this LCU, the construction of the National Grid substation extension would increase the influence of large scale energy developments in this part of the LCU, thus detracting from the strength of the underlying rural character. The landscape character would be affected by the presence and activity of the plant, the scale</p>	<p>Scenario 1 and 2:</p> <p>Not significant with the exception of a localised significant effect in the area of the spur. The combination of the medium sensitivity and the high magnitude of change would</p>	<p>Scenario 1 and 2:</p> <p>Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month construction</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	Grid substation and Dudgeon substation. The overhead line extends along this spur to the north-west. The LCU is characterised by large fields of arable with limited enclosure. The A47 has a localised influence on the southern part of the spur, despite the enclosure of tree cover. The construction of the onshore project substation would occur concurrently in the River Wissey LCU to the east and this would have an indirect influence on the character of the Pickenham Plateau.	medium. Although the National Grid substation extension construction would be located in this LCU, it would occupy only a localised part of the much wider LCU. The susceptibility is moderated by the modified nature of the farmland and there is also an existing influence from the Necton National Grid substation, Dudgeon substation, and associated overhead lines.	of the mobilisation areas and sites, the earthworks required to create a level platform, and the emergence of electrical infrastructure on the site. The onshore project substation, located in the adjacent LCU, would add indirectly to the effects on the Pickenham Plateau LCU by creating a context in which energy developments would be seen to spread into the wider landscape.	lead to localised significant effects. Tree cover along the A47 would prevent this effect extending north across the wider LCU.	phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).
Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU	Scenario 2 onshore project substation construction would be located in the River Wissey Tributary Farmland LCU and Scenario 1 onshore project substation construction in the Beeston Plateau LCU to the immediate east. The National Grid substation extension construction would be located in the adjacent Pickenham Plateau LCU to the west. The landform of the local area is typical of the wider LCU with the valley sides sloping down towards the	The sensitivity of this LCU to the project construction is medium . The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure. The susceptibility of the LCU to the construction works is medium. Although under	Scenario 1 and 2: The magnitude of change would be high or medium to high within the local area, medium within the surrounding area and low or no effect across the wider LCU. Under both scenarios Necton National Grid substation and Dudgeon substation already have a notable influence on this part of the LCU, while under Scenario 1, Norfolk Vanguard onshore project substation and National Grid substation extension would add further to the influence of large scale energy developments, thus detracting from the strength of the underlying rural character. Under Scenario 2, landscape	Scenario 1 and 2: Not significant with the exception of a localised significant effect in the area extending to the A47 to the north, Great Wood and Smuggler’s Lane to the east, Necton National Grid Substation and the Necton	Scenario 1 and 2: Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month construction

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	unnamed river course. Scenario 2 onshore project substation would be located on the upper slopes adjacent to the Beeston Plateau LCU, while Scenario 1 onshore project substation to the east. The land use is predominantly arable farmland with a pattern of enclosure which has been eroded owing to the intensification of farming practices. Views are generally medium range, contained within the wider valley with some closer range enclosure where mature woodland and hedgerows occur. Necton National Grid substation and Dudgeon substation are baseline features on the spur of the Pickenham Plateau LCU to the north-west of the onshore project substation.	Scenario 2, the onshore project substation construction would be located in this LCU, it would occupy only a localised part of the much wider LCU. The susceptibility is also moderated by the modification this landscape has undergone through the practices of intensive farming and there is an existing influence from the Necton National Grid substation, Dudgeon substation and associated overhead lines.	character would be affected by the presence and activity of the plant, the scale of the temporary works area, the earthworks required to create a level platform, and the emergence of development on the permanent footprint. The scale of the construction cranes and the scale and mass of the emerging HVDC buildings would appear at variance with the scale and character of the rural landscape. Scenario 1 onshore project substation and Scenario 1 and Scenario 2 National Grid substation extensions, located in the adjacent LCUs, would have an indirect, but nonetheless notable effect on the River Wissey LCU by creating a context in which energy developments would be seen to increase within the wider landscape.	ridgeline to the west and Ivy Todd Road to the south. The combination of the medium sensitivity and high or medium to high magnitude of change would lead to a significant effect.	phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).
Plateau Farmland LCT – Beeston Plateau	Under Scenario 1, the onshore project substation would be located completely within a small southern spur of the Beeston Plateau LCU, while under Scenario 2 it would be located mostly within this spur with the western end extending into the adjacent River Wissey Tributary	The sensitivity of this LCU to the onshore project substation construction is medium . The value of the LCU is medium – it is not covered by any landscape designations which would otherwise denote a special value. The	Scenario 1 and 2: The magnitude of change would be high or medium to high within the local area, medium within the surrounding area and low or no effect across the wider LCU. Despite the existing influence of Necton National Grid substation and Dudgeon substation under both scenarios, and also Norfolk Vanguard onshore project	Scenario 1 and 2: Not significant with the exception of a localised significant effect in the area extending to the A47 to the north,	Scenario 1 and 2: Medium term and reversible in respect of onshore project substation construction.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Farmland LCU. The distinction between the LCUs in this transitional area is subtle, with the landform rounding off from the steeper valley into the flatter plateau. The land use is similarly arable farmland and enclosure is partly eroded causing larger field patterns. This local area is characterised by the mature Necton Wood in the adjoining River Wissey Tributary Farmland LCU and other blocks in the Beeston Plateau LCU to the north and south. The National Grid substation extensions would be located in the Pickenham Plateau LCU further north-west, where the Necton and Dudgeon substations already exist.</p>	<p>landscape has been modified by agricultural practices and although some hedgerow loss has occurred, the broad pattern of enclosure has remained intact.</p> <p>The susceptibility of the LCU to the construction works is medium. Although the Scenario 1 onshore project substation would be located completely in this LCU and the Scenario 2 onshore project substation partly in this LCU, it would occupy only a localised part of the much wider LCU. The susceptibility is also moderated by the modification this landscape has undergone through the practices of intensive farming and there is a baseline influence from the existing Necton National Grid substation, Dudgeon substation and associated overhead lines.</p>	<p>substation and National Grid substation extension under Scenario 1, the direct or close range indirect effect of the Norfolk Boreas onshore project substation would add further to the influence of large scale developments on local landscape character. The presence and activity of the plant, the scale of the temporary works area and the emergence of the development on the permanent footprint would appear at variance with the baseline rural character and scale of the landscape. The use of tall cranes and the emergence of the large scale HVDC halls would give rise to notable effects. Although the National Grid substation extension would lie almost 1km to the north-west of the Beeston Plateau, the large scale of this extended development would increase the wider influence of energy developments on this LCU.</p>	<p>Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. The combination of the medium sensitivity and high or medium to high magnitude of change would lead to a significant effect.</p>	<p>Localised significant effects would last for the 30 month construction phase and reduce to not significant post-construction. Medium term and reversible in respect of hedgerow re-establishment (not significant).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Onshore project substation – Visual Receptors					
VP1 Ivy Todd Road west	<p>This viewpoint is located on Ivy Todd Road, midway between the village of Necton and the hamlet of Ivy Todd at a point where a gated access track leads north through the adjacent farmland. The view is intended to be representative of the views of road-users, although the road is enclosed by mature hedgerows along much of its length, such that views are largely contained. This field access provides one of the few glimpsed views towards the site. Located on a localised high point, the landform falls away to the north-east where the onshore project substation site would be located. Although Necton National Grid substation and Dudgeon substation are not visible from this viewpoint, the overhead line is evident along the skyline to the north.</p>	<p>The sensitivity of road-users on this minor road would be medium.</p> <p>The value of the view would be medium. The view is not from a formal viewpoint and is not representative of any designated landscapes.</p> <p>The susceptibility of road-users would be medium. While much of the road is enclosed by hedgerow, the alignment of this opening means that east-bound road-users would experience this view, albeit for a very short duration. In winter months, filtered views through the hedgerow may be experienced although only the outline of the construction works associated with the onshore project substation would be visible. Greater visibility may arise from the more elevated section around the viewpoint if the intervening hedgerow were cut low.</p>	<p>Scenario 2:</p> <p>The magnitude of change would be medium to high for the approximate 10m section where the opening to the field occurs and medium to low, low or no effect from the remaining sections.</p> <p>The construction works associated with the onshore project substation would form a prominent feature in the view and while some ground level works would be screened by distant hedgerows, the remainder of the works would be readily apparent. The most notable feature would be the emergence of the electrical infrastructure, especially the HVDC halls and the tall cranes used for their construction. These would be evident owing to their large scale and modern character relative to the predominantly open and rural context. Construction lighting would add to the prominence of the project in winter months when working days would extend into hours of darkness. The extent of the medium to high magnitude of change would be contained within the very short section of road from which this open view would be experienced. From the remainder of the road between Necton and Ivy Todd the magnitude of change would be low, despite</p>	<p>Scenario 1 and 2:</p> <p>Significant within the short 10m section of road from which this open view would be experienced. The combination of the medium sensitivity and medium to high magnitude of change would lead to a significant effect. Views from the remainder of Ivy Todd Road between Necton and Ivy Todd would be not significant, unless roadside hedgerows were removed or cut low by landowners or other parties in which case the</p>	<p>Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month construction phase.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
		The National Grid substation extension would not be readily visible from this viewpoint owing to intervening landform and vegetation.	<p>the fact that filtered views may be experienced during the winter months. This could increase to medium or medium to high in elevated sections if the roadside hedgerows were cut low.</p> <p>Scenario 1: The magnitude of change would be medium to high for the approximate 10m section where the opening to the field occurs and medium to low, low or no effect from the remaining sections.</p> <p>The Scenario 1 location for the onshore project substation would be 127m further to the right than the Scenario 2 location, such that it would be seen at a similar range and to similar extents, making the Scenario 2 assessment also applicable to Scenario 1.</p>	significant effect would extend further.	
VP2 Lodge Lane south	This viewpoint is located at the southern end of Lodge Lane to the north of the hamlet of Ivy Todd. It is not a PRow but is shown on OS mapping as a route with public access. The view looks north-east across the arable farmland towards the onshore project substation at a range of approximately 620m. The view is representative of the views of walkers in this area and features	<p>The sensitivity of walkers and users of Lodge Lane would be medium.</p> <p>The value of the views of walkers is medium. The view is not from a formal viewpoint and does not look onto any landscape designations. The existing Necton National Grid substation, Dudgeon substation and overhead line are evident, and these make</p>	<p>Scenario 2: The magnitude of change would be high along the southern section of Lodge Lane for approximately 400m.</p> <p>The construction of the onshore project substation would form a prominent feature, seen approximately 620m from the viewpoint and set along part of the containing skyline of the view. Intervening hedgerows and tree cover around Lodge Farm would provide notable screening, especially of the ground level construction</p>	Scenario 1 and 2: Significant along the southern section of Lodge Lane for approximately 400m. The combination of the medium sensitivity and the high magnitude of change would	Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, forms readily apparent development along the skyline to the north-west. The view is contained in the middle range by the subtle relief of the landform and enclosure of hedgerows. Hedgerows and tree cover are depleted across the farmland but more substantial around Ivy Todd to the south.</p>	<p>large scale electricity developments a feature of the baseline views from Lodge Lane.</p> <p>The susceptibility of walkers is medium. Access on the lane provides only a short walk as it does not connect with the wider PRow network. While the experience of walkers is already influenced by the existing Necton and Dudgeon National Grid substations, the onshore project substation would be notably closer.</p>	<p>works, although larger plant, including tall cranes and the emergence of the lightning protection masts and converter halls would be readily apparent along the skyline. Construction lighting would add to the prominence of the project in winter months when working days would extend into hours of darkness. The magnitude of change would be high for much of the length of Lodge Lane owing to the close proximity and relatively open views.</p> <p>The construction of the National Grid substation extension would not add to the magnitude of change, owing to its location behind the existing Necton National Grid and Dudgeon Substations. These existing developments would largely screen the construction of the new extension and therefore, reduce its influence on the views of walkers on Lodge Lane. The additional transmission towers would form an additional visible feature, although this effect would be moderated by the presence of similar sized towers in the baseline context.</p> <p>Scenario 1:</p> <p>The magnitude of change would be medium to high along the southern section of Lodge Lane for approximately 400m.</p> <p>Although the Scenario 1 location for the onshore project substation would be 127m</p>	<p>lead to a significant effect.</p>	<p>construction phase.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			further to the right than the Scenario 2 location, it would be seen at a similar range albeit to slightly lesser extents, thus making the Scenario 2 assessment also applicable to Scenario 1.		
VP3 Lodge lane north	<p>This viewpoint is located at the northern end of Lodge Lane to the north of the hamlet of Ivy Todd. It is not a PRow but is shown on OS mapping as a route with public access. The view looks north towards the mature tree cover that encloses Lodge Farm and north-west towards the Necton National Grid substation and Dudgeon substation.</p> <p>The view looks across the arable farmland towards the onshore project substation at a range of approximately 340m. The view is representative of the views of walkers in this area and features Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, forms readily apparent development along the skyline. The view is contained in the middle range by the subtle relief of the landform and enclosure of hedgerows.</p>	<p>The sensitivity of walkers on Lodge Lane would be medium.</p> <p>The value of the view is medium. The view is not from a formal viewpoint and does not look onto any landscape designations. The existing Necton National Grid substation and overhead line are evident, and these make large scale electricity developments a feature of the baseline views from Lodge Lane.</p> <p>The susceptibility of walkers is medium. Access on the lane provides only a short walk as it does not connect with the wider PRow network. As the lane approaches Lodge Farm, visibility of the onshore project substation and the National Grid substation extension would become increasingly screened by</p>	<p>Scenario 2:</p> <p>The magnitude of change as a result of the project construction would be medium. Despite the closer range of this viewpoint, at approximately 340m, compared to 620m for Viewpoint 2, there would be less visibility of the construction works associated with the onshore project substation owing to the closer proximity of the intervening landform and vegetation. The trees which enclose Lodge Farm would screen most of the construction works, with only construction cranes and some of the taller lightning protection masts visible at the right side where the hedgerow provides lower cover, although the similarity between the masts and the existing towers of the overhead line would reduce the magnitude of change.</p> <p>The construction of the National Grid substation extension would not increase the magnitude of change, owing to its location behind the existing National Grid and Dudgeon substations. These existing developments would largely screen the construction of the new extension and</p>	<p>Scenario 2:</p> <p>Significant in the northern section of Lodge Lane for approximately 250m. The combination of the medium sensitivity and the medium magnitude of change would lead to a significant effect.</p> <p>Scenario 1:</p> <p>Despite the extent of screening of the onshore project substation by vegetation in the case of Scenario 1 and landform in the case of Scenario 2, the close proximity to</p>	<p>Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month construction phase.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	Hedgerows and tree cover are depleted within the farmland but more substantial around Ivy Todd to the south.	intervening vegetation. The experience of walkers closer to the viewpoint is already influenced by the existing electricity developments although this viewpoint would be close to the onshore project substation.	therefore, reduce its influence on the views of walkers on Lodge Lane. Scenario 1: The magnitude of change would be medium along the northern section of Lodge Lane for approximately 250m. Although the Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, and as a consequence, also largely concealed by intervening landform, construction cranes and other large scale plant would be readily visible at a close range and therefore lead to a similar medium magnitude of change. The National Grid substation extension would also be readily visible, being set to the east of the existing Dudgeon substation, albeit integrating with the existing electrical infrastructure and seen at a slightly longer range than the onshore project substation.	the tall cranes and other large scale plant would lead to a significant effect.	
VP4 A47 Necton Substation	This viewpoint is located at the access from the A47 into Necton National Grid substation. It represents the views of road-users on the A47, which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some more open sections,	The sensitivity of road-users on this section of the A47 is medium . The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal	Scenario 2: The magnitude of change from the adjacent sections of the A47 would be medium . There would be a limited effect in respect of the construction of the onshore project substation as it would be located below the level of the intervening landform, with the exception of tall cranes used in the construction of the converter halls which	Scenario 2: Significant in the section adjacent to the proposed project for approximately 250m. The combination of the medium	Medium term and reversible in respect of onshore project substation construction. Localised significant

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>substantial mitigation planting associated with Dudgeon onshore works will add further to the screening effect over time. The access provides a view that at most would be glimpsed by passing road-users travelling at speed. The electrical infrastructure associated with Necton National Grid substation forms the characterising feature in this view. It appears at variance with the rural character of the surrounding landscape and establishes energy developments as a feature of the baseline view.</p>	<p>viewpoints and nearby laybys are largely enclosed by tree cover.</p> <p>The susceptibility of road-users to the effects of the project is medium. From this viewpoint, while the onshore project substation would be largely screened by intervening landform and the Necton National Grid substation, the National Grid substation extension would be close in range. From adjacent parts of the A47, tree cover encloses most of the views, although views may occur at this access and through other gaps and this raises the susceptibility.</p>	<p>may potentially be visible. The construction of the National Grid substation extension would be more readily visible, with the extension seen to the fore of the Necton National Grid Substation and the temporary works area adjacent to the A47. While the construction cranes and other large plant would be evident, the baseline character of this site as an established energy development, combined with the presence of the larger scale overhead line towers, would moderate the overall effect. Nonetheless, the proximity of the works to the road combined with the occurrence of gaps and filtered views through, especially during the winter months, would give rise to a notable effect on the views of road-users. Construction lighting would add to the prominence of the project in winter months when working days would extend into hours of darkness. Furthermore, the proximity of the additional transmission tower to this section of the A47 would add to the overall effect during the construction phase.</p> <p>Scenario 1:</p> <p>The magnitude of change from the adjacent sections of the A47 would be low.</p> <p>The onshore project substation and National Grid substation extension would be largely screened by the existing National</p>	<p>sensitivity and the medium magnitude of change would lead to a localised significant effect. Effects further west on the A47 would be not significant. Effects further east are assessed under Viewpoint 5 and Viewpoint 6 below.</p> <p>Scenario 1:</p> <p>Not significant. The combination of the medium sensitivity and the low magnitude of change would lead to a not significant effect.</p>	<p>effects would last for the 30 month construction phase and reduce to not significant post-construction.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			Grid substations and Norfolk Vanguard substation extension.		
VP5 A47 Spicer's Corner	<p>This viewpoint is located opposite Spicer's Corner layby on the A47. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some gaps in the vegetation where views over the adjacent landscape can be experienced, mitigation planting associated with Dudgeon onshore works will add further to the screening effect over time. The opening and other gaps in the tree cover provide views that would be experienced by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent owing to the higher elevation than the other viewpoints. Existing Necton National Grid substation and Dudgeon substation are readily apparent in this view, but not always apparent in the views of</p>	<p>The sensitivity of road-users on this section of the A47 is medium to high.</p> <p>The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and nearby laybys are largely enclosed by tree cover.</p> <p>The susceptibility of road-users to the effects of the onshore project substation construction is medium to high. While currently from this viewpoint, the view is fleeting and from adjacent parts of the A47, tree cover encloses most of the views, under Scenario 2, the introduction of the new A47 junction would require the removal of a substantial section of the existing tree cover on the southern side of the road and this would open up the view and raise the</p>	<p>Scenario 2:</p> <p>The magnitude of change from the adjacent section of the A47 would be medium to high.</p> <p>Under Scenario 2, the existing enclosure experienced in this section of the A47 would be altered by the removal of a 300m section of the existing vegetation along the southern road-side to accommodate the road widening for a turning lane into the site access from the A47. While this would remove the taller and older vegetation by the road-side, the smaller and younger vegetation, planted as part of the mitigation works associated with Dudgeon Substation, would be largely retained apart from over the approximate 20m section where the access from the A47 would be taken. These removals would open up visibility of the construction works from the A47, and although at a range of 1.09km and located perpendicular to the direction of travel, the presence and activity of the plant, especially the use of tall cranes, coupled with the emergence of the converter halls, and the use of construction lighting would create a new focus that would appear at variance</p>	<p>Scenario 2:</p> <p>Significant over the approximate 300m section where vegetation removals would occur. The combination of the medium to high sensitivity and the medium to high magnitude of change would lead to a significant effect. Effects to the immediate west on the A47 would be not significant. Effects further west are assessed under Viewpoint 4 and effects further east assessed under Viewpoint 6.</p> <p>Scenario 1:</p>	<p>Medium term and reversible in respect of onshore project substation construction. Localised significant effects would last for the 30 month construction phase.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	road-users on the adjacent section of the A47.	susceptibility of road-users during the construction phase. Under Scenario 1, the worst case assumption would be that the opening for the new A47 junction implemented under the Norfolk Vanguard DCO Application would not have been infilled by planting prior to the construction of Norfolk Boreas.	<p>with the small scale and rural character of the landscape.</p> <p>The construction of the National Grid substation extension and overhead line modification works would also be visible from this viewpoint, although seen as an expansion of existing features rather than the introduction of new features. The two sites of construction work, in separate locations, albeit the same sector of the view, would add to the magnitude of change by increasing the extent of influence.</p> <p>Scenario 1:</p> <p>The magnitude of change from the adjacent section of the A47 would be medium.</p> <p>Under Scenario 1, the new A47 junction would already be implemented although for the purposes of this assessment it is assumed that an opening would still exist, thus making the construction of the Norfolk Boreas onshore project substation and National Grid substation extension potentially visible. The construction of the onshore project substation would be seen partly to the rear of the Norfolk Vanguard onshore project substation, albeit with the emerging converter halls forming a notable feature to the left, adding to the horizontal extent and the density of the development. The National Grid substation extension</p>	<p>Significant over the approximate 300m section where vegetation removals would occur. The combination of the medium to high sensitivity and the medium magnitude of change would lead to a significant effect.</p>	

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			would increase the horizontal extent by a much lesser degree and therefore would not make such a readily apparent addition.		
VP6 A47 Top Farm	<p>This viewpoint is located west of the layby on the A47 to the west of the access road to Top Farm. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some gaps in the tree cover, mitigation planting associated with Dudgeon would add further to the screening effect over time. This viewpoint represents views that would be experienced by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent owing to its relatively high elevation. Existing Necton National Grid substation and Dudgeon substation are readily apparent in this view, but not apparent in the views of road-users on the adjacent section of the A47 owing to the extent of roadside vegetation.</p>	<p>The sensitivity of road-users on this section of the A47 is medium.</p> <p>The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and nearby laybys are largely screened by tree cover.</p> <p>The susceptibility of road-users to the effects of the onshore project substation construction is medium. While roadside vegetation aligns the road between the layby and Viewpoint 5, it is thin and fragmented in parts and views through to the adjacent landscape occur, albeit fleeting and experienced whilst in transit at high speeds.</p>	<p>Scenario 2:</p> <p>The magnitude of change from the adjacent sections of the A47 would be medium.</p> <p>Glimpsed views would occur as road-users pass gaps in the roadside vegetation, although these would be short in duration and at an oblique angle to the direction of travel. Filtered and glimpsed views would potentially alter the experience of road-users, owing to the presence and activity of plant and the emergence of electrical infrastructure, albeit into an area, already influenced by the presence of existing energy developments and overhead lines. The use of construction lighting would add to the prominence of the project albeit with the intensity reduced by the separation from the A47. The construction of the onshore project substation would be partly concealed by intervening mature tree cover around Top Farm, although tall cranes would potentially be visible above the tree tops.</p> <p>Construction works associated with the National Grid substation extension and overhead line modification works would be</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium sensitivity and the medium magnitude of change would lead to a not significant effect in this instance. The extent to which the onshore project substation construction would be screened by intervening tree cover would notably reduce its visual influence.</p>	<p>Medium term and reversible in respect of the temporary construction works (30 months).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			<p>largely concealed by intervening vegetation from this section of the A47.</p> <p>Scenario 1:</p> <p>The magnitude of change from the adjacent sections of the A47 would be medium.</p> <p>As described in the assessment above, the magnitude of change would be moderated by the screening effect of the roadside vegetation.</p>		
VP7 Ivy Todd Road east	<p>This viewpoint is located on Ivy Todd Road, midway between the hamlet of Ivy Todd and the cluster of properties around Willow Farm, along a section which is largely unenclosed to the north. The view is representative of the views of road-users, along this open section of approximately 200m. The road to the west is enclosed by hedge banks and to the east by hedgerow and tree cover. Located on a localised high point next to Vale House access, the landform falls away to the north-west where the onshore project substation construction works would be located. While the</p>	<p>The sensitivity of road-users on this minor road would be medium.</p> <p>The value of the view would be medium. The view is not from a formal viewpoint and does not look onto any landscape designations.</p> <p>The susceptibility of road-users would be medium. While much of the road is enclosed by hedgerow, this section opens up the view, although still contained within the close range by the field boundary to the north, behind which the onshore project</p>	<p>Scenario 2:</p> <p>The magnitude of change would be medium.</p> <p>The gentle fall in the landform from the viewpoint towards the site, would set the construction works of the onshore project substation partly below the intervening ridge, thus reducing their prominence in views from the road. The full depth of the construction site would not be apparent and the intervening trees and hedgerows would partially screen the construction works along the southern boundary of the site. Despite the limited visibility, it would be evident as an emerging development, especially owing to the use of tall cranes and the use of construction lighting in</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium sensitivity and the medium magnitude of change would lead to a not significant effect in this instance. The extent to which the onshore project substation would be screened by intervening tree cover would</p>	<p>Medium term and reversible in respect of the temporary construction works (30 months).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	existing Necton National Grid substation and Dudgeon substation are not readily apparent in this view, the overhead line is visible along the skyline to the north.	substation construction works would be located.	<p>winter months, and this would alter the character of the rural view.</p> <p>Scenario 1:</p> <p>The magnitude of change would be medium. The Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, albeit seen at a similar range and to similar extents and would, therefore, give rise to a similar magnitude of change during the construction phase.</p>	notably reduce its visual influence.	
VP8 Chapel Road, Necton	This viewpoint is located on the south-east edge of Necton and is representative of the views of residents along this edge. The properties along Chapel Road are orientated west, such that their rear elevations and gardens are orientated north-east towards the onshore project substation site with the National Grid substation extension located to the north. The adjacent farmland is characterised by large arable fields with intermittent hedgerow enclosure. The view is contained within the close range by the convex landform with overhead line towers and trees forming apparent vertical features along the skyline. The existing Necton	<p>The sensitivity of residents to the proposed project would be medium to high.</p> <p>The value of the view would be medium to high. The view is not taken from a formal viewpoint and is not representative of any landscape designations. The value relates to the visual amenity of residents on this eastern side of the settlement.</p> <p>The susceptibility of residents to the construction of the onshore project substation is medium. The rears of the properties are orientated towards the site and although</p>	<p>Scenario 2:</p> <p>The magnitude of change would be medium to low.</p> <p>The majority of the construction works would be screened by intervening landform, such that the presence and activity of much of the plant would not be readily visible from the eastern edge of Necton. The visualisation in Figure 29.42c shows how only a small number of the tips of the lightning protection masts would possibly be visible along the skyline. There is the potential that the tall cranes used for the construction of the converter halls would be visible and that from more elevated properties to the north-west and upper floors, higher parts of the construction works may be visible beyond the intervening hedge. The limited extent of</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium sensitivity and the medium to low magnitude of change would lead to a not significant effect.</p>	Medium term and reversible in respect of the temporary construction works (30 months).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	National Grid substation and Dudgeon substation are not readily apparent in this view.	intervening landform, boundary fences and garden vegetation would largely screen the construction works, higher elements would be visible, most notably tall cranes, especially from upper floors, and this raises susceptibility.	visibility combined with the separation distance of 1.4km would moderate the effect and ensure that it would not give rise to a notable effect. Scenario 1: The magnitude of change would be medium to low . Although the Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, it would be seen at a similar range and to similar limited extents, thus making the Scenario 2 assessment also applicable to Scenario 1.		
VP9 St Andrews Lane, Necton	St Andrews Lane forms an arc around the north-east edge of Necton, connecting Tuns Road, close to the A47, with the Chapel Road junction, where Viewpoint 8 is located. Whilst there is residential development at both these ends, and a cluster of developments to the south of the road in the middle, the majority of the roadside is undeveloped. At the southern end the properties are mostly two-storey and semi-detached with some	The sensitivity of residents to the proposed project would be medium to high . The value of the view would be medium to high. The view is not taken from a formal viewpoint and is not representative of any landscape designations. The value relates to the visual amenity of residents on this eastern side of the settlement.	Scenario 2: The magnitude of change would be medium to low . The majority of the construction works would be screened by intervening landform, such that the presence and activity of much of the plant would not be readily visible from the eastern edge of Necton. The visualisation in Figure 29.43c shows how only the top of the National Grid substation extension would be visible above the skyline. There is the potential that the tall cranes used for construction would be visible and that from the more elevated	Scenario 1 and 2: Not significant. The combination of the medium to high sensitivity and the medium to low magnitude of change would lead to a not significant effect in this instance.	Medium term and reversible in respect of the temporary construction works (30 months).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>bungalows at the top end of the street. The middle section is enclosed by mature and continuous hedgerow on either side, with openings to the east only for farm access, and to the west where access to the Rectory and Necton Grange Care Home occurs. These properties are largely enclosed by garden vegetation. Further north, the eastern side of the road opens up and the views of road-users extend across the adjacent arable farmland. While Dudgeon and Necton Substations are not readily apparent, transmission towers can be seen along the skyline. The small group of bungalows at the northern end face onto the street and are largely enclosed by garden vegetation.</p> <p>The level of the road is low at either end and rises in the middle. The viewpoint is located at the high point where the first farm field opening occurs, from where the overhead line is visible along with the top of the Dudgeon Substation.</p>	<p>The susceptibility of residents to the construction of the onshore project substation is medium. The rears of the properties are orientated towards the site and although intervening landform, boundary fences and garden vegetation would largely screen the construction works, higher elements would be visible, most notably tall cranes, especially from upper floors, and this raises susceptibility.</p>	<p>properties and upper floors, higher parts of the construction works would be visible beyond the intervening hedge. The limited extent of visibility would moderate the effect and ensure that it would not give rise to a notable effect.</p> <p>Scenario 1: The magnitude of change would be medium to low.</p> <p>Although the Scenario 1 location for the National Grid substation extension would be further to the right than the Scenario 2 location, it would be seen at a similar range and to similar limited extents, thus making the Scenario 2 assessment also applicable to Scenario 1.</p>		

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
VP10 Holme Hale	<p>Holme Hale is a small village located approximately 2km to the south-east of Necton. It is essentially a linear settlement, set across rising landform from north to south, with properties mostly inward looking and enclosure afforded by surrounding tree cover. The representative viewpoint is located on Station Road to the south-east of the Hamlet, where the landform is more elevated. The view extends from this ridge over the valley of the River Wissey to the spur of subtly elevated land where the overhead line forms a readily visible feature along the skyline. Dudgeon and Necton substations form a small scale and distant feature partly concealed by intervening tree cover. The view is otherwise typically rural with a predominance of arable farmland and small interspersed settlements.</p>	<p>The sensitivity of residents and road-users to the proposed project would be medium to low.</p> <p>The value of the view would be medium. The view is not taken from a formal viewpoint and is not representative of any landscape designations.</p> <p>The susceptibility of residents to the construction of the proposed project is low. Views from the village are largely contained by the enclosure of built form and tree cover. The susceptibility of road-users on Station Road is medium to low. The elevated location and relatively open aspect means that views potentially extend to both the National Grid substation extension and onshore project substation, albeit at an oblique angle to the direction of travel.</p>	<p>Scenario 2:</p> <p>The magnitude of change for residents would be low and for road-users would be medium to low.</p> <p>The separation distance of approximately 3.4km to the National Grid substation extension and approximately 3.3km to the onshore project substation construction works would limit the scale of the visible parts of the project, such that they would appear relatively small, especially seen within the wider panorama of the view. The National Grid substation extension would be set behind Dudgeon and Necton substations, such that its construction would be largely screened, although tall cranes and the construction of the additional transmission tower would still form readily apparent features. The onshore project substation, as it emerged during the construction phase, would be screened by mature tree cover. The tall cranes would potentially be visible above the tree tops and would potentially draw attention to this site. Whilst these features would appear at variance with the rural character experienced by road-users, the visual effect of the project would be moderated by the separation distance and the partial screening from woodland and existing developments.</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium to low sensitivity and the medium to low magnitude of change experienced by road-users would lead to a not significant effect. The combination of the medium to low sensitivity and the low magnitude of change experienced by residents would lead to a not significant effect.</p>	<p>Medium term and reversible in respect of the temporary construction works (30 months).</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			<p>Scenario 1:</p> <p>The magnitude of change for residents would be low and for road-users would be medium to low.</p> <p>The construction of the onshore project substation would be partially visible though the intervening tree cover, with the tall cranes forming the most apparent feature, albeit seen at a range of approximately 3.3km and occupying only a small proportion of a wider view. The construction of the National Grid substation extension would occur to the fore of the Dudgeon and Necton Substations and this would raise the magnitude of change to medium to low for road-users, albeit being seen at a range of approximately 3.4km would moderate the overall effect.</p>		
VP11 Hale Road east of Holme Hale Hall	Hale Road is the minor road connecting Bradenham to the east with Holme Hale to the west. The road runs along a low ridge from where views north across the River Wissey valley extend. Arable farmland occupies the land to the north and south of the road, the land to the north comprising also intermittent blocks of woodland, most notably Necton Common woodland seen across the middle ground of the	<p>The sensitivity of road-users to the proposed project would be medium to low.</p> <p>The value of the view would be medium. The view is not taken from a formal viewpoint and is not representative of any landscape designations.</p> <p>The susceptibility of road-users on Hale Road is medium to low. The relatively open aspect of this section means</p>	<p>Scenario 2:</p> <p>The magnitude of change for road-users would be medium to low.</p> <p>The separation distance of approximately 3.2km to the National Grid substation extension would limit the scale of the visible parts of the project, such that they would appear relatively small, especially seen within the wider panorama of the view. The National Grid substation extension would be seen set within woodland, such that its construction would be largely screened,</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium to low sensitivity and the medium to low magnitude of change experienced by road-users would lead to a not significant effect.</p>	Medium term and reversible in respect of the temporary construction works (30 months).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>view. Mature tree cover also encloses properties and farmsteads set along the road, the viewpoint being located to the east of Holme Hale Hall and west of Pond Farm.</p>	<p>that views would extend to the National Grid substation extension, albeit at an oblique angle to the direction of travel.</p>	<p>although tall cranes and the emergence of the electrical infrastructure would still form a readily apparent feature. Parts of the onshore project substation, as it emerged during the construction phase, would also be visible between the trees, from the section of Hale Road to the west of the viewpoint, and again, the tall cranes would draw further attention to this site.</p> <p>Whilst these features would appear at variance with the rural character experienced by road-users, the visual effect of the project would be moderated by the separation distance and the partial screening from woodland and existing developments.</p> <p>Scenario 1:</p> <p>The magnitude of change for road-users would be medium to low.</p> <p>The construction of the Scenario 1 National Grid substation extension would be more visible owing to less screening from tree cover, although its impact would be moderated by its location coinciding with the existing Necton and Dudgeon substations and the presence of the overhead line. The construction of the Scenario 1 onshore project substation would be located to the right of the Norfolk Vanguard onshore project substation, albeit</p>		

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			more concealed by intervening close and middle range tree cover.		
VP 12 Ivy Todd	Ivy Todd is a hamlet approximately 1.7km east of the village of Necton. It comprises a cluster of residential properties and Ivy Todd Farm set within the valley of the unnamed river that flows from north to south to join the River Wissey. The hamlet is largely enclosed by tree cover and the majority of the houses are orientated in towards either Ivy Todd Road or Watery Lane. The only readily apparent opening occurs on the north side of the hamlet, where the garden grounds of Lodge Cottage appear open to the north. Lodge Lane extends alongside the unnamed river to the north of the hamlet and views from this path are represented by Viewpoints 2 and 3.	<p>The sensitivity of residents to the proposed project would be medium.</p> <p>The value of the views of residents is medium. The hamlet is not covered by a conservation area designation and the surrounding landscape is not covered by any scenic designations, which would otherwise indicate a special value. The value relates to the importance of the visual amenity of local residents.</p> <p>The susceptibility of residents' views is medium to low. The settlement is largely enclosed, such that it would be unlikely for residents to gain views of the proposed project from their internal living space, although views may occur from garden grounds, most notably at Lodge Cottage.</p>	<p>Scenario 2:</p> <p>The magnitude of change for residents of Ivy Todd would be medium to low.</p> <p>From the viewpoint, located at the central crossroads in the village, there would be very limited visibility of the onshore project substation construction works, as these would be screened by the intervening tree cover to the east of the river. While there would be the possibility of seeing a very small part of the construction works through the tree cover this would have a limited magnitude of change. This is the only publicly accessible point in the hamlet from which a potential view would be gained (views further north on Lodge Lane are assessed under viewpoints 2 and 3). While there is the potential that the onshore project substation construction works may be visible from the private garden grounds of Lodge Cottage, this would occur from a range of approximately 0.7km with intervening vegetation and landform reducing the vertical and horizontal extent of these works and this would moderate the magnitude of change.</p> <p>Scenario 1:</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium sensitivity and the medium to low magnitude of change experienced by residents would lead to a not significant effect.</p>	Medium term and reversible in respect of the temporary construction works (30 months).

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
			<p>The magnitude of change for residents of Ivy Todd would be medium to low.</p> <p>While the construction of the Scenario 1 onshore project substation would not be visible from much of the village, there is the possibility that visibility may arise from the private garden grounds at Lodge Cottage, albeit at an oblique angle and with partial screening from vegetation.</p>		

29.7.5 Potential Impacts During Operation

29.7.5.1 Introduction

178. The potential impacts during the operational and maintenance phase would largely be limited to the presence of the above ground onshore infrastructure and its influence on landscape and visual receptors.
179. In the Norfolk Boreas Scoping Opinion, the SoS agreed that the operational impacts of the landfall and onshore cable route could be scoped out of the assessment, but that consideration would be required of the impact of vegetation loss and the mitigation through replanting. These considerations have been made in the assessment of effects during the construction phase. Prior to the implementation of landscape mitigation, the Scenario 1 and Scenario 2 onshore project substation and National Grid substation extension would have potential to give rise to significant visual effects during the operational phase owing to the presence of the components and their scale relative to the predominantly rural context. These would have an influence on landscape character and visual amenity, the effects of which are assessed in detail below.

29.7.5.2 Potential impacts during operation – Onshore project substation and National Grid substation extension.

29.7.5.2.1 Scenario 2

180. Under Scenario 2, the impact of the onshore project substation, National Grid substation extension and overhead line modification during the operational phase would relate principally to the following features of the project.
- The effect on landscape character and visual amenity owing to the presence of the onshore project substation with converter halls up to 19m in height (lightning protection masts projecting a further 6m over the height of the converter halls) and occupying a site of 250m x 300m.
 - The effect on landscape character and visual amenity owing to the presence of the National Grid substation extension (150m x 200m) up to 15m in height and associated overhead line modifications.
 - The effect on landscape character and visual amenity owing to the presence of the new A47 junction.
 - The effect of the re-establishment of hedgerows over cable easements and re-establishment of woodland planting along the A47 road corridor.
 - The effect of mitigation planting in terms of its screening of the onshore project substation.

29.7.5.2.2 Scenario 1

181. Under Scenario 1, the impact of the onshore project substation and National Grid substation extension during the operational phase would relate principally to the features of the project, as described above, albeit with the following differences.

- The Scenario 1 onshore project substation would be located to the immediate east of the proposed Norfolk Vanguard onshore project substation, while the Scenario 2 onshore project substation would be located in a position offset 127m to the east of the Scenario 1 onshore project substation.
- The Scenario 1 National Grid substation extension would be located to the east of the Necton National Grid substation with a smaller footprint of 135m x 150m (compared to 150m x 200m).

29.7.5.2.3 Summary

182. Mitigation measures associated with the onshore project substation would comprise planting as described in section 29.7.1 and shown on Figures 29.9 and 29.10 (Scenario 1) and Figures 29.19, 29.20b and 29.21b (Scenario 2).

183. Table 29.13 shows the detail of the assessment for each receptor under Scenario 2. In respect of a number of landscape receptors, the assessment under Scenario 1 is the same as that assessed under Scenario 2. Where the assessment for Scenario 1 is different, this is highlighted in the table.

184. In summary, under Scenario 1 and Scenario 2, the operational phase of the onshore project substation, National Grid substation extension and overhead line modification would have a significant effect on landscape character in the localised parts of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU but would not have significant effects on the remaining parts and all other LCUs. In respect of the representative viewpoints, significant effects would arise from the central section of Lodge Lane to the immediate south of the site, a very localised section of Ivy Todd Road to the south-west and a section of the A47 to the north. These effects would all occur within 1.2km of the onshore project substation, making them localised. There would be no significant effects on the views of nearby residents at Ivy Todd and Necton.

185. Mitigation planting would be expected to reduce the visual effects from Viewpoint 4 – Necton Substation and Viewpoint 5 – A47 Spicer’s Corner within 10 years of the indicative project design life, largely by screening the views of road-users on the A47. From Viewpoint 2 – Lodge Lane south and Viewpoint 3 – Lodge Lane north, mitigation planting would achieve a sufficient height relative to the height of the onshore project substations to mitigate the effects on the views of walkers on this

local path by 20 years of the indicative design life. The effects on road-users and walkers, once mitigation planting had taken effect, would be not significant.

Table 29.13 Scenario 1 and Scenario 2: Potential impacts during operation - onshore project substation and National Grid substation extension

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Onshore project substation and National Grid substation extension – Landscape Receptors					
Plateau Farmland LCT – Pickenham Plateau LCU	The National Grid substation extension would be located in the Pickenham Plateau LCU. This LCU covers an extensive plateau area extending across the north-west of the study area. The National Grid substation extension would occur in the southern most ‘spur’ which lies to the immediate west of the narrow River Wissey Tributary Farmland. This spur forms a relatively level area of land which has been utilised for the development of Necton National Grid substation and Dudgeon substation. The overhead line extends along this spur to the north-west. The LCU is characterised by large fields of arable with limited enclosure.	The sensitivity of this LCU to the operational project is medium . The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure. The susceptibility of the LCU to the operational project is medium. Although the National Grid substation extension would be located in this LCU, it would occupy only a localised part of the much wider LCU. The susceptibility is moderated by the modified nature of the farmland and there is also an existing influence from	Scenario 1 and 2: The magnitude of change would be high within the local area, medium within the surrounding area and low or no effect across the wider LCU. While Necton National Grid substation and Dudgeon substation already have a notable influence on this LCU, the National Grid substation extension would increase the influence of large scale energy developments in this part of the LCU, thus detracting from the strength of the underlying rural character. The landscape character would be affected by the scale of the onshore project substation (145m x 200m) which would add notably to the existing footprint of the Necton National Grid substation and Dudgeon substation. The existing influence of large scale energy developments would be increased within this local landscape, although the extent contained by the enclosure of tree cover along the A47 to the north.	Scenario 1 and 2: Not significant with the exception of a localised significant effect in the area of the spur. The combination of the medium sensitivity and the high magnitude of change would lead to a localised significant effect. Tree cover along the A47 would limit the northern influence of this landscape effect. Significant effect would be mitigated to not significant after 20 years of indicative design life.	Scenario 1 and 2: Long term and reversible. Localised significant effect lasting for 20 years reducing to not significant for remaining 10 years of the 30 year indicative design life.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	The A47 has a localised influence on the southern part of the spur, despite the enclosure of tree cover.	the Necton National Grid substation, Dudgeon substation, and associated overhead lines, as well as the Norfolk Vanguard National Grid substation extension under Scenario 1.			
Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU	The onshore project substation would be located in the River Wissey Tributary Farmland LCU and the National Grid substation would be located in the adjacent Pickenham Plateau LCU to the west. The landform of the local area is typical of the wider LCU with the valley sides sloping down towards the unnamed river course. The onshore project substation would be located on the upper slopes adjacent to the Beeston Plateau LCU to the east. The land use is predominantly arable farmland with a pattern	<p>The sensitivity of this LCU to the operational project is medium.</p> <p>The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure.</p> <p>The susceptibility of the LCU to the operational project is medium. Although the onshore project substation would be located in this LCU, it would occupy only a localised part of the much wider LCU. The</p>	<p>Scenario 1 and 2:</p> <p>The magnitude of change would be high within the local area, medium within the surrounding area and low or no effect across the wider LCU. The local landscape character would be directly affected by the presence of the onshore project substation, with its maximum footprint of 250m x 300m and its maximum building height of 19m. This would form a large fenced site containing electrical infrastructure, the most notable components being the HVDC converter halls. Their scale and mass would appear at variance with the scale and character of the rural landscape. Despite the extent of mitigation planting around the onshore project substation, it would be insufficient in scale to completely reduce the landscape effect within the operational period.</p> <p>The local landscape character would be indirectly affected by the presence of the National Grid substation extension in the Pickenham Plateau to the north-west. Although separated from the River Wissey LCU, the</p>	<p>Scenario 1 and 2:</p> <p>Not significant with the exception of a localised significant effect in the area extending to the A47 to the north, Great Wood and Smuggler’s Lane to the east, Necton National Grid Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. The combination of the medium sensitivity and the high magnitude of change would lead to a localised significant effect.</p>	<p>Scenario 1 and 2:</p> <p>Long term and reversible. Localised significant effect lasting for 20 years reducing to not significant for remaining 10 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	of enclosure which has been eroded owing to the intensification of farming practices. Views are generally medium range, contained within the wider valley with some closer range enclosure where mature woodland and hedgerows occur. The Necton National Grid substation and Dudgeon substation are baseline features on the spur of the Pickenham Plateau LCU to the north-west of the onshore project substation.	susceptibility is also moderated by the modification this landscape has undergone through the practices of intensive farming and there is an existing influence from the Necton National Grid substation, Dudgeon substation and associated overhead lines.	extension containing electrical infrastructure up to 15m in height, in addition to the existing Necton National Grid substation and Dudgeon substation, would increase the influence of energy developments across the wider landscape.		
Plateau Farmland LCT – Beeston Plateau	The onshore project substation would be located immediately adjacent to a small southern spur of the Beeston Plateau LCU. The distinction between the LCUs in this transitional area is subtle, with the landform rounding off	The sensitivity of this LCU to the operational project is medium . The value of the LCU is medium – it is not covered by any landscape designations which would otherwise denote a special value. The landscape has been modified by agricultural	Scenario 1 and 2: The magnitude of change would be high within the local area, medium within the surrounding area and low or no effect across the wider LCU. The onshore project substation site in the River Wissey to the immediate west and the National Grid substation extension further west, would give rise to direct and indirect effects on local landscape character. Despite the baseline influence on landscape character from the Necton National Grid substation and Dudgeon	Scenario 1 and 2: Not significant with the exception of a localised significant effect in the area extending to the A47 to the north, Great Wood and Smuggler’s Lane to the east, and the LCU boundary to the west and south.	Scenario 1 and 2: Long term and reversible. Localised significant effect lasting for 20 years reducing to not significant for remaining 10 years of the 30

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>from the steeper valley into the flatter plateau. The land use is similarly arable farmland and enclosure is partly eroded causing larger field patterns. This local area is characterised by the mature Necton Wood in the adjoining River Wissey Tributary Farmland LCU and other blocks in the Beeston Plateau LCU to the north and south. The mobilisation area for the onshore project substation would be located in the spur of the LCU while the onshore project substation would be located in the adjacent Tributary Farmland LCU to the west and the National Grid substation extension in the Pickenham Plateau LCU further west.</p>	<p>practices and although some hedgerow loss has occurred, the broad pattern of enclosure has remained intact. The susceptibility of the LCU to the operational project is medium. Although the onshore project substation temporary construction compound would be located in this LCU and may be retained to facilitate the Norfolk Boreas onshore project substation construction, it would occupy only a localised part of the much wider LCU. The susceptibility is also moderated by the modification this landscape has undergone through the practices of intensive farming and there is a baseline influence from the existing Necton National Grid substation, Dudgeon substation and associated overhead lines.</p>	<p>substation, the large footprints and notable vertical scale of the onshore project substation and National Grid substation extension would increase the close range influence of energy developments on the character of this LCU.</p>	<p>The combination of the medium sensitivity and the high magnitude of change would lead to a localised significant effect.</p>	<p>year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
Onshore project substation and National Grid Substation extension – Visual Receptors					
VP1 Ivy Todd Road west	<p>This viewpoint is located on Ivy Todd Road, midway between the village of Necton and the hamlet of Ivy Todd at a point where a gated access track leads north through the adjacent farmland. The view is intended to be representative of the views of road-users, although the road is enclosed by mature hedgerows along much of its length, such that views are largely contained. This gated opening provides one of the few glimpsed views towards the site. Located on a localised high point, the landform falls away to the north-east where the onshore project substation site would be located. The Necton National Grid substation and Dudgeon substation are</p>	<p>The sensitivity of road-users on this minor road would be medium.</p> <p>The value of the views of road-users is medium. The view is not from a formal viewpoint and does not look onto any designated landscapes.</p> <p>The susceptibility of road-users to the effects of the operational project is medium. While much of the road is enclosed by hedgerow, the alignment of this opening means that east-bound road-users would experience this view, albeit for a very short duration. In winter months, filtered views through the hedgerow may be experienced although this limited visibility would limit the susceptibility of road-users to the onshore project substation. If hedgerows were cut low along elevated sections,</p>	<p>Scenario 2</p> <p>The magnitude of change would be medium to high for the approximate 10m section where the opening to the field occurs and medium to low, low or no effect from the remaining sections.</p> <p>The photomontage in Figure 29.35c shows how the onshore project substation would form a prominent feature in the view. It would occupy a notable horizontal extent in this sector of the view, although the eastern extent would be screened by the mature woodland around Lodge Farm. The vertical scale would extend above the surrounding and background tree cover. It would appear at variance with the rural character of the baseline view, owing to its large mass and scale, and despite the existing presence and influence of the transmission towers. The extent of the medium to high magnitude of change would be contained within the very short section of road from which this open view would be experienced. From the remainder of the road between Necton and Ivy Todd the magnitude of change would be low, negligible or no effect, despite the fact filtered views may be experienced during the winter months.</p> <p>Scenario 1:</p> <p>The magnitude of change would be medium to high for the approximate 10m section where the</p>	<p>Scenario 1 and 2</p> <p>The effect would be significant along the approximate 10m section of road from which this open view would be experienced, or more extensively if road-side hedgerows are cut low by landowners or another party. The combination of the medium sensitivity and the medium to high magnitude of change would lead to a localised significant effect.</p> <p>Not significant along remaining sections.</p>	<p>Long term and reversible.</p> <p>Localised significant effect lasting for 25 years reducing to not significant for remaining 5 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	not readily visible from this viewpoint, although the overhead line is.	this might give rise to additional visibility.	opening to the field occurs and medium to low, low or no effect from the remaining sections. The Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, and therefore would be seen at a similar range and to similar extents, thus making the Scenario 2 assessment also applicable to Scenario 1.		
VP2 Lodge Lane south	This viewpoint is located on Lodge Lane to the north of the hamlet of Ivy Todd. It looks north-east across the arable farmland towards the onshore project substation site at a range of approximately 620m. The view is representative of the views of walkers in this area and is characterised by the presence of Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, forms a readily apparent feature along the skyline. The view is	The sensitivity of walkers on Lodge Lane would be medium . The value of views of walkers is medium. The view is not from a formal viewpoint and is not representative of any landscape designations. The existing Necton National Grid substation, Dudgeon substation and overhead line are evident, and these make large scale electricity developments a feature of the baseline views from Lodge Lane. The susceptibility of walkers to the effects of the operational project is medium. Access on the lane provides only a short	Scenario 2: The magnitude of change would be medium over an approximate 400m section in the southern part of Lodge Lane and low in other parts. Figure 29.36c shows how the onshore project substation would be largely screened by intervening landform and vegetation such that only a small proportion of the project would be visible to walkers on Lodge Lane. The curvature of the landform would screen the depth of the project such that only the southern edge would be potentially visible, and the woodland around Lodge Farm would screen the western extent of the onshore project substation. Only the roof of the converter hall and the lightning protection masts would be visible within the eastern extent, although the lightning protection masts would form a more prominent feature, seen set along the containing skyline of the view. Whilst these factors would moderate the magnitude of change, the proximity of the onshore project substation combined with the relatively open	Scenario 1 and 2: Significant along an approximate 400m section in the southern part of Lodge Lane. The combination of the medium sensitivity and the medium magnitude of change would lead to a localised significant effect. Not significant after the first 20 years of the project's life as planting matured to largely screen the onshore project substation. Effect beneficial after 20 years as mitigation planting would	Long term and reversible. Localised significant effect lasting for 20 years reducing to not significant for remaining 10 years of the 30 year indicative design life.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	contained in the middle range by the subtle relief of the landform and enclosure of hedgerows. Hedgerows and tree cover are depleted within the farmland but more substantial around Ivy Todd to the south.	walk as it does not connect with the wider PRow network. The experience of walkers is already influenced by the existing electricity developments although this viewpoint would be close to the onshore project substation.	views experienced by walkers along Lodge Lane, would make it an apparent addition that would appear at variance with the rural character. This would be gradually reduced to medium to low as mitigation planting matured over the first 20 years of the indicative design life and would reduce the extent of visibility along the lane. The National Grid substation extension would not increase the magnitude of change, owing to its location behind the existing National Grid and Dudgeon Substations. These existing developments would largely screen the new extension and therefore, reduce its influence on the views of walkers on Lodge Lane. Scenario 1: The magnitude of change would be medium over an approximate 400m section in the southern part of Lodge Lane and low in other parts. The Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, therefore, it would be seen at a similar range and to similar extents, thus making the Scenario 2 assessment also applicable to Scenario 1.	enhance visual amenity of area.	
VP3 Lodge Lane north	This viewpoint is located at the northern end of Lodge Lane to the north of the hamlet of Ivy Todd. It is not a PRow but is shown on	The sensitivity of walkers on Lodge Lane to the operational project is medium . The value of the views of walkers is medium to low.	Scenario 2: The magnitude of change as a result of the operational project would be medium to low over the approximate 250m northern section of the lane.	Scenario 1 and 2: Not significant in the northern section of Lodge Lane for approximately 250m. The combination of	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>OS mapping as a route with public access. The view looks north towards the mature tree cover that encloses Lodge Farm and north-west towards the Necton National Grid substation and Dudgeon substation.</p> <p>The view looks across the arable farmland towards the onshore project substation at a range of approximately 340m. The view is representative of the views of walkers in this area and features the Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, form readily apparent development along the skyline. To the north the view is contained in the middle range by the subtle relief of the landform and enclosure of</p>	<p>The view is not from a formal viewpoint and does not look onto any landscape designations.</p> <p>The existing Necton National Grid substation, Dudgeon substation and overhead line are evident, and these make large scale electricity developments a feature of the baseline views from Lodge Lane.</p> <p>The susceptibility of walkers to the effects of the operational project is medium. Access on the lane provides only a short walk as it does not connect with the wider PRow network. As the lane approaches Lodge Farm, visibility of the onshore project substation and the National Grid substation extension would become increasingly screened by intervening vegetation.</p> <p>The experience of walkers closer to the viewpoint is already influenced by the</p>	<p>Despite the closer range of this viewpoint, at approximately 340m, compared to 620m for Viewpoint 2, there would be even less visibility of the operational onshore project substation owing to the closer proximity of the intervening landform and vegetation. The only readily visible components of the onshore project substation would be the lightning protection masts, which would be seen to rise above the enclosing skyline. The masts on the left, would be seen to almost their full height, whilst the others would be partially screened by landform and hedgerow. The limited extent to which the onshore project substation would be visible from this northern end of Lodge Lane would notably moderate the magnitude of change. The baseline presence of electricity transmission towers in the sector of the view towards the National Grid substation, means that the lightning protection masts, being similar in appearance, would not appear as a notably unfamiliar feature.</p> <p>The National Grid substation extension would not increase the magnitude of change, owing to its location behind the existing National Grid and Dudgeon Substations. These existing developments would largely screen the new extension and therefore, reduce its influence on the views of walkers on Lodge Lane.</p> <p>Scenario 1:</p> <p>The magnitude of change as a result of the operational project would be medium to low</p>	<p>the medium sensitivity and the medium to low magnitude of change would lead to a not significant effect.</p>	

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	hedgerows. Hedgerows and tree cover are depleted within the farmland but more substantial around Ivy Todd to the south.	existing electricity developments although this viewpoint would be close to the onshore project substation.	over the approximate 350m northern section of the lane. While the onshore project substation would be largely screened by intervening landform, the lightning protection masts would be visible and seen in conjunction with parts of the Norfolk Vanguard onshore project substation. Furthermore, the National Grid substation extension would be visible to the fore of the existing Necton and Dudgeon substations, and while it would appear integrated with the existing electrical infrastructure, it would nonetheless form an apparent extension.		
VP4 A47 Necton Substation	This viewpoint is located at the access from the A47 into Necton National Grid substation. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some more open sections, substantial mitigation planting associated with the Dudgeon onshore works will add further to the screening effect over time. The	The sensitivity of road-users on this section of the A47 is medium . The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and nearby laybys are largely enclosed by tree cover. The susceptibility of road-users to the effects of the operational project is medium. While the onshore project	Scenario 2: The magnitude of change experienced by road-users on the adjacent sections of the A47 would be medium . There would be a limited effect in respect of the onshore project substation as it would be located below the level of the intervening landform and screened by the intervening substations. The National Grid substation extension would be more readily visible, with the extension seen to the fore of the Necton National Grid Substation. The baseline character of this site as an established energy development, combined with the presence of the large scale overhead line towers, would moderate the overall effect. Furthermore, screening along the adjacent parts of the A47 from existing vegetation, coupled with the	Scenario 2: Not significant. The combination of the medium sensitivity and the medium magnitude of change would lead to a not significant effect in this instance. Despite the close proximity of the National Grid substation extension, the existing influence of energy developments in this view combined with the extent of screening along the	Short term owing to the screening effect of the close range Dudgeon mitigation planting and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	access provides a view that at most would be glimpsed by passing road-users travelling at speed. The Necton National Grid substation forms the characterising feature in this view. It appears at variance with the rural character of the surrounding landscape and establishes energy developments as a feature of the baseline view.	substation would be largely screened by intervening landform and the Necton National Grid substation, the National Grid substation extension would be close in range. From adjacent parts of the A47, tree cover encloses most of the views, although views may occur at this access and through other gaps and this raises the susceptibility.	additional screening from mitigation planting associated with Dudgeon Substation, would mitigate the effect on road-users within the first 10 years. Scenario 1: The magnitude of change experienced by road-users on the adjacent sections of the A47 would be negligible . The Norfolk Boreas National Grid substation extension and onshore project substation would be largely concealed behind Norfolk Vanguard National Grid substation extension, Dudgeon Substation and Necton substation.	A47 would moderate the potential effect. Scenario 1: Not significant. The combination of the medium sensitivity and the negligible magnitude of change would lead to a not significant effect. The project would be largely concealed by the other developments.	
VP5 A47 Spicer's Corner	This viewpoint is located opposite Spicer's Corner layby on the A47. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some open sections where glimpsed views over the adjacent landscape can be experienced, mitigation planting	The sensitivity of road-users on this section of the A47 is medium . The value of the views of road-users on the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and nearby laybys are largely enclosed by tree cover. The susceptibility of road-users to the effects of the operational project is	Scenario 2: The magnitude of change experienced by road-users on the adjacent sections of the A47 would be medium to high reducing to low . The photomontage in Figure 29.39c shows how the onshore project substation would be visible at 1.09km from the viewpoint, seen as a prominent feature set along the skyline and comprising a group of converter halls and other electrical infrastructure. The onshore project substation would appear at variance with the small scale and rural character of the surrounding rural landscape and this would give rise to a medium to high magnitude of change during the first 10 years of operation.	Scenario 1 and 2: Significant over a 300m section for the first 10 years. The combination of the medium sensitivity and the medium to high or medium magnitude of change would lead to a localised significant effect. Not significant after the first 10 years of operation owing to the	Long term and reversible. Localised significant effects lasting for 10 years reducing to not significant for remaining 20 years of 30 year indicative design life.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>associated with the Dudgeon onshore works will add further to the screening effect over time. The gated opening provides a view that at most would be glimpsed by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent. The existing Necton National Grid substation, Dudgeon substation and the overhead line are readily apparent in this view, although would not be readily apparent to road-users on the A47.</p>	<p>medium. The combination of mitigation planting associated with Dudgeon Substation, established along the southern side of the A47, and mitigation planting around the new access road, would reduce visibility in the directions of the operational onshore project substation and National Grid substation extension.</p>	<p>Beyond this, the establishment of the Dudgeon mitigation planting along the southern side of the A47 would grow to largely screen the views of road-users. An opening of approximately 16m would remain around the access junction through which glimpsed views of the onshore project substation would be experienced. The establishment of mitigation planting to the south of the A47 and the access road, would over 10 years, come to screen views south towards the onshore project substation and south-west towards the National Grid substation extension.</p> <p>Scenario 1:</p> <p>The magnitude of change experienced by road-users on the adjacent sections of the A47 would be medium reducing to low. The Scenario 1 location for the onshore project substation would be slightly further to the left than the Scenario 2 location and seen at a similar range and to similar extents. The presence of Norfolk Vanguard onshore project substation and National Grid substation extension would moderate the magnitude of change as they would already have an influence on the character within the same sectors of the view where Norfolk Boreas would be visible.</p>	<p>screening effects of mitigation planting. Effect beneficial after 10 years as mitigation planting would enhance visual amenity of area.</p>	
VP6 A47 Top Farm	<p>This viewpoint is located west of the layby on the A47 to the west of the access road to Top Farm. It</p>	<p>The sensitivity of road-users on the A47 to the operational project is medium.</p>	<p>Scenario 2:</p> <p>The magnitude of change experienced by road-users on the adjacent sections of the A47 would be medium to low.</p>	<p>Scenario 1 and 2: Not significant. The combination of the medium sensitivity</p>	<p>Long term and reversible.</p>

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some open sections, mitigation planting associated with the Dudgeon substation will add further to the screening effect over time. This gated opening provides a view that at most would be glimpsed by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent. The existing Necton National Grid substation, Dudgeon substation and the overhead line are readily apparent in this view, although would not be readily apparent</p>	<p>The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and nearby laybys are largely enclosed by tree cover.</p> <p>The susceptibility of road-users to the effects of the onshore project substation is medium. While roadside vegetation aligns the road between the layby and Viewpoint 5, it is thin and fragmented in parts and views through to the adjacent landscape occur, albeit fleeting and experienced whilst in transit at high speeds.</p>	<p>While the photomontage in Figure 29.40c shows how the National Grid substation extension would be readily apparent, road-users would not experience such clear views. A glimpsed view would occur as road-users would pass the gated opening, but this would be short in duration and at an oblique angle to the direction of travel. Views from adjacent sections would be largely screened by intervening tree cover although filtered and glimpsed views would potentially alter the experience of road-users, by introducing large-scale energy developments into their views. Views of the onshore project substation would be largely screened by the mature tree cover around Top Farm, thus reducing its influence on the experience of road-users.</p> <p>Scenario 1:</p> <p>The magnitude of change experienced by road-users on the adjacent sections of the A47 would be medium to low.</p> <p>Although the onshore project substation would be located slightly further to the left and therefore more fully screened by intervening tree cover, the National Grid substation extension would be visible to the left of Dudgeon substation and, in the context of the Norfolk Vanguard National Grid substation extension, would be seen a notable extension. The magnitude of change would, however, be moderated by the existing enclosure along the</p>	<p>and medium to low magnitude of change would lead to a not significant effect.</p> <p>Effect beneficial after 10 years as mitigation planting would enhance visual amenity of area.</p>	

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	to road-users on the A47.		A47, which will be further bolstered by Dudgeon and Norfolk Boreas mitigation planting.		
VP7 Ivy Todd Road east	This viewpoint is located on Ivy Todd Road, midway between the hamlet of Ivy Todd and the cluster of properties around Willow Farm, along a section which is largely unenclosed to the north. The view is representative of the views of road-users, along this open section of approximately 200m. The road to the west is enclosed by hedge banks and to the east by hedgerow and tree cover. Located on a localised high point next to Vale House access, the landform falls away to the north-west where the onshore project substation site would be located. Necton National Grid substation and Dudgeon substation are	The sensitivity of road-users on this minor road to the operational project is medium . The value of the view is medium. The view is not from a formal viewpoint and does not look onto any landscape designations. The susceptibility of road-users to the operational project is medium. While much of the road is enclosed by hedgerow, this section opens up the view, although still contained within the close range by the field boundary to the north, behind which the onshore project substation would be located.	Scenario 2: The magnitude of change experienced by road-users would be medium . Figure 29.41c shows how the gentle fall in the landform from the viewpoint towards the site, would set the onshore project substation partly below the intervening ridge, making it appear low in the landscape. The full depth of the project would not be apparent and the perceived scale of the converter halls would be moderated by their comparison with the larger scale of the closer range trees, which would also partially screen the onshore project substation. Despite the limited visibility, the onshore project substation would be evident as a new and large-scale development and this would alter the character of the rural view. Over time, mitigation planting would bolster the screening effect of the existing vegetation as it matured. Scenario 1: The magnitude of change would be medium . The Scenario 1 location for the onshore project substation would be slightly further to the right than the Scenario 2 location, albeit seen at a similar range and to similar extents and would, therefore, give rise to a similar magnitude of change. Mitigation planting would reduce the effect further over time.	Scenario 1 and 2: Not significant. The combination of the medium sensitivity and medium magnitude of change would lead to a not significant effect in this instance. The extent to which the onshore project substation would be screened by intervening tree cover would moderate its visual influence.	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	not readily apparent from this viewpoint, although the overhead line is.				
VP8 Chapel Road, Necton	This viewpoint is located on the south-east edge of Necton and is representative of the views of residents along this edge. The properties along Chapel Road are orientated west, such that their rear elevations and gardens are orientated east towards the onshore project substation site. The adjacent farmland is characterised by large arable fields with intermittent hedgerow enclosure. The view is contained within the close range by the convex landform with transmission towers and trees forming apparent vertical features along the skyline. Necton National Grid	The sensitivity of residents to the operational project is medium . The value of the view is medium. The view is not taken from a formal viewpoint and is not representative of any landscape designations. The value relates to the visual amenity of residents on this eastern side of the settlement. The susceptibility of residents to the operational project is medium. The backs of the properties are orientated towards the site and although intervening landform, boundary fences and garden vegetation would largely screen the onshore project substation, there is potential that the taller components may be	Scenario 2: The magnitude of change on local residents would be medium to low . The majority of the operational onshore project substation would be screened by intervening landform. The visualisation in Figure 29.42c shows how only a small number of tips of the lightning protection masts would potentially be visible above the skyline. These would form small scale and relatively discreet features and in the context of the baseline transmission towers would not appear out of character. From the more elevated properties to the north of the viewpoint and from the upper floors of all the properties, there would be the possibility that a greater extent of the taller elements would be visible above the intervening landform and hedgerows. While these would form an apparent feature, the separation distance of approximately 1.4km and the limited extent to which they would be visible, would moderate the effect. Scenario 1: The magnitude of change on local residents would be medium to low . The Scenario 1 location for the onshore project substation would be slightly further right of the	Scenario 1 and 2: Not significant. The combination of the medium sensitivity and medium to low magnitude of change would lead to a not significant effect.	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	substation and Dudgeon substation are not readily apparent from this viewpoint, although the overhead line is.	visible from the ground level of the more elevated properties and form the upper floors of all properties, and this raises susceptibility.	Scenario 2 location, and, therefore, seen at a similar range and to similar limited extents, thus making the Scenario 2 assessment also applicable to Scenario 1.		
VP9 St Andrews Lane, Necton	St Andrews Lane forms an arc around the north-east edge of Necton, connecting Tuns Road, close to the A47, with the Chapel Road junction, where Viewpoint 8 is located. Whilst there is residential development at both these ends, and a cluster of developments to the south of the road in the middle, the majority of the road is undeveloped. At the southern end the properties are mostly two-storey and semi-detached with some bungalows at the top end of the street. The middle section is	<p>The sensitivity of residents to the proposed project would be medium to high.</p> <p>The value of the view would be medium to high. The view is not taken from a formal viewpoint and is not representative of any landscape designations. The value relates to the visual amenity of residents on this eastern side of the settlement.</p> <p>The susceptibility of residents to the construction of the National Grid substation extension is medium. The backs of the properties are orientated towards the site and although intervening landform,</p>	<p>Scenario 2:</p> <p>The magnitude of change would be medium to low.</p> <p>The majority of the National Grid substation extension would be screened by intervening landform, such that it would only be partly visible from the north-eastern edge of Necton. The visualisation in Figure 29.43c shows how only the top of the National Grid substation extension would be visible above the skyline, and this would be visible from the more elevated properties and upper floors of adjacent properties. The limited extent of visibility would moderate the effect and ensure that it would not give rise to a notable effect.</p> <p>Furthermore, mitigation planting along the southern boundary of the National Grid substation extension would grow to form a screen to the development, which would effectively mitigate effects after 20 years of the indicative design life.</p> <p>Scenario 1:</p>	<p>Scenario 1 and 2:</p> <p>Not significant. The combination of the medium to high sensitivity and the medium to low magnitude of change would lead to a not significant effect in this instance.</p>	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>enclosed by mature and continuous hedgerow on either side, with openings to the east only for farm access, and to the west where access to the Rectory and Necton Grange Care Home occurs. These properties are largely enclosed by garden vegetation. Further north, the eastern side of the road opens up and the views of road-users extend across the adjacent arable farmland. While the Dudgeon and Necton Substations are not readily apparent from the road, transmission towers can be seen along the skyline.</p> <p>The road is low at either end and rises in the middle. The viewpoint is located at the high point where the first farm field opening occurs, from</p>	<p>boundary fences and garden vegetation would largely screen the construction works, higher elements would be visible, most notably tall cranes, especially from upper floors, and this raises susceptibility.</p>	<p>The magnitude of change would be medium to low.</p> <p>Although the Scenario 1 location for the National Grid substation extension would be further to the right than the Scenario 2 location, it would be seen at a similar range and to similar limited extents, thus making the Scenario 2 assessment also applicable to Scenario 1.</p>		

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	where the overhead line is visible along with the top of Dudgeon Substation.				
VP10 Holme Hale	Holme Hale is a small village located approximately 2km to the south-east of Necton. It is essentially a linear settlement, set across rising landform from north to south, with properties mostly inward looking and enclosure afforded by surrounding tree cover. The representative viewpoint is located on Station Road to the south-east of the Hamlet, where the landform is more elevated. The view extends from this ridge over the valley of the River Wissey to the spur of subtly elevated land where the overhead line forms a readily visible feature along the skyline. The Dudgeon and Necton	<p>The sensitivity of residents and road-users to the proposed project would be medium to low.</p> <p>The value of the view would be medium. The view is not taken from a formal viewpoint and is not representative of any landscape designations.</p> <p>The susceptibility of residents to the operation of the proposed project is low. Views from the village are largely contained by the enclosure of built form and tree cover. The susceptibility of road-users on Station Road is medium to low. The elevated location and relatively open aspect means that views potentially extend to both the National Grid substation extension and onshore project</p>	<p>Scenario 2:</p> <p>The magnitude of change for residents and road-users would be low.</p> <p>The separation distance of approximately 3.4km to the National Grid substation extension and approximately 3.3km to the onshore project substation would limit the scale of the new developments, such that they would appear relatively small, especially seen within the wider panorama of the view. The National Grid substation extension would be set behind the Dudgeon and Necton Substations, such that it would be largely screened and not make a notable difference. The onshore project substation would be screened by intervening mature tree cover, such that only a very small extent of the converter hall would potentially be visible. The limited extent of visibility would lead to a low magnitude of change.</p> <p>Scenario 1:</p> <p>The magnitude of change for residents would be low and for road-users would be medium to low.</p> <p>The Scenario 1 onshore project substation would be partially visible though the intervening tree cover, albeit seen at a range of approximately 3.3km and occupying only a small</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium to low sensitivity and the medium to low or low magnitude of change experienced by road-users and residents would lead to a not significant effect.</p>	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	substations form a small scale and distant feature partly concealed by intervening tree cover. The view is otherwise typically rural with a predominance of arable farmland and small interspersed settlements.	substation, albeit at an oblique angle to the directions of travel.	proportion of a wider view. The National Grid substation extension would occur to the fore of the Dudgeon and Necton Substations and this would raise the magnitude of change to medium to low for road-users, albeit being seen at a range of approximately 3.4km would moderate the overall effect.		
VP11 Hale Road east of Holme Hale Hall	Hale Road is the minor road connecting Bradenham to the east with Holme Hale to the west. The road runs along a low ridge from where views north across the River Wissey valley extend. Arable farmland occupies the land to the north and south of the road, the land to the south comprising also intermittent blocks of woodland, most notably Necton Common woodland seen across the middle ground of the view.	The sensitivity of road-users to the proposed project would be medium to low . The value of the view would be medium. The view is not taken from a formal viewpoint and is not representative of any landscape designations. The susceptibility of road-users on Hale Road is medium to low. The relatively open aspect means that views would extend to the National Grid substation extension, albeit at an oblique angle to the direction of travel.	Scenario 2: The magnitude of change for road-users would be medium to low . The separation distance of approximately 3.2km to the National Grid substation extension would limit the scale of the sites, such that they would appear relatively small, especially seen within the wider panorama of the view. The National Grid substation extension would be seen set behind an area of woodland which would partly screen the wider extent of energy developments in this area. Parts of the onshore project substation would potentially be visible between the trees, in the section of Hale Road to the west of the viewpoint. Comparisons in scale with closer range trees would reduce the perceived scale of the converter halls and this would reduce their perceived prominence in the view. Whilst these distant features would	Scenario 1 and 2: Not significant. The combination of the medium to low sensitivity and the medium to low magnitude of change experienced by road-users would lead to a not significant effect.	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	Mature tree cover also encloses properties and farmsteads set along the road, the viewpoint being located to the east of Holme Hale Hall and west of Pond Farm.		<p>appear at variance with the rural character experienced by road-users, the visual effect of the proposed project would not redefine the character of these views.</p> <p>Scenario 1:</p> <p>The magnitude of change for road-users would be medium to low.</p> <p>The Scenario 1 National Grid substation extension would be more visible owing to less screening from tree cover, although its impact would be moderated by its location coinciding with the existing Necton and Dudgeon substations and the presence of the overhead line. The Scenario 1 onshore project substation would be located to the right of the Norfolk Vanguard onshore project substation, albeit more concealed by intervening close and middle range tree cover.</p>		
VP12 Ivy Todd	Ivy Todd is a hamlet approximately 1.7km east of the village of Necton. It comprises a cluster of residential properties and Ivy Todd Farm set within the valley of the unnamed river that flows from north to south to join the River Wissey. The hamlet is largely enclosed by tree cover	<p>The sensitivity of residents to the proposed project would be medium.</p> <p>The value of the views of residents is medium. The hamlet is not covered by a conservation area designation and the surrounding landscape is not covered by any scenic designations, which would otherwise indicate a</p>	<p>Scenario 2:</p> <p>The magnitude of change for residents of Ivy Todd would be medium to low.</p> <p>The photomontage in Figure 29.46b shows that from the viewpoint, located at the central crossroads in the village, there would be no visibility of the project as it would be screened by intervening mature tree cover and landform. This is the only publicly accessible point in the hamlet from which a potential view would be gained (views further north on Lodge Lane are assessed under viewpoints 2 and 3). While there is the potential that the onshore project</p>	<p>Scenario 1 and 2:</p> <p>Not significant.</p> <p>The combination of the medium sensitivity and the medium to low magnitude of change experienced by residents would lead to a not significant effect.</p>	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Change	Significance of Effect	Duration of Effect
	<p>and the majority of the houses are orientated in towards either Ivy Todd Road or Watery Lane. The only readily apparent opening occurs on the north side of the hamlet, where the garden grounds of Lodge Cottage appear open to the north. Lodge Lane extends alongside the unnamed river to the north of the hamlet and views from this path are represented by Viewpoints 2 and 3.</p>	<p>special value. The value relates to the importance of the visual amenity of local residents.</p> <p>The susceptibility of residents' views is medium to low. The settlement is largely enclosed, such that it would be unlikely for residents to gain views of the proposed project from their internal living space, although views may occur from garden grounds, most notably at Lodge Cottage.</p>	<p>substation may be visible from the private garden grounds of Lodge Cottage, this would occur from a range of approximately 0.7km with intervening vegetation and landform reducing the vertical and horizontal extent of the onshore project substation visible. Mitigation planting along the southern side of the onshore project substation would gradually mitigate these effects.</p> <p>Scenario 1:</p> <p>The magnitude of change for residents of Ivy Todd would be medium to low.</p> <p>While the Scenario 1 onshore project substation would not be visible from much of the village, there is the possibility that visibility may arise from the private garden grounds at Lodge Cottage, albeit at an oblique angle and with partial screening from vegetation.</p>		

29.7.6 Potential Impacts during Decommissioning

186. This section describes the potential impacts of the decommissioning of the onshore project area with regard to impacts on landscape and visual receptors. Further details are provided in Chapter 5 Project Description.
187. No decision has been made regarding the final decommissioning policy for the onshore cables, as it is recognised that industry best practice, rules and legislation change over time. It is likely the onshore cables would be pulled through the ducts and removed, with the ducts themselves left in-situ in order to minimise further ground disturbance.
188. In relation to the onshore project substation and National Grid substation extension, the programme for decommissioning is expected to be similar in duration to the construction phase. Under Scenario 1 and Scenario 2, the detailed activities and methodology would be determined later within the project lifetime, but are expected to include:
- Dismantling and removal from site of outside electrical equipment located outside of the onshore project substation buildings and at the National Grid substation extension;
 - Removal of cabling from sites;
 - Dismantling and removal of electrical equipment from within the onshore project substation buildings;
 - Removal of main onshore project substation building and minor services equipment;
 - Demolition of the support buildings and removal of fencing at onshore project substation and National Grid substation extension;
 - Landscaping and reinstatement of the sites (including land drainage); and
 - Removal of areas of hard standing.
189. Whilst details regarding the decommissioning of the onshore project substation are currently unknown, considering the worst case assumption (which would be the removal and reinstatement of the current land use at the site) it is anticipated that the impacts would be similar to or less than those assessed during construction. The difference at the decommissioning phase would be that mitigation planting would have matured over 30 years of the indicative design life and therefore screen the decommissioning works from many of the surrounding landscape and visual receptors.
190. The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the project so as to reflect current guidance, policy and legislation at that point. Any such methodology would be agreed with the relevant authorities

and statutory consultees. The decommissioning works could be subject to a separate licensing and consenting approach.

29.8 Cumulative Impacts

191. The cumulative assessment of landscape and visual impacts considers the potential for cumulative impacts to arise as a result of the project in conjunction with other developments.
192. Projects identified for potential cumulative impacts were agreed as part of the Norfolk Boreas PEIR consultation. These projects, as well as any relevant development applications submitted since this consultation have been considered and their anticipated potential for cumulative impact are detailed in Table 29.14.

Table 29.14 Summary of projects considered for the CIA in relation to LVIA

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
National Infrastructure Planning							
Norfolk Vanguard Offshore Wind Farm	Application submitted	Expected construction 2020 to 2025	0 – projects are co-located	Full ES available: https://infrastructure.planninginspectorate.gov.uk/projects/eastern/norfolk-vanguard/?ipcsection=docs	High	Yes under Scenario 1	Under Scenario 1 Norfolk Boreas onshore project substation and National Grid substation extension would be sited adjacent to the respective onshore infrastructure of Norfolk Vanguard. There is the potential significant cumulative effects may arise in combination with this project under Scenario 1 and therefore it is included in the CIA.
Hornsea Project Three Offshore Wind Farm	Application submitted	Expected construction start date 2021. Duration 6 to 10 years dependent on phasing.	0 – cable intersects project 32km between substation locations	Full ES available: https://infrastructure.planninginspectorate.gov.uk/projects/eastern/hornsea-project-three-offshore-wind-farm/?ipcsection=docs	High	Yes under Scenario 2	Hornsea Project Three Offshore Wind Farm onshore cable route would cross the Norfolk Boreas onshore cable route to the north-east of Reepham and construction compounds would be located near disused Oulton Airfield. Other Hornsea Project Three onshore infrastructure would be sited in distant locations from Norfolk Boreas onshore infrastructure. Under Scenario 2, there is the potential significant cumulative effects may arise in conjunction with this project and therefore it is included in the CIA. Under Scenario 1, the potential for a significant cumulative effect to arise is limited by the construction works being largely reduced to cable pulling.

¹ Shortest distance between the considered project and Norfolk Boreas – unless specified otherwise.

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
Dudgeon Offshore Wind Farm	Commissioned	Constructed	0	http://dudgeonoffshorewind.co.uk/	High	No (considered in main assessment)	National Grid substation extension sited adjacent to constructed and operational Dudgeon Substation. This development is operational and is therefore included as part of the baseline conditions within the main assessment above and not included in the CIA.
A47 corridor improvement programme – North Tuddenham to Easton	Pre-application (application due 2020)	Start works April 2021 Open May 2023	26.7	https://highwaysengland.co.uk/projects/a47-north-tuddenham-to-easton-improvement-scheme/	Medium	No	A47 improvement works would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
A47 corridor improvement programme – A47 Blofield to North Burlingham	Pre-application (application due 2019)	Start works 2021 Open 2022	25	https://highwaysengland.co.uk/projects/a47-blofield-to-north-burlingham/	Medium	No	As above.
A47 corridor improvement programme – A47 / A11 Thickthorn Junction	Pre-application (application due 2019)	Start works 2021 Open 2023	18	https://highwaysengland.co.uk/projects/a47-thickthorn-junction/	Medium	No	As above.

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
Norwich Western Link	Pre-application	Expected construction start late 2022	2.8	https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/norwich/norwich-western-link	Medium	No	The Norwich Western Link works would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
Third River Crossing (Great Yarmouth)	Pre-application (application due 2019)	Expected construction start in late 2020 Open early 2023	28	https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/great-yarmouth/third-river-crossing	Medium	No	The Third Crossing works at Great Yarmouth would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
King's Lynn B Power Station amendments	Approved	Expected construction start 2019 to 2022	28	https://www.kingslynnbccgt.co.uk/	Medium	No	The Kings Lynn B Power Station amendment works would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
North Norfolk District Council							
PF/17/1951 Erection of 43 dwellings and new access with associated landscaping, highways and external works	Approved	Anticipated Q2 2018	0.7	Application available: https://idoxpa.north-norfolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=_NNORF_DCAPR_92323	High	No	Development at Laundry Loke in North Walsham would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The site is situated in the centre of the town and surrounded by urban development. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
Bacton and Walcott Coastal Management Scheme	Approved	Expected construction start date Spring 2019	1.0	Public information leaflets available: https://www.north-norfolk.gov.uk/media/3371/bacton-to-walcott-public-information-booklet-july-2017.pdf	Medium	No	Bacton Coastal Protection Scheme would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
Coastal defence/protection works, Happisburgh PF/18/0751	Approved	Coastal protection over 10 year duration from August 2018	0.12	https://idoxpa.north-norfolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=_NNORF_DCAPR_93543	Medium	No	Coastal Defence / Protection Works at Happisburgh would have a limited influence on the cumulative situation owing to the relatively small scale and intermittent nature of the works and their separation distance from the Norfolk Boreas onshore infrastructure. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
Breckland Council							
Erection of 85 Dwellings with Associated Open Space 3PL/2018/1246/F	Awaiting Decision	Application received 04/10/18.	1.26	http://planning.breckland.gov.uk/OcellaWeb/planningDetails?reference=3PL/2018/1246/F&form=planningSearch	Medium	No	Development at Rectory Road in Swanton Morley would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure, as a result of the extent of intervening built development and tree cover. The potential for significant cumulative effects to arise in conjunction with this project are limited and therefore it is not included in the CIA.
Residential development of 40 No. units comprising a mix of housing types, accommodati	Approved	Application approved 11/02/19. Construction must begin within 2 years.	1.42	http://planning.breckland.gov.uk/OcellaWeb/planningDetails?reference=3PL/2018/0993/F&fro	Medium	No	Development off Hall Road in Bawdeswell would have a limited influence on the cumulative situation owing to separation distance and limited inter-visibility with Norfolk Boreas onshore infrastructure as a result of the extent of intervening built development and tree cover. The potential for significant cumulative effects

Project	Status	Development period	¹ Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
ng open space and appropriate associated infrastructure with vehicle access via Hall Road 3PL/2018/099 3/F				m=planningSe arch			to arise in conjunction with this project are limited and therefore it is not included in the CIA.

193. In summary, the following projects will be assessed for potential direct cumulative impacts:

Scenario 1

- Norfolk Vanguard Offshore Wind Farm

Scenario 2

- Hornsea Project Three Offshore Wind Farm.

194. Under Scenario 1, the developments most relevant to the CIA for the Norfolk Boreas onshore project substation and National Grid substation extension is the Norfolk Vanguard onshore project substation and associated National Grid substation extension. Under Scenario 1, these developments would already be operational and while they therefore form part of the baseline assessment, the CIA considers the combined effect of these developments with the Norfolk Boreas onshore project substation and National Grid substation extension in more detail. Necton National Grid substation and Dudgeon substation form part of the baseline assessment but are also referenced in the 'in combination' CIA.
195. The cumulative scenario considered in the assessment comprises these developments in the context of the existing Necton National Grid substation and Dudgeon substation. For the Norfolk Boreas onshore cable route, the potential for significant effects to arise in relation to Hornsea Project Three would be limited by the small scale; limited extents and short-term nature of the cable pulling.
196. Under Scenario 1, whilst there is the potential for a cumulative effect to arise in respect of the landfall construction of Norfolk Boreas and Norfolk Vanguard taking place concurrently, it is unlikely that the cumulative effect would be significant. This would relate to the relatively small scale of the construction works and the close proximity of the sites. These factors combined with the fact that the two developments would comprise the same construction works occurring at the same time would mean they would appear as one development and this would notably reduce the cumulative effect.
197. Under Scenario 2, Norfolk Vanguard would not be constructed and therefore there would be no onshore project infrastructure to contribute to a cumulative effect. Under Scenario 2, there would, however, be the potential for cumulative effects to arise between the construction of the Norfolk Boreas and Hornsea Project Three onshore cable routes.
198. The approach to CIA follows a two-stage process. Firstly, all the impacts from previous sections are presented in Table 29.15 below and assessed for potential to act cumulatively with other projects. Secondly, a detailed assessment of these

potential cumulative impacts is carried out in Table 29.17 and Table 29.18 in respect of the relevant landscape and visual receptors.

Table 29.15 Potential cumulative impacts

Impact associated with Norfolk Boreas	Potential for cumulative impact	Proximity between projects	Rationale
Construction at landfall	Yes	Norfolk Boreas adjacent to Norfolk Vanguard.	Under Scenario 1, there is the option for Norfolk Boreas landfall construction works to take place at the same time as the Norfolk Vanguard landfall construction works. There would, therefore, be potential for a cumulative effect, although unlikely to be significant and therefore not assessed in detail.
Construction of onshore cable route	No	Norfolk Boreas onshore cable route coinciding with Norfolk Vanguard onshore cable route (Scenario 1 only).	Under Scenario 1, the Norfolk Vanguard DCO application would include for the laying of Norfolk Boreas ducts. As the construction works would take place concurrently and as part of the same application there would be no cumulative effect.
	Yes	Hornsea Project Three onshore cable route to cross Norfolk Boreas onshore cable route north of Reephham.	Under Scenario 2, there is the potential that the construction of the Hornsea Project Three onshore cable route would be constructed at the same time as the Norfolk Boreas onshore cable route. There would be the potential for significant cumulative effects to arise. Under Scenario 1, the potential for cumulative effects to arise would be very limited owing to the limited extent of works associated with the onshore cable pulling. The cumulative effects of Scenario 1 in conjunction with Hornsea Project Three are therefore not considered further in this CIA.
Construction of onshore project substation, National Grid substation extension and overhead line modification	No	Norfolk Boreas onshore project substation, National Grid substation extension and overhead line modification works in proximity to Norfolk Vanguard onshore project substation, National Grid substation extension and overhead line modification works.	Under Scenario 1, the construction of the Norfolk Vanguard onshore project substation and National Grid substation extension would not take place at the same time as the construction of the Norfolk Boreas onshore project substation and National Grid substation extension. There would be no cumulative effect during the two construction phases.

Impact associated with Norfolk Boreas	Potential for cumulative impact	Proximity between projects	Rationale
Operation of landfall	No	Norfolk Boreas landfall adjacent to Norfolk Vanguard landfall.	Under Scenario 1, during the operational phase of Norfolk Boreas landfall, there would be no visible elements other than very small-scale link boxes. There would be no potential for significant cumulative effects to arise.
Operation of onshore cable route	No	Hornsea Project Three onshore cable route to cross Norfolk Boreas onshore cable route north-east of Reepham.	During the operational phase of Norfolk Boreas onshore cable route, there would be no visible elements other than link boxes and the re-establishing gaps in hedgerows. There would be no potential for significant cumulative effects to arise.
Operation of onshore project substation and National Grid substation extension	Yes under Scenario 1	Norfolk Boreas onshore project substation and National Grid substation extension adjacent to Norfolk Vanguard onshore project substation and National Grid substation extension.	Under Scenario 1, Norfolk Vanguard onshore project substation and National Grid substation extension, and Norfolk Boreas onshore project substation and National Grid substation extension would be operational concurrently and this could give rise to significant cumulative effects.
Decommissioning	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. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

199. Table 29.17 presents the potential cumulative impacts in respect of the construction phase of Norfolk Boreas onshore cable route in conjunction with the Hornsea Project Three onshore cable route (under Scenario 2). Table 29.18 presents the cumulative impacts of the operational phase of Norfolk Vanguard onshore project substation and associated National Grid substation extension with the operational phase of the Norfolk Boreas onshore project substation and National Grid substation extension (under Scenario 1).
200. Under Scenario 1, visualisations show the Norfolk Vanguard onshore project substation and associated National Grid substation extension in conjunction with Norfolk Boreas onshore project substation and National Grid substation extension (Figures 29.23 to 29.46). These represent the views from local visual receptors and are shown both without mitigation planting and with mitigation planting 20 years into the operational phase.

201. Table 29.15 above highlighted how Scenario 1 cumulative effects would relate to Norfolk Boreas in conjunction with Norfolk Vanguard and how Scenario 2 cumulative effects would relate to Norfolk Boreas in conjunction with Hornsea Project Three. Table 29.16 below provides an assessment of the potential cumulative impacts under Scenario 1. Some of the viewpoints are discounted from the detailed cumulative assessment owing to the limited extent to which the Norfolk Boreas or Norfolk Vanguard onshore project substations or National Grid substation extensions would be visible, either as a result of distance, the screening effect of intervening woodland or the screening effect of the substations on one another. In these instances, the impacts are assessed as not significant. The shaded cells in the table indicate which viewpoints are to be assessed in detail.

Table 29.16 Preliminary assessment of potential cumulative visual impacts

Viewpoint	Influence of cumulative developments	Potential for significant cumulative effects
VP1 Ivy Todd Road west	Norfolk Boreas and Norfolk Vanguard onshore project substations would be visible from this viewpoint and associated section of the road.	Yes – there is the potential for a significant cumulative effect to arise.
VP2 Lodge Lane south	Norfolk Boreas and Norfolk Vanguard onshore project substations and National Grid substation extensions would be visible from this viewpoint and associated section of path.	Yes– there is the potential for a significant cumulative effect to arise.
VP3 Lodge lane north	Norfolk Boreas and Norfolk Vanguard onshore project substations and National Grid substation extensions would be visible from this viewpoint and associated section of path.	Yes– there is the potential for a significant cumulative effect to arise.
VP4 A47 Necton Substation	Only Norfolk Vanguard National Grid substation extension would be readily apparent from this viewpoint and associated section of the A47.	No - no other cumulative developments would be visible.
VP5 A47 Spicer's Corner	Norfolk Boreas and Norfolk Vanguard onshore project substations and National Grid substation extensions would be visible from this viewpoint and associated section of road.	Yes – there is the potential for a significant cumulative effect to arise.
VP6 A47 Top Farm	Norfolk Boreas and Norfolk Vanguard onshore project substations and National Grid substation extensions would be visible from this viewpoint and associated section of road.	Yes – there is the potential for a significant cumulative effect to arise.
VP7 Ivy Todd Road east	While Norfolk Boreas and Norfolk Vanguard onshore project substations would be visible from this viewpoint the limited extent of visibility would limit the potential for a significant cumulative effect to arise.	No – limited potential for significant cumulative effects to arise owing to limited visibility of both developments.
VP8 Chapel Road, Necton	The limited extent of visibility of Norfolk Boreas and Norfolk Vanguard onshore project substation would limit the potential for a significant cumulative effect to arise.	No – limited potential for significant cumulative effects to arise owing to limited visibility of both developments.

Viewpoint	Influence of cumulative developments	Potential for significant cumulative effects
VP9 St Andrews Lane, Necton	Norfolk Boreas National Grid substation extension would not be visible from this viewpoint but would potentially be visible from associated properties in the area. Visibility of Norfolk Vanguard National Grid substation extension would be limited.	No – limited potential for significant cumulative effects to arise owing to limited visibility of Norfolk Vanguard National Grid substation extension.
VP10 Holme Hale	Norfolk Boreas National Grid substation extension would be visible from this viewpoint but owing to the limited visibility of Norfolk Vanguard National Grid substation extension, would be limited potential for a significant cumulative effect to arise.	No – limited potential for significant cumulative effects to arise owing to limited visibility of Norfolk Vanguard National Grid substation extension.
VP11 Hale Road east of Holme Hale Hall	Norfolk Boreas National Grid substation extension would be visible from this viewpoint but owing to the limited visibility of Norfolk Vanguard National Grid substation extension, the potential for a significant cumulative effect to arise would be limited.	No – limited potential for significant cumulative effects to arise owing to limited visibility of Norfolk Vanguard National Grid substation extension.
VP12 Ivy Todd	Norfolk Vanguard onshore project substation may be partly visible from very localised parts on the northern edge of the hamlet. Visibility of Norfolk Boreas onshore project substation would be limited and the National Grid substation extensions would not be visible.	No – limited potential for significant cumulative effects to arise owing to limited visibility of Norfolk Vanguard and Norfolk Boreas onshore project substations.

29.8.1 Cumulative Impacts during construction - Onshore Cable Route

202. The cumulative impact of the onshore cable route in conjunction with Hornsea Project Three onshore cable route during the construction phase would relate to the presence and activity of the construction plant, the presence and activity of trenchless crossing and associated compounds, the presence of the trenches and associated compounds and running tracks, and the influence these would have on landscape character and visual amenity.
203. The Hornsea Project Three onshore cable route, shown as part of the ES submission indicates an intersection with the Norfolk Boreas onshore cable route to the north-east of Reepham in an agricultural area to the north of Marriott's Way and south of Salle Park. The Hornsea Project Three onshore cable corridor follows a north to south alignment from Weybourne on the north coast to Swardeston to the south of Norfolk, while the Norfolk Boreas onshore cable route follows an east to west alignment from Happisburgh to Necton. It is only in this one location that the onshore cable routes intersect.

204. Under Scenario 2, the construction of the Norfolk Boreas onshore cable route would comprise an initial stage during which the trench would be excavated, the ducts installed and the ground reinstated, and a later stage, during which the cables would be pulled through the ducts. Although the overall construction window for the onshore cable route is 2 years, construction works would occur in this area for two short periods during the earlier and later stages. The likelihood of these works coinciding with a similar programme of works for Hornsea Project Three is limited, but a potential overlap of construction works has been assessed to ensure the worst case assumption is considered. The onshore cable route of either Norfolk Boreas or Hornsea Project Three may require trenchless crossing to pass under the ducts of the other onshore cable route. In the WCA, Norfolk Boreas would use trenchless crossing and this would necessitate trenchless crossing compounds which would appear as a more notable feature than the construction of the cable trench. If either project were not to progress to construction, there would be no need for a trenchless crossing and there would be no cumulative effect.
205. While there is also the potential for a significant cumulative effect to arise in respect of the proximity of the Hornsea Project Three construction compound, potentially to be located at Oulton Airfield, and the Norfolk Boreas construction compound, potentially to be located south of Heydon Road to the south-east of Oulton Airfield, this potential is moderated by the baseline character of these locations. Both are characterised by large areas of concrete hardstanding and the presence of farm buildings. The use of these locations for the storage of materials and plant, as well as possibly site offices, welfare facilities and associated temporary infrastructure, would present a limited magnitude of change as these locations already constitute developed farmland and the change in appearance would not be as pronounced were they located on greenfield land. Furthermore, visibility of the Norfolk Boreas construction compound would be largely limited to road-users on Heydon Road, from which the mature and well-tended hedgerows and hedgetrees would be likely to form an effective screen. There is, therefore, limited potential for a cumulative effect to arise in respect of the construction compounds.
206. Under Scenario 2, the cumulative impact of the construction of the Norfolk Boreas onshore cable route and Hornsea Project Three onshore cable route would relate principally to the following features of the proposed projects.
- The effect on landscape character and visual amenity owing to the presence of the two onshore cable routes crossing in this area.
 - The effect on landscape character and visual amenity owing to the presence of two mobilisation areas associated with Hornsea Project Three.

- The effect on landscape character and visual amenity owing to the trenchless crossing and associated trenchless compounds required by Norfolk Boreas under the WCA.
 - The effect of the re-establishment of hedgerows over cable easements.
207. Mitigation measures associated with the onshore cable route would comprise planting as outlined in section 29.7.1. This would involve the re-establishment of hedgerows where removals had occurred and the reinstatement of the agricultural land. Based on information presented within Hornsea Project Three Offshore Wind Farm ES, Hornsea Project Three have made the commitment to implement similar mitigation measures following construction of their onshore cable route and associated infrastructure.
208. Table 29.17 shows the detail of the assessment for each receptor. In summary, under Scenario 2, the construction of the Norfolk Boreas onshore cable route in addition to the Hornsea Project Three onshore cable route would have a short term significant cumulative effect on the views of walkers on an approximate 200m section of Marriott's Way, but would not have significant effects on the remaining parts of this route or on any other landscape or visual receptors, including nearby Salle Park and the B1145.

Table 29.17 Potential cumulative impacts during construction - onshore cable route

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
Onshore cable route – Landscape Receptors					
Salle Park	<p>Salle Park is a designated landscape in Historic England’s ‘Register of Parks and Gardens’. It is located approximately 2km north-east of Reepham and to the immediate north of the B1145 with minor roads to the west and east. The surrounding landscape comprises arable farmland and the landform falls gently from south-west to north-east. The designed landscape is set around Salle Hall, an 18th century Palladian country house, and includes formal gardens and a walled kitchen garden. Historic England’s description states ‘it enjoys a very rural setting and is almost entirely surrounded by dense perimeter plantations.’ This enclosure limits the visual association between the designed landscape and the surrounding landscape although the south-east drive emerges at the corner closest to the proposed project and a</p>	<p>The sensitivity of Salle Park to the proposed project is medium to high.</p> <p>The value of Salle Park is high. Its inclusion in the Register of Parks and Gardens denotes its national importance.</p> <p>The susceptibility of Salle Park to the proposed project is medium. The designed landscape is enclosed by dense woodland such that there is no visibility of the landscape to the east where the mobilisation area would be located and the south-east where the onshore cable route construction would take place. The only potential for visibility would occur from the south-east corner where the gated entrance to the south-east drive occurs, although its recessed location within mature tree cover combined with the hedgerow enclosure along the B1145 would limit any such potential.</p>	<p>The cumulative magnitude of change on Salle Park as a result of the proposed project would be low.</p> <p>There would be no visibility of the proposed project from the designed landscape owing to the maturity and density of the perimeter planting along the southern and eastern boundaries. At the south-east gated entrance, the potential for visibility is limited by enclosing tree and hedgerow cover, and if visibility were to occur the construction works would appear relatively small in scale. While the Norfolk Boreas mobilisation area, trenchless compounds and onshore cable route construction would potentially have an impact on the setting of the designed landscape, from the B1145, where the impacts would occur, the hedgerows would screen much of the construction works with the exception of where a 13m to 16.5m break would be formed at the crossing point.</p> <p>The Hornsea Project Three mobilisation area to the south of the</p>	<p>Not significant.</p> <p>The combination of the medium to high sensitivity and the low magnitude of change would lead to a not significant effect. The mature enclosure around Salle Park means that both projects would have an almost negligible effect on views from within and a low effect on the setting of the designated landscape.</p>	<p>Short term and reversible in respect of onshore cable route construction.</p> <p>Medium term and reversible in respect of presence of the mobilisation area and hedgerow re-establishment.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	gothic cottage, Cawston Lodge, is located on the opposite side of the B1145 to this entrance.		south-west corner of Salle Park would potentially be visible from the small open section of the designed landscape located adjacent to the B1145, but would not give rise to a cumulative effect.		
Onshore cable route – Visual Receptors					
B1145 (west of Cawston)	The B1145 connects King’s Lynn in the west with Mundesley in the east. The onshore cable route would cross the B1145 approximately 200m north-east of Reepham and then again to the immediate east of Salle Park, where a mobilisation area would also be located. The B1145 to the north-east of Reepham is mostly enclosed by mature and continuous hedgerow, such that views beyond the road are limited. A more open section occurs around the bend to the west of Salle Park where views south open up. To the east of Salle Park, the north side of this section of the B1145 is enclosed by hedgerow. This	The sensitivity of the views of road-users on this section of the B1145 is medium . The value of the views from the road is medium. There are no formal viewpoints and the views are not representative of a designated landscape. Views towards the wooded boundary of Salle Park are evident to west-bound road-users and this adds to the value although the designed landscape is screened by the trees. The views are largely enclosed by roadside vegetation, and this reduces the susceptibility of road-users to the proposed project in the adjacent fields. Glimpsed views would, however, be experienced, to	The cumulative magnitude of change on road-users as a result of the Norfolk Boreas onshore cable route in addition to the Hornsea Project Three onshore cable route would be medium to low or no effect . Whilst the presence of the mobilisation area to the east of Salle Park would give rise to a singular significant effect, as assessed in the main assessment in Table 29.9, there would be no influence from Hornsea Three Project along this section and therefore there would be no cumulative effect. To the west of Salle Park, where the B1145 bends towards the south, the absence of hedgerow ensures an open view for road-users towards the mobilisation area and onshore cable route of Hornsea Project Three. The separation distance	Not significant. The combination of the medium sensitivity and the medium to low magnitude of change would lead to a not significant effect. Although the two projects would come into close proximity to each other and the B1145, the limited extent to which they would be seen in combination limits the potential for a significant cumulative effect to arise.	Short term and reversible in respect of onshore cable route construction. Medium term and reversible in respect of mobilisation area and hedgerow re-establishment.

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	forms an almost continuous screen to road-users, apart from where a 15m opening occurs, which allows views across the adjacent arable farmland. The vegetation on the south-side is more fragmented with sections of hedgerow and scrubber vegetation, such that some views into the adjacent young woodland plantation can be gained.	reveal the presence of the Norfolk Boreas mobilisation area to the north of the B1145 and the Hornsea Project Three mobilisation area and the Norfolk Boreas trenchless compounds to the south, albeit from the sections to the east and west of Salle Park respectively.	of Norfolk Boreas onshore cable route combined with the relatively small scale of its construction works would mean the cumulative magnitude of change would be medium to low. As the B1145 approaches Reepham, the enclosure of the hedgerow on either side of the road would limit visibility of both projects and it would only be the 13m to 16.5m sections removed on either side for the construction of Norfolk Boreas onshore cable route that would add to the cumulative effect. The limited extent of the removals and the screening of the wider operations would ensure a magnitude of change of medium to low.		
Marriott's Way	Marriott's Way connects Norwich and Aylsham along disused railway lines. It passes into the 1,045m wide study area to the west of Aylsham and follows the south-west alignment of the cable route over an approximate 13km stretch, before it passes out of the study area to the west of Reepham. Those sections of relevance to this assessment	The sensitivity of the views of recreational users on Marriott's Way is medium to high . Marriott's Way is a long distance recreational route which connects with NCR 1 near Reepham. The sections of route within the study area are not located within or overlooking any national, regional or local scenic designations or recognised	The cumulative magnitude of change as a result of the addition of the proposed project to the cumulative situation would be medium to low . The most notable impact would occur to the north of Marriott's Way where the construction of the onshore cable routes of Hornsea Project Three and Norfolk Boreas would be seen in conjunction, with construction compounds associated with trenchless crossings. Hornsea Project Three	Not significant with the exception of a localised significant effect over an approximate 200m section centred on the intersection with the Hornsea Project Three onshore cable route. The combination of the medium to high	Short term and reversible in respect of onshore cable route construction. Localised significant cumulative effects lasting the short term of overlapping

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	<p>occur to the east of Reepham, where the Norfolk Boreas onshore cable route comes close and the Hornsea Project Three onshore cable route intersects the path.</p> <p>The section of Marriott's Way to the east of Reepham is largely enclosed by mature tree cover, often dense in parts albeit potentially with some gaps from which glimpsed views of the surrounding arable farmland to the north and south is visible. The character along this section of Marriott's Way is typically rural with little development evident other than typical small scale rural development. At either end the urban areas of Reepham and Cawston, present a contrasting built-up character.</p>	<p>scenic views which might signify heightened value.</p> <p>The susceptibility of recreational users on this route is influenced by the potential proximity and level of visibility of the onshore cable routes. Hornsea Three Project would cross Marriott's Way to the south of Salle Park, while the Norfolk Boreas would run parallel to the path, in the arable farmland to the north.</p> <p>The expectations of recreational users of this route would typically be to enjoy the rural landscape and this increases their susceptibility to the construction works, which overall is considered to be medium to high.</p>	<p>would use trenchless crossing to pass under Marriott's Way. Whilst the construction of the Norfolk Boreas onshore cable route, singularly would not have a notable effect on Marriott's Way, in addition to the effects of the Hornsea Project Three, the cumulative magnitude of change would be medium to low. This effect would be moderated by the extent of enclosure around much of the path and the separation distance between the path and the onshore cable route.</p>	<p>sensitivity and the medium to low magnitude of change would lead to a significant effect.</p> <p>The effect on the remainder of the route would be not significant largely owing to the enclosure around the route and separation distance from construction works.</p>	<p>construction phases, reducing to not significant post construction.</p> <p>Medium term and reversible in respect of the re-instatement of hedgerows.</p>

29.8.2 Cumulative Impacts during operation- onshore project substation and National Grid substation extension

209. The cumulative impact of the onshore project substation and the National Grid substation extension in conjunction with Norfolk Vanguard onshore project substation and associated National Grid substation extension during the operational phase would relate to the presence of the sites and their component parts, and the influence these would have on landscape character and visual amenity. Under Scenario 1, the Norfolk Boreas onshore project substation would be located to the immediate east of the Norfolk Vanguard onshore project substation. The Norfolk Boreas National Grid substation extension would be located to the east, while the Norfolk Vanguard National Grid substation extension would be located to the west.
210. The cumulative impact of the Norfolk Boreas onshore project substation and National Grid substation extension with the Norfolk Vanguard onshore project substation and its associated National Grid substation extension would relate principally to the following features of the proposed projects.
- The effect on landscape character and visual amenity owing to the presence of the two adjacent onshore project substations; each occupying a site of 250m x 300m, fenced and surfaced with converter halls up to 19m in height, and lightning protection masts to 25m.
 - The effect on landscape character and visual amenity owing to the presence of the Norfolk Boreas National Grid substation extension (135m x 150m) and Norfolk Vanguard National Grid substation extension (200m x 150m) both up to 15m in height.
 - The effect of the re-establishment of hedgerows over cable easements and woodland planting adjacent to the A47.
 - The effect of mitigation planting, associated with both Norfolk Vanguard and Norfolk Boreas, in terms of its screening of the onshore project substations and National Grid substation extensions.
211. Mitigation measures associated with the onshore project substation and National Grid substation extension would comprise planting and earthworks as described in section 29.7.1 and illustrated on Figures 29.9a and 29.10b (Scenario 1) and Figures 29.19, 29.20b and 29.21b (Scenario 2).
212. Table 29.18 shows the detail of the assessment for each receptor. In summary, under Scenario 1, the onshore project substation and National Grid substation extension for Norfolk Boreas in conjunction with the onshore project substation and associated National Grid substation extension for Norfolk Vanguard would have a significant cumulative effect on landscape character in the localised parts of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau

Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU but would not have significant effects on the remaining parts and all other LCUs. In respect of the representative viewpoints, significant cumulative effects would arise from Lodge Lane to the immediate south of the site and a very localised section of Ivy Todd Road to the south-west. These effects would all occur within 1.2km of the onshore project substation, making them localised.

213. Embedded mitigation planting for Norfolk Boreas and Norfolk Vanguard would be expected to reduce the cumulative visual effects from Viewpoint 2 – Lodge Lane south, and Viewpoint 3 – Lodge Lane north, over the first 20 years of operation. It would achieve a sufficient height, relative to the scale of the onshore project substations, to mitigate the effects on the views of walkers on this path.

Table 29.18 Potential cumulative impacts during operation - onshore project substation

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
Plateau Farmland LCT – Pickenham Plateau LCU	<p>The National Grid substation extensions would be located in the Pickenham Plateau LCU, the Norfolk Vanguard onshore project substation in the River Wissey LCU to the immediate east and the Norfolk Boreas onshore project substation in the Beeston Plateau further east. This LCU covers an extensive plateau area extending across the north-west of the study area. The National Grid substation extensions would be located in the southern most ‘spur’ which lies to the immediate west of the narrow River Wissey Tributary Farmland. This spur forms a relatively level area of land which has been utilised for the development of Necton National Grid substation and Dudgeon substation. The overhead line extends along this spur to the north-west. The LCU is characterised by large fields of arable with limited enclosure. The A47 has a localised influence on the southern part of the spur,</p>	<p>The sensitivity of this LCU to the cumulative effects of the project is medium. The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure. The susceptibility of the LCU to the cumulative effects is medium. Although the National Grid substation extensions would be located in this LCU, and the two onshore project substations in the adjacent LCUs, it would occupy only a localised part of the much wider LCU. The susceptibility is moderated by the existing influence from the Necton National Grid substation, Dudgeon substation, and associated overhead lines in this localised part of the LCU and the modified nature of the farmland across the wider LCU.</p>	<p>The cumulative magnitude of change would be medium to high within the local area, medium within the surrounding area and low or no effect across the wider LCU. The cumulative magnitude of change would be medium to high owing to the scale and extent of the additional Norfolk Boreas National Grid substation extension in this LCU, despite the existing influence on landscape character from Norfolk Vanguard National Grid substation extension, Necton National Grid substation and Dudgeon substation. Collectively these developments would form one very large energy development in this LCU. The presence of Norfolk Vanguard onshore project substation and Norfolk Boreas onshore project substation in the adjacent LCUs would form a second large scale cluster, which would have indirect effects on the character of the LCU by increasing the spread of energy developments into the adjacent landscape. The clusters would be close enough to prevent the spread of development into the wider landscape, while the gap of approximately 500m</p>	<p>Not significant with the exception of a localised significant effect in the area of the spur. The combination of the medium sensitivity and the medium to high magnitude of change would lead to a significant effect. Tree cover along the A47 would prevent this landscape effect from extending further north across the wider LCU. Mitigation planting around the National Grid substations and substation extensions and onshore project substations would reduce the significant effect to</p>	<p>Long term and reversible. Localised significant cumulative effects lasting for 20 years reducing to not significant for the remaining 10 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	despite the enclosure of tree cover.		would be enough to keep the clusters separate and prevent coalescence into one larger group.	not significant after 20 years of growth.	
Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU	The Norfolk Vanguard onshore project substation would be located in the River Wissey Tributary Farmland LCU, the National Grid substation extensions in the Pickenham Plateau LCU and the Norfolk Boreas onshore project substation in the Beeston Plateau LCU. The landform of the local area is typical of the wider LCU with the valley sides sloping down towards the unnamed river course. The land use is predominantly arable farmland, albeit with a pattern of enclosure which has been eroded in parts. Views are generally medium range, contained within the wider valley with some closer range enclosure where mature woodland and hedgerows occur. Necton National Grid substation and Dudgeon substation are located to the north-west of the onshore project substation sites, which, along with the associated overhead lines establishes	The sensitivity of this LCU to the cumulative effects of the project is medium . The value of the LCU is medium – it is not covered by any landscape designations which might otherwise denote a special value. The landscape has been modified by agricultural practices and hedgerow loss has eroded the historic pattern of enclosure. The susceptibility of the LCU to the cumulative effects is medium. While Norfolk Vanguard onshore project substation would be located in this LCU and Norfolk Boreas onshore project substation in the adjacent Beeston Plateau LCU, their sites would occupy only a small proportion of the much wider LCU and occur in an area that has been modified by intensive farming practices. While the character is predominantly rural, there is a baseline influence from the	The cumulative magnitude of change would be medium to high within the local area, medium within the surrounding area and low or no effect across the wider LCU. The cumulative effect on the LCU would relate to the direct effect of the Norfolk Vanguard onshore project substation and the indirect effects of the Norfolk Boreas onshore project substation, National Grid substation extensions, Necton National Grid substation and Dudgeon substation in adjacent LCUs. The concentration of these large scale energy developments, in and around this LCU, would collectively detract from the strength of the underlying rural character, despite there being a baseline influence from existing energy developments in the Pickenham Plateau LCU. The scale and extent of these developments would give rise to a local landscape defined by energy developments.	Not significant with the exception of a localised significant effect in the area defined by the A47 to the north, Great Wood and Smuggler’s Lane to the east, Necton National Grid Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. The combination of the medium sensitivity and high magnitude of change would lead to a significant effect. Mitigation planting around the National Grid substations and substation extensions and onshore project	Long term and reversible. Localised significant cumulative effects lasting for 20 years reducing to not significant for the remaining 10 years of the 30 year indicative design life.

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	energy developments as a part of the baseline landscape.	existing Necton National Grid substation, Dudgeon substation and associated overhead lines.		substations would reduce the significant effect to not significant after 20 years of growth.	
Plateau Farmland LCT – Beeston Plateau LCU	The Norfolk Boreas onshore project substation would be located in the Beeston Plateau LCU, the Norfolk Vanguard onshore project substation in the adjacent River Wissey Tributary Farmland LCU and the National Grid substation extensions in the Pickenham Plateau. The distinction between the LCUs in this transitional area is subtle, with the landform rounding off from the steeper valley into the flatter plateau. The land use is similarly arable farmland and enclosure is mostly complete, albeit with some loss causing a larger field pattern in parts. This local area is characterised by the mature Necton Wood in the adjoining Tributary Farmland LCU and other blocks in the Plateau Farmland LCU to the north and south.	<p>The sensitivity of this LCU to the cumulative effects of the onshore project substations is medium.</p> <p>The value of the LCU is medium – it is not covered by any landscape designations which would otherwise denote a special value.</p> <p>The susceptibility of the LCU to the cumulative effects of the project is medium. While Norfolk Boreas onshore project substation would be located in this LCU and Norfolk Vanguard onshore project substation in the adjacent Tributary Farmland LCU, their sites would occupy only a small proportion of the much wider LCUs and occur in an area that has been modified by intensive farming practices. While the character is predominantly rural, there is a baseline influence from the existing Necton National Grid</p>	<p>The magnitude of change would be medium to high within the local area, medium within the surrounding area and low or no effect across the wider LCU.</p> <p>The cumulative effect on the LCU would relate to the direct effect of the Norfolk Boreas onshore project substation and the indirect effects of the Norfolk Vanguard onshore project substation, National Grid substation extensions, Necton National Grid substation and Dudgeon substation in adjacent LCUs. The concentration of these large scale energy developments, in and around this LCU, would collectively detract from the strength of the underlying rural character, despite there being a baseline influence from existing energy developments in the Pickenham Plateau LCU. The scale and extent of these developments would give rise to a local landscape defined by energy developments.</p>	Not significant with the exception of a localised significant effect in the area defined by the A47 to the north, Great Wood and Smuggler’s Lane to the east, and the LCU boundary to the west and south. The combination of the medium sensitivity and the medium to high magnitude of change. Mitigation planting around the National Grid substations and substation extensions and onshore project substations would reduce the	<p>Long term and reversible.</p> <p>Localised significant cumulative effects lasting for 20 years reducing to not significant for the remaining 10 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
		substation, Dudgeon substation and associated overhead lines.		significant effect to not significant after 20 years of growth.	
VP1 Ivy Todd Road west	<p>This viewpoint is located on Ivy Todd Road, midway between the village of Necton and the hamlet of Ivy Todd at a point where a gated access track leads north through the adjacent farmland. The view is intended to be representative of the views of road-users, although the road is enclosed by mature hedgerows along much of its length, such that views are largely contained. This gated opening provides one of the few glimpsed views towards the onshore project substation sites. Located on a localised high point, the landform falls away to the north-east where Norfolk Vanguard and Norfolk Boreas onshore project substations would be located. Necton National Grid substation and Dudgeon substation are not readily visible from this viewpoint, although the overhead line is.</p>	<p>The sensitivity of road-users on this minor road to the cumulative effects of the project would be medium. The value of the view would be medium to low. The view is not from a formal viewpoint and is not representative of any designated landscapes. The susceptibility of road-users would be medium. While much of the road is enclosed by hedgerow, the alignment of this opening means that east-bound road-users would experience this view, albeit for a very short duration. In winter months, filtered views through the hedgerow may be experienced and if the hedgerow were to be cut low, wider views would perhaps open up from the elevated section near the viewpoint.</p>	<p>The cumulative magnitude of change would be medium over an approximate 10m section where the field opening occurs and low or no effect over all remaining parts. The photomontage in Figure 29.23d shows how the onshore project substations would be located along the ridgeline on the opposite side of the valley. Norfolk Vanguard would be seen to the fore of Norfolk Boreas and would screen almost half of Norfolk Boreas, with intervening planting adding to the reduced visibility, which in turn would moderate the cumulative effect. The combined effect would, nonetheless, appear notable, owing to the broad horizontal extent and the prominence of the HVDC converter halls, especially where they extend above the treeline. The onshore project substations would appear at variance with the rural character of the baseline view, owing to their large mass and scale. The extent of the medium cumulative magnitude of change would be contained within the very short section</p>	<p>Significant over an approximate 10m section where the field opening occurs. The combination of the medium sensitivity and the medium cumulative magnitude of change would lead to a localised significant effect. The effect on views from the remainder of Ivy Todd Road between Necton and Ivy Todd would be not significant. Mitigation planting around the onshore project substations would reduce the significant effect to not significant after 25 years of growth.</p>	<p>Long term and reversible. Localised significant cumulative effects lasting for 25 years reducing to not significant for the remaining 5 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
			of road from which this open view would be experienced. From the remainder of the road between Necton and Ivy Todd the magnitude of change would be low, negligible or no effect, although there is potential that this could increase in elevated sections if hedgerows were cut low.		
VP2 Lodge Lane south	<p>This viewpoint is located on Lodge Lane to the north of the hamlet of Ivy Todd. It looks north-east across the arable farmland towards the onshore project substation sites at a range of approximately 610m. The view is representative of the views of walkers in this area and features the Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, form readily apparent developments along the skyline to the north-east. The view to the north is contained in the middle range by the subtle relief of the landform and enclosure of hedgerows. Hedgerows and tree cover are depleted within the farmland but more substantial around Ivy Todd to the south.</p>	<p>The sensitivity of walkers on Lodge Lane to the cumulative effects of the project is medium.</p> <p>The value of the view is medium to low. The view is not from a formal viewpoint and is not representative of any landscape designations. The existing Necton National Grid substation, Dudgeon substation and overhead line are evident, and these make large scale electricity development a feature of the baseline views from Lodge Lane.</p> <p>The susceptibility of walkers is medium. Access on the lane provides only a short walk as it does not connect with the wider PRow network. The experience of walkers is already influenced by the existing</p>	<p>The cumulative magnitude of change would be medium to high.</p> <p>Figure 29.24d shows how Norfolk Vanguard and Norfolk Boreas would both be seen at their longest horizontal extent, which, when combined, would occupy almost all of the 53.5-degree frame. The cumulative effect would, however, be moderated by the partial screening formed by intervening landform and vegetation. The convex shape of the landform means that the majority of the onshore project substations would be located over the ridgeline. The more southerly parts, which would be readily visible, would be partly screened by intervening vegetation. These factors reduce the prominence of the onshore project substations, especially in respect of Norfolk Boreas on the right. The comparison with the closer range vegetation would also</p>	<p>Significant over the approximate 550m southern section of Lodge Lane. The combination of the medium sensitivity and the medium to high magnitude of change would lead to a localised significant effect.</p> <p>Effect not significant and beneficial after 20 years as mitigation planting would enhance visual amenity of area.</p> <p>The effects on the remaining northern part of Lodge Lane</p>	<p>Long term and reversible.</p> <p>Localised significant cumulative effects lasting for 20 years reducing to not significant for the remaining 10 years of the 30 year indicative design life.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
		electricity developments although this viewpoint would be closer to the onshore project substations.	help to reduce the perceived scale of the HVDC converter halls. The horizontal spread would nonetheless be notable and the cumulative magnitude of change would be medium to high for much of the length of Lodge Lane owing to the relatively open views. The National Grid substation extension would not add to the cumulative magnitude of change, because of its location to the rear of the existing National Grid and Dudgeon Substations, which would largely screen its extent.	are assessed under Viewpoint 3 below.	
VP3 Lodge lane north	This viewpoint is located at the northern end of Lodge Lane to the north of the hamlet of Ivy Todd. It is not a PRoW but is shown on OS mapping as a route with public access. The view looks north towards the mature tree cover that encloses Lodge Farm. The view is representative of the views of walkers in this area and features Necton National Grid substation and Dudgeon substation which, along with the associated overhead line, form readily apparent developments	The sensitivity of walkers on Lodge Lane to the cumulative effects of the project is medium . The value of the view is medium to low. The view is not from a formal viewpoint and is not representative of any landscape designations. The existing Necton National Grid substation, Dudgeon substation and overhead line are evident, and these make large scale electricity developments a	The cumulative magnitude of change as a result of the operational project would be medium to low. Figure 29.25d shows how Norfolk Boreas onshore project substation would be mostly concealed by intervening landform and vegetation, such that only parts of the lightning protection masts would be visible to the right of the mature trees that enclose Lodge Farm, with parts of the converter halls visible from further south on the path. The cumulative effect of these onshore project substations would be medium to low. While collectively they span a notable	The cumulative effect would be not significant in the northern section of Lodge Lane for approximately 250m. The combination of the medium sensitivity and medium to low cumulative magnitude of change would lead to a not significant effect.	Long term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	along the skyline to the north-east. To the north, the view is contained in the middle range by the subtle relief of the landform and enclosure of hedgerows. Hedgerows and tree cover are depleted within the farmland but more substantial around Ivy Todd to the south.	feature of the baseline views from Lodge Lane. The susceptibility of walkers is medium. Access on the lane provides only a short walk as it does not connect with the wider PRow network. The experience of walkers is already influenced by the existing electricity developments although this viewpoint would be close to the onshore project substations.	horizontal extent along the ridgeline, the extent to which they are screened by intervening landform and vegetation notably reduces their combined effect. The limited visibility of Norfolk Vanguard and Norfolk Boreas limits the overall potential for a notable cumulative effect to arise. While the Norfolk Boreas National Grid substation extension would add to the cumulative magnitude of change owing to its location to the east of the Dudgeon Substation and Necton Substation, the existing influence of these developments combined with the extent to which the extension would integrate with the existing electrical infrastructure would moderate the cumulative effect.	Effect beneficial after 20 years as mitigation planting would enhance visual amenity of area.	
VP5 A47 Spicer's Corner	This viewpoint is located opposite Spicer's Corner layby on the A47. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some open sections where views into the adjacent landscape can be experienced, mitigation planting associated with the Dudgeon substation	The sensitivity of road-users on the A47 to the cumulative effects of the project is medium to high . The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and	The magnitude of change from the adjacent sections of the A47 would be medium to low . The photomontage in Figure 29.27d shows how Norfolk Vanguard would be located to the fore of Norfolk Boreas with such a substantial overlap that only the left third of Norfolk Boreas would be visible. The limited visibility of Norfolk Boreas would limit the potential for a cumulative effect to arise as the effects would relate	Not significant. The combination of the medium to high sensitivity with the medium to low cumulative magnitude of change would lead to a not significant effect. The extent to which the Norfolk Boreas	Medium term and reversible.

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	<p>onshore works will add further to the screening effect over time. The opening provides a view that at most would be glimpsed by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent. The existing Necton National Grid substation, Dudgeon substation and the overhead line are readily apparent in this view but not apparent to road-users on the adjacent section of the A47.</p>	<p>nearby laybys are largely enclosed by tree cover. The susceptibility of road-users to the effects of the onshore project substations is medium to high. The extent of tree removal along the southern side of the A47 during the construction phase would open up the views of road-users and while mitigation planting associated with the Dudgeon Substation, established along the southern side of the A47, would reduce visibility, the opening at the access would allow views towards the operational onshore project substations.</p>	<p>principally to Norfolk Vanguard on its own and not the cumulative effect of both substations combined. By the operational phase, mitigation planting associated with the Dudgeon Substation, located along the southern side of the A47, would have reached a sufficient height to largely screen the views of road-users from the wider extent where vegetation removal would have occurred. Views towards the onshore project substation would occur from the approximate 20m to 25m wide site access opening which would potentially be reduced in extent over time as mitigation planting at either side matures. This would still be enough of an opening for road-users to get a view of the cumulative developments, albeit, transitory at speed and at an oblique angle.</p>	<p>onshore project substation would be screened by Norfolk Vanguard onshore project substation would limit the potential for a cumulative effect to arise. Effect beneficial after 10 years as mitigation planting would enhance visual amenity of area.</p>	
VP6 A47 Top Farm	<p>This viewpoint is located west of the layby on the A47 to the west of the access road to Top Farm. It represents the views of road-users on the A47 which are filtered by bare trees in the winter and screened by leafed trees in the summer. While there are some open sections, mitigation planting associated</p>	<p>The sensitivity of road-users on the A47 to the cumulative effect of the onshore project substations is medium. The value of the views from the A47 is medium. The A47 is not a 'scenic route' and this section does not pass through any landscape designations. There are no formal viewpoints and</p>	<p>The magnitude of change from the adjacent sections of the A47 would be low. The photomontage in Figure 29.28d shows how distant intervening vegetation would screen much of Norfolk Boreas onshore project substation and the left third of Norfolk Vanguard. The very limited visibility of Norfolk Boreas would reduce the</p>	<p>Not significant. The combination of the medium sensitivity and low cumulative magnitude of change would lead to a not significant effect. The extent to which Norfolk Boreas would be</p>	<p>Long term and reversible.</p>

Receptor	Baseline	Sensitivity	Magnitude of Cumulative Change	Significance of Cumulative Effect	Duration of Cumulative Effect
	<p>with the Dudgeon substation onshore works will add substantially to the screening effect over time. This gap in the enclosure provides a view that at most would be glimpsed by passing road-users travelling at speed. The view is of arable farmland with hedgerow and woodland enclosure and expansive in extent. Necton National Grid substation, Dudgeon substation and the overhead line to the right of the view, establish large-scale energy developments as part of the baseline character, although visibility from the adjacent section of the A47 would be limited.</p>	<p>nearby laybys are largely enclosed by tree cover. The susceptibility of road-users to the cumulative effects of the onshore project substations is medium to low. While roadside vegetation aligns the road between the layby and Viewpoint 5, it is thin and fragmented in parts and views through to the adjacent landscape occur, albeit fleeting and experienced whilst in transit at high speeds.</p>	<p>potential for a cumulative effect to arise and the visual effect would relate to the singular effect of Norfolk Vanguard onshore project substation. Glimpsed views would occur as road-users pass gaps in the roadside vegetation, but these would be short in duration and at an oblique angle to the direction of travel.</p>	<p>screened by distant intervening tree cover and both Norfolk Boreas and Norfolk Vanguard would be screened by the A47 roadside planting, would notably reduce the potential for a cumulative effect to arise. Effect beneficial after 10 years as mitigation planting would enhance visual amenity of area.</p>	

29.8.3 Cumulative Impacts during decommissioning

214. Decommissioning of Norfolk Vanguard and Hornsea Project Three may potentially take place at the same time as Norfolk Boreas. Under Scenario 1 and Scenario 2, the detail and scope of the decommissioning works for Norfolk Boreas will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.

29.9 Inter-relationships

215. Table 29.19 lists out the inter-relationships between this chapter and other chapters within the ES.

Table 29.19 Chapter topic inter-relationships

Topic and description	Related Chapter	Where addressed in this Chapter	Rationale
Onshore Ecology	Chapter 22	Section 29.7 (all impacts); section 29.7.1 (embedded mitigation)	Both chapters consider the potential effects of hedgerow and tree removals, the LVIA considering the impact on hedgerows and trees as landscape elements, and the Onshore Ecology assessment considering the impact on hedgerows and trees as important ecological assets. Both chapters consider the mitigation of hedgerow and tree loss in respect of proposals to replant.
Onshore Archaeology and Cultural Heritage	Chapter 28	Section 29.7 (all impacts); section 29.6.3 (landscape designations)	Both chapters consider the potential effects of the project on designated Registered Parks and Gardens and their setting within the landscape.
Tourism and Recreation	Chapter 30	Section 29.7 (all impacts).	Both chapters consider the potential effects of the onshore project substation, National Grid substation extension and overhead line modification on the visual amenity of recreational users in the local area.

216. Alongside the viewpoints considered for the purposes of this chapter from a landscape perspective, a number of ‘heritage-specific’ viewpoints were also identified in consultation with and feedback from the Norfolk County Council Historic Environment Service and Historic England. All viewpoints have taken account of the topography of the landscape within which the project infrastructure will be constructed and operated within this area of Norfolk. Visualisations have been produced from these viewpoints to inform a heritage settings assessment, which is reported on separately in Chapter 28 Onshore Archaeology and Cultural Heritage

and also associated Appendix 28.7 (where the heritage specific viewpoints in relation to heritage setting and the onshore project substation are captured).

29.10 Interactions

217. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The worst case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity, the areas of interaction between impacts are presented in Table 29.20, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 29.20 Interaction between impacts

Potential interaction between impacts						
Construction	1 Loss of agricultural land	2 Loss of hedgerows and trees	3 Changes to landscape character	4 Changes to landscape designations	5 Changes to visual amenity	6 Landscape mitigation
1 Loss of agricultural land	-	Yes	Yes	Yes	Yes	Yes
2 Loss of hedgerows and trees	Yes	-	Yes	Yes	Yes	Yes
3 Changes to landscape character	Yes	Yes	-	Yes	Yes	Yes
4 Changes to landscape designations	Yes	Yes	Yes	-	Yes	Yes
5 Changes to visual amenity	Yes	Yes	Yes	Yes	-	Yes
6 Mitigation measures	Yes	Yes	Yes	Yes	Yes	-
Operation						
	1 Changes to landscape character	2 Changes to landscape designations	3 Changes to visual amenity	4 Landscape mitigation		
1 Changes to landscape character	-	Yes	Yes	Yes	Yes	
2 Changes to landscape designations	Yes	-	Yes	Yes	Yes	
3 Changes to visual amenity	Yes	Yes	-	Yes	Yes	

Potential interaction between impacts						
Construction	1 Loss of agricultural land	2 Loss of hedgerows and trees	3 Changes to landscape character	4 Changes to landscape designations	5 Changes to visual amenity	6 Landscape mitigation
4 Landscape mitigation	Yes	Yes		Yes	-	

29.11 Summary

29.11.1 Construction

29.11.1.1 Landfall

218. The landfall construction works would be the same under Scenario 1 and Scenario 2, with locations in the same area to the south of Happisburgh. The findings below, therefore, relate to both scenarios.
219. The landfall construction would be relatively small in scale and this explains the very localised extent of the effects, contained within an area of approximately 300m. The landscape character of the Bacton to Sea Palling Coastal Plains LCU as a whole, would not be significantly affected owing to the relatively small scale of the construction works, while the very localised landscape character around the landfall would be significantly affected, albeit only during the short term construction period. Walkers on the Norfolk Coastal Path would be significantly affected in the very localised section adjacent to the landfall, while walkers on the wider extent of the route would remain unaffected. Walkers on PRoW RB22 would also be significantly affected owing to the close proximity of this route to the landfall. Residents in Happisburgh would not be significantly affected, with the exception of residents of the southern extent of Lighthouse Lane, which is the closest part of the settlement to the landfall. The construction works would last a maximum of 20 weeks, making the effects short term. Reinstatement of the majority of the agricultural land at the end of this period would make the effects largely reversible.

29.11.1.2 Onshore Cable Route

220. Under Scenario 1 and Scenario 2, the construction works along the onshore cable route would be different. Under Scenario 1 the ducts for the Norfolk Boreas cables would already have been installed under the Norfolk Vanguard DCO application. The construction phase would, therefore, principally involve the pulling through of the cables and construction of jointing pits. Under Scenario 2, construction works would involve the excavation of trenches and laying of ducts, as well as the pulling through of cables and construction of jointing pits. The construction works associated with Scenario 1 would be limited in terms of their scale, extent and duration and, therefore, would be unlikely to give rise to significant effects.

221. Under Scenario 2, the onshore cable route construction works would be relatively small in scale giving rise to very localised effects, many of which are associated with the more notable mobilisation areas. Owing to the cultivated nature of the land, the relatively small sections of hedgerows and very small number of trees to be removed, the effect of the onshore cable route construction on agricultural land, trees and hedgerows would be not significant with the exception of select instances where a small number of good condition hedgerows or trees would be removed.
222. Blickling Hall and Salle Park RPGs are located within the onshore study area. However, neither will be significantly affected by the project. There are no other designated sites within the onshore cable route study area. In terms of road-users, significant effects would occur within localised sections of the A47, A149, B1146, B1147, A1067, B1145 (west of Cawston), Heydon Road and Lime Kiln Road, and effects would not be significant on all other roads and railways. These effects would relate largely to the presence and activity associated with the mobilisation areas. Walkers on the recreational route of the Wensum Way would experience significant effects, albeit over a very localised extent adjacent to the trenchless crossing (e.g. HDD) compound near the River Wensum. Settlements along the length of the onshore cable route would not be significantly affected, largely owing to a combination of the scale of the construction works, their distance from the settlements and the screening effect of intervening vegetation and built form.
223. All effects from the onshore cable route would occur within a 6 year period, including pre- construction, and would be reversible, with the agricultural land and hedgerows reinstated post construction. A longer term effect would occur where trees could not be replanted in the onshore cable route easement, although very few trees would be removed, and their loss would be offset to some extent by the replanting of hedgerows.

29.11.1.3 Onshore project substation and National Grid substation extension

224. Under Scenario 1 and Scenario 2, the construction of the onshore project substation and National Grid substation extension would not significantly affect the landscape elements of agricultural land and hedgerows. The landscape character of the area would not be significantly affected apart from in the localised areas of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU, in which the onshore project substation or National Grid substation extension would be located or would have a close range influence. Whilst the aspiration would be to implement advanced planting early on in the construction phase, as it is not possible at this stage of the project to confirm in which areas advanced planting would be implemented, the worst case assumption is that all planting would be implemented at the start of the operational phase.

225. In respect of representative viewpoints, under Scenario 1 and Scenario 2, significant effects would be experienced by walkers on Lodge Lane to the immediate south of the site, and by road-users on a very localised section of Ivy Todd Road to the south-west and two sections of the A47 to the north. These effects would all occur within approximately 1.2km of the onshore project substation, making them localised. The effects would be short term and reversible, although effects relating to the presence of the onshore project substation and National Grid substation extension would extend into the operational phase. There would be no significant effects on the views of residents at Ivy Todd and Necton.

29.11.2 Operation

29.11.2.1 Landfall and onshore cable route

226. There would be no significant effects in relation to the landfall and onshore cable route during the operational phase, as the majority of the infrastructure would be buried under ground and therefore would have no effect on landscape character or visual amenity. This forms a notable part of the project's embedded mitigation.

29.11.2.2 Onshore project substation and National Grid substation extension

227. Under Scenario 1 and Scenario 2, the operational phase of the onshore project substation and National Grid substation extension would not significantly affect landscape character, apart from in the localised areas of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU in which the onshore project substation or National Grid substation extension would be located or would have a close range influence.
228. In respect of representative viewpoints, significant effects would be experienced by walkers on the central section of Lodge Lane to the immediate south of the site, and by road-users on a very localised section of Ivy Todd Road to the south-west and a localised section of the A47 to the north. These effects would all occur within approximately 1.2km of the onshore project substation, making them localised. There would be no significant effects on the views of residents at Ivy Todd and Necton.
229. Extensive landscape planting and earthworks would be implemented on the sites of the onshore project substation, National Grid substation extension and around the new A47 junction (in respect of Scenario 2), in order to mitigate localised effects. Landscape planting would comprise mostly woodland planting that would grow to screen or partially screen the onshore components and associated infrastructure of the project.
230. Mitigation planting located around the onshore project substation, National Grid substation extension and A47 junction would mature sufficiently during the

indicative design life of the project to mitigate significant effects. Of the post-construction effects, effects on road-users on the A47 would be mitigated within the first 10 years of operation and effects on walkers on Lodge Lane and on local landscape character would be mitigated within the first 20 years. While the effects on Viewpoint 1 Ivy Todd Road west would take 25 years of the indicative design life to mitigate, the limited extent to which this view is experienced by road-users, moderates this effect.

29.11.3 Cumulative

231. Under Scenario 1, the onshore project substation for Norfolk Boreas and the National Grid substation extension in conjunction with the onshore project substation and National Grid substation extension for Norfolk Vanguard would have a not significant cumulative effect on landscape character, with the exception of the localised parts of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU, in which the onshore project substations or National Grid substation extensions would be located or would have a close range influence. In respect of representative viewpoints, significant cumulative effects would arise in respect of the views of walkers on Lodge Lane to the immediate south of the site and road-users on a very localised section of Ivy Todd Road to the south-west. These effects would all occur within approximately 1.2km of the onshore project substation, making them localised.
232. Mitigation planting located around the onshore project substation, National Grid substation extension and A47 junction would mature sufficiently during the indicative design life of the project to mitigate significant cumulative effects. Of the post-construction effects, cumulative effects on walkers on Lodge Lane and on local landscape character would be mitigated within the first 20 years. While the cumulative effects on Viewpoint 1 Ivy Todd Road west would take 25 years of the indicative design life to mitigate, the limited extent to which this view is experienced by road-users, moderates this effect.
233. Under Scenario 2, the construction of the Norfolk Boreas onshore cable route in addition to the Hornsea Project Three onshore cable route would have a short term significant cumulative effect on the views of walkers on an approximate 200m section of Marriott's Way, but would not have significant effects on the remaining parts of this route or on any other landscape or visual receptors, including nearby Salle Park and the B1145. This effect would be short term and reversible.

29.11.4 Conclusions

234. Table 29.21 below summarises the significant impacts that would potentially arise under Scenario 1 and Scenario 2 as a result of the project but does not present the

‘not significant’ effects. The assessment has shown that the significant effects would occur within localised extents of certain components of the project. Both direct and indirect effects would occur as a result of the presence of components of the project and the influence of their visibility across specific parts of the study area.

235. The LVIA and CIA have demonstrated that despite the scale of the project, under Scenario 1 and Scenario 2, the significant impacts would occur in relatively contained parts of each relevant study area, with the majority of landscape and visual receptors in each study area either undergoing not significant effects or no effect. Furthermore, not all landscape and visual receptors within the defined areas where significant effects would occur would necessarily be significantly affected as the visual influence of the project would be variable across these areas.
236. Under Scenario 1 and Scenario 2 at the landfall and Scenario 2 along the onshore cable route, significant impacts would occur only during the construction phase and not the operational phase, and these effects would be short term in relation to the construction works, and medium term in relation to the re-establishment of hedgerows. The only long term effects would occur in very localised areas where tree removal or the removal of good condition hedgerows or hedgetrees would be required to accommodate the onshore cable route. The vast majority of trees and hedgerows along the 60km route would remain unaffected owing to careful siting.
237. There would be no significant cumulative impacts in relation to either the landfall or the onshore cable route, with the exception of a localised and short term significant cumulative effect under Scenario 2 and arising in respect of walkers on a short section of the Marriott’s Way walking route to the south-west of Salle Park, where Hornsea Project Three onshore cable route would have a cumulative influence.
238. Under Scenario 1 and Scenario 2 and in respect of the onshore project substation and National Grid substation extension, the extent of the significant impacts and significant cumulative impacts would be largely contained within the local landscape, partly owing to the extent of existing woodland cover to the north and east and rising landform to the south. Effects on visual amenity would be limited largely owing to the enclosure of hedgerows along roads and around settlements. Significant effects and significant cumulative effects would be contained within 1.2km of the onshore project substation and National Grid substation extension.
239. Of all the visual receptors which occur around the onshore project substation and National Grid substation extension, significant impacts have been assessed in relation only to road-users on two short sections of the A47 and at a brief opening on Ivy Todd Road and in relation to walkers on Lodge Lane. Post construction, embedded mitigation in the form of landscape planting would mitigate these localised effects within 10 years in respect of the views from the A47, 20 years in

respect of the views from the central section of Lodge Lane and 25 years in respect of the opening on Ivy Todd Road west. In respect of local landscape character, effects would be gradually mitigated as planting grows during the indicative design life, with the assessment that by 20 years of operation, significant impacts would be mitigated. Once mitigated, the impacts would become beneficial as the mitigation planting would enhance the local visual amenity.

Table 29.21 Potential significant impacts for landscape and visual receptors (excludes not significant impacts)

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Scenario 1 and Scenario 2: Construction – Landfall						
Potential impact on landscape character relating to landfall construction.	Coastal Plain LCT – Bacton to Sea Palling.	Medium to high	Medium to high or medium between the ridge on which Happisburgh Lighthouse sits in the north and PRoW Happisburgh RB22 in the south. Low or no effect across remainder of LCU.	Significant between the ridge on which Happisburgh Lighthouse sits in the north and PRoW Happisburgh RB22 in the south. Not significant across remainder of LCU.	Land reinstated post construction.	None. Effect short term and reversible, relating to construction phase.
Potential impact on visual amenity of walkers relating to landfall construction.	Walkers on Norfolk Coastal Path	High	Medium to high or medium between Happisburgh coastal car park and PRoW Happisburgh RB22. No effect across remainder of path.	Significant between Happisburgh coastal car park and PRoW Happisburgh RB22. Not significant across remainder of path.	Land reinstated post construction.	None. Effect short term and reversible, relating to construction phase.
Potential impact on visual amenity of residents relating to landfall construction.	Residents in Happisburgh	Medium to high	Medium on Lighthouse Lane. Low or no effect across remaining parts.	Significant on Lighthouse Lane. Not significant across remaining parts of settlement.	Land reinstated post construction.	None. Effect short term and reversible, relating to construction phase.
Potential impact on visual amenity of walkers relating to landfall construction.	Walkers on PRoW RB22	Medium to high	Medium to high along length of PRoW.	Significant along length of PRoW.	Land reinstated post construction.	None. Effect short term and reversible, relating to construction phase.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Scenario 2: Construction - Onshore Cable Route						
Potential impact on landscape element of hedgerows and hedgetrees relating to onshore cable route construction.	Hedgerows and hedgetrees	Medium	Medium to high or medium in respect of mature good quality hedgerows and hedgetrees. Medium to low in respect of poorer quality hedgerows.	Significant where mature good quality hedgerows and hedgetrees are removed. Not significant for all remaining hedgerows.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps. Hedgetrees could not be replanted over cable easements.	None. Effect short term and reversible in respect of hedgerows and most hedgetrees. Significant where good quality hedgetrees are removed. Long term and reversible effect.
Potential impact on landscape element of trees relating to onshore cable route construction.	Trees	Medium to high	Medium to high or medium in respect of specific good quality trees. Medium to low in respect of poorer quality or isolated trees.	Significant where specific good quality trees are removed. Not significant for all remaining trees.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps. (Trees could not be replanted over cable easements.)	Significant where good quality trees are removed and cannot be replaced. Long term and reversible effect.
Potential impact on visual amenity of road-users relating to presence of mobilisation area.	Road-users on Dereham Road (west of Scarning)	Medium	Medium over approximate 120m section. Low or no effect across remaining parts.	Significant over approximate 120m section. Not significant for remaining parts.	Land reinstated post construction.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to	Road-users on A47	Medium	Medium over approximate 150m section.	Significant over approximate 150m section.	Land reinstated post construction.	None. Effect short term and reversible.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
trenchless crossing (e.g. HDD) compounds.	(south-west of Dereham)		Low or no effect across remaining parts.	Not significant for remaining parts.		
Potential impact on visual amenity of road-users relating to mobilisation area.	Road-users on B1146 (north of Dereham)	Medium	Medium to high over approximate 800m section. Low or no effect across remaining parts.	Significant over approximate 800m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 5 - 10 years to infill gaps.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to mobilisation area.	Road-users on B1147 (south of Swanton Morley)	Medium	Medium to high over approximate 200m section. Low or no effect across remaining parts.	Significant over approximate 200m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 5 - 10 years to infill gaps.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to mobilisation area and onshore cable route construction.	Road-users on Lime Kiln Road	Medium	Medium over approximate 1.2km and 200m section. Low or no effect across remaining parts.	Significant over approximate 1.2km and 200m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to mobilisation area.	Road-users on A1067 (west of Sparham)	Medium	Medium over approximate 300m section. Low or no effect across remaining parts.	Significant over approximate 300m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to onshore cable route construction.	Road-users on B1145 (west of Cawston)	Medium	Medium over approximate 70m section. Low or no effect across remaining parts.	Significant over approximate 70m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect short term and reversible.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Potential impact on visual amenity of road-users relating to mobilisation area.	Road-users on Heydon Road	Medium	Medium over approximate 150m section. Low or no effect across remaining parts.	Significant over approximate 150m section. Not significant for remaining parts.	Land reinstated post construction.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to mobilisation area.	Road-users on A149	Medium	Medium over approximate 400m section. Low or no effect across remaining parts.	Significant over approximate 400m section. Not significant for remaining parts.	Land reinstated post construction.	None. Effect short term and reversible.
Potential impact on visual amenity of road-users relating to onshore cable route construction.	Walkers on Wensum Way	Medium to high	Medium to high over approximate 550m section next to mobilisation area and 80m section at crossing point. Low or no effect across remaining parts.	Significant over approximate 550m section and 80m section. Not significant for remaining parts.	Land reinstated post construction. Hedgerows replanted post construction – 5-10 years to infill gaps. Trees could not be replanted over cable easements.	None. Effect short term and reversible.
Scenario 1 and Scenario 2: Construction – Onshore Project Substation and National Grid substation extension						
Potential impact on landscape character relating to project construction.	Plateau Farmland LCT: Pickenham Plateau LCU	Medium	High or medium within local area of spur. Low or no effect across remainder of LCU.	Significant in local area of spur. Not significant across remainder of LCU.	Mitigation planting implemented post construction at latest. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect medium term and reversible.
Potential impact on landscape character relating to project construction.	Settled Tributary Farmland LCT: River Wissey LCU	Medium	High or medium in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid	Significant in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid	Mitigation planting implemented after construction at latest.	None. Effect medium term and reversible.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
			Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. Low or no effect across remainder of LCU.	Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. Not significant across remainder of LCU.	Hedgerows replanted post construction – 3-5 years to infill gaps.	
Potential impact on landscape character relating to project construction.	Plateau Farmland LCT: Beeston Plateau	Medium	High or medium in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Low or no effect across remainder of LCU.	Significant in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Not significant across remainder of LCU.	Mitigation planting implemented post construction at latest. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect medium term and reversible.
Potential impact on visual amenity of road-users relating to project construction.	VP1 Ivy Todd Road (west)	Medium	Medium to high over approximate 10m section. Low or no effect across wider extent of road.	Significant over approximate 10m section. Not significant across wider extent of road.	Mitigation planting implemented post construction at latest. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect medium term and reversible.
Potential impact on visual amenity of walkers relating to project construction.	VP2 Lodge Lane (south)	Medium	High over approximate 400m southern section of lane.	Significant over approximate 400m southern section of lane.	Mitigation planting implemented post construction at latest. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect medium term and reversible.
Potential impact on visual amenity of walkers	VP3 Lodge Lane (north)	Medium	Medium over approximate 250m northern section of lane.	Significant over approximate 250m northern section of lane.	Mitigation planting implemented post construction at latest.	None. Effect medium term and reversible.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
relating to project construction.					Hedgerows replanted post construction – 3-5 years to infill gaps.	
Potential impact on visual amenity of A47 road-users relating to project construction.	VP4 A47 Necton Substation	Medium	Medium over approximate 250m section of A47. Low or no effect across other adjacent sections.	Significant over approximate 250m section of A47. Not significant across remainder of A47.	Existing mitigation planting associated with Dudgeon Substation located to south of A47.	None. Effect medium term and reversible over approximate 300m section.
Potential impact on visual amenity of A47 road-users relating to project construction.	VP5 A47 Spicer's Corner	Medium	Medium to high over approximate 300m section of A47. Low or no effect across other adjacent sections.	Significant over approximate 300m section of A47. Not significant across remainder of A47.	Trees replanted post construction – 10 years to infill gaps. Existing mitigation planting associated with Dudgeon Substation located to south of A47.	None after 10 years. Significant effect long term (10 years) and reversible over approximate 300m section.
Scenario 1 and Scenario 2: Operation – Onshore Project Substation and National Grid substation extension						
Potential impact on landscape character relating to project operation.	Plateau Farmland LCT: Pickenham Plateau LCU	Medium	High or medium within local area of spur. Low or no effect across remainder of LCU.	Significant in local area of spur. Not significant across remainder of LCU.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.
Potential impact on landscape character relating to project operation.	Settled Tributary Farmland LCT: River Wissey LCU	Medium	High or medium in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid Substation and the Necton	Significant in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid Substation and the Necton	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
			ridgeline to the west and Ivy Todd Road to the south. Low or no effect across remainder of LCU.	ridgeline to the west and Ivy Todd Road to the south. Not significant across remainder of LCU.		
Potential impact on landscape character relating to project operation.	Plateau Farmland LCT: Beeston Plateau	Medium	High or medium in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Low or no effect across remainder of LCU.	Significant in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Not significant across remainder of LCU.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.
Potential impact on visual amenity of road-users relating to project operation.	VP1 Ivy Todd Road (west)	Medium	Medium to high over an approximate 10m section of the road. Low or no effect over wider extent of road.	Significant over an approximate 10m section of the road. Not significant across wider extent of road.	Mitigation planting would gradually reduce effect to not significant during the first 25 years of indicative design life.	None after 25 years. Significant effect long term (25 years) and reversible over 10m section.
Potential impact on visual amenity of walkers relating to project operation.	VP2 Lodge Lane (south)	Medium	Medium to high along approximate 400m southern section. Low or no effect over remaining parts of lane.	Significant along approximate 400m southern section.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible over 400m section. Beneficial effect for remaining 10 years.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Potential impact on visual amenity of A47 road-users relating to project operation.	VP5 A47 Spicer's Corner	Medium	Medium to high over approximate 300m section of A47 reducing to low as mitigation planting matures. Low or no effect across other adjacent sections.	Significant over approximate 300m section of A47 reducing to not significant as mitigation planting matures. Not significant across adjacent sections.	Mitigation planting would gradually reduce effect to not significant after 10 years Existing mitigation planting associated with Dudgeon Substation located to south of A47.	None after 10 years. Significant effect long term (10 years) and reversible over 50m section. Beneficial effect for remaining 20 years.
Decommissioning						
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. A decommissioning plan will be provided. As such, impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.						
Scenario 2: Cumulative - Onshore Cable Route Construction						
Potential cumulative impact on visual amenity of walkers relating to Norfolk Vanguard and Norfolk Boreas.	Marriott's Way	Medium to high	Medium to low along approximate 200m southern section of lane. Low or no effect along remaining northern extent of lane.	Significant along an approximate 200m section of path. Not significant along remaining northern extent of path.	Land reinstated post construction. Hedgerows replanted post construction – 3-5 years to infill gaps.	None. Effect short term and reversible.
Scenario 1: Cumulative - Onshore Project Substation Operation						
Potential cumulative impact on landscape character relating to Norfolk Vanguard and Norfolk Boreas.	Plateau Farmland LCT: Pickenham Plateau LCU	Medium	Medium to high within local area of spur. Low or no effect across remainder of LCU.	Significant in local area of spur. Not significant across remainder of LCU.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Potential cumulative impact on landscape character relating to Norfolk Vanguard and Norfolk Boreas.	Settled Tributary Farmland LCT: River Wissey LCU	Medium	Medium to high or medium in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. Low or no effect across remainder of LCU.	Significant in the area defined by the A47 to the north, Great Wood and Smuggler's Lane to the east, Necton National Grid Substation and the Necton ridgeline to the west and Ivy Todd Road to the south. Not significant across remainder of LCU.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.
Potential cumulative impact on landscape character relating to Norfolk Vanguard and Norfolk Boreas.	Plateau Farmland LCT: Beeston Plateau	Medium	Medium to high or medium in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Low or no effect across remainder of LCU.	Significant in the area extending to the A47 to the north, Great Wood and Smuggler's Lane to the east, and the LCU boundary to the west and south. Not significant across remainder of LCU.	Mitigation planting would gradually reduce effect to not significant over first 20 years of indicative design life.	None after 20 years. Significant effect long term (20 years) and reversible in localised area.
Potential cumulative impact on visual amenity of road-users relating to Norfolk Vanguard and Norfolk Boreas.	VP1 Ivy Todd Road (west)	Medium	Medium over an approximate 10m section of the road. Low or no effect across wider extent of road.	Significant over an approximate 10m section of the road. Not significant across wider extent of road.	Mitigation planting would gradually reduce effect to not significant over the first 25 years of indicative design life.	None after 25 years. Significant effect long term (25 years) and reversible over 10m section.
Potential cumulative impact on visual amenity of walkers relating to	VP2 Lodge Lane (south)	Medium	Medium to high along approximate 550m southern section of lane.	Significant along an approximate 550m southern section of lane.	Mitigation planting would gradually reduce effect to not significant	None after 20 years. Significant effect long term

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Norfolk Vanguard and Norfolk Boreas.			Low or no effect along remaining northern extent of lane.	Not significant along remaining northern extent of lane.	after 20 years of indicative design life.	(20 years) and reversible over 550m section. Beneficial effect for remaining 10 years.
Cumulative - Decommissioning						
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. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.						

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