East Anglia ONE North and East Anglia TWO Offshore Windfarms

Applicants' Responses to Examining Authority's Written Questions

Volume 2 – 1.0 Overarching, general and cross-topic questions

Applicants: East Anglia ONE North Limited and East Anglia TWO Limited
Document Reference: ExA.WQ-1.D1.V1_02
SPR Reference: EA1N_EA2-DWF-ENV-REP-IBR-001085 Rev 01

Date: 2nd November 2020
Revision: Version 01
Author: Royal HaskoningDHV

Applicable to East Anglia ONE North and East Anglia TWO

Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
001	02/11/2020	Paolo Pizzolla	Lesley Jamieson / Ian Mackay	Rich Morris

Description of Revisions			
Rev	**Page**	**Section**	**Description**
001	n/a	n/a	Final for Deadline 1

This document is supported by the following appendices:

Appendix number	Title
1	Overview Scale of Outline Landscape Mitigation Plan
2	East Anglia ONE Substation Detailed Design Document
3	Email Correspondence with Whale and Dolphin Conservation
4	Ecological Mitigation Works
5	Email Correspondence with Suffolk Wildlife Trust
6	Illustrative Open Trench and Trenchless Onshore Cable Route
7	Onshore Crossing Schedule
8	Environment Agency Flood Zones
9.1	EA1N Annotated Viewpoint 1
9.2	EA1N Annotated Viewpoint 3
9.3	EA1N Annotated Viewpoint 4
9.4	EA1N Annotated Viewpoint 5
9.5	EA1N Annotated Viewpoint 8
9.6	EA1N Annotated Viewpoint 14
9.7	EA2 Annotated Viewpoint 1
9.8	EA2 Annotated Viewpoint 2
9.9	EA2 Annotated Viewpoint 3
9.10	EA2 Annotated Viewpoint 4
9.11	EA2 Annotated Viewpoint 5
9.12	EA2 Annotated Viewpoint 8
10	Landfall Indicative HDD Working Area
11	Landfall HDD Cross Sections
12	Suffolk Seascape Sensitivity to Offshore Wind Farms Final Report
13	Tourism Impact Review
14	Junction Locations

Glossary of Acronyms

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ADD	Acoustic Deterrent Devices
AEOI	Adverse Effect on Integrity
AIL	Abnormal Indivisible Load
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
ALO	Agricultural Liaison Officer
ANO	Air and Navigation Order
AONB	Area of Outstanding Natural Beauty
APP	Application Document
AST	Assured Shorthold Tenancies
ATC	Automatic Traffic Counts
BCT	Bat Conservation Trust
BEIS	Department of Business Energy and Industrial Strategy
BMV	Best and Most Versatile
BoR	Book of Reference
BT	British Telecom
CA	Compulsory Acquisition
CCS	Construction Consolidation Sites
Cd	Candela
CfD	Contract for Difference
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CION	Connection and Infrastructure Options Note
COCP	Code of Construction Practice
dB	Decibels
DCO	Development Consent Order
DML	Deemed Marine Licence
DMO	Destination Management Organisation
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental Impact Assessment
EM	Explanatory Memorandum
EMP	Ecological Management Plan
ES	Environmental Statement
ESC	East Suffolk Council
ESCA	European Subsea Cables Association
ESDAL	Electronic Service Delivery for Abnormal Loads
ETG	Expert Topic Group
ExA	Examining Authority
ExQs	Examining Authorities First Written Questions
FID	Final Investment Decision
FRA	Flood Risk Assessment
GEART	Guidelines for the Environmental Assessment of Road Traffic
GIS	Gas Insulated Switchgear
GLVIA	Guidelines for Landscape and Visual Impact Assessment
Ha	Hectares
HDD	Horizontal Directional Drilling
HE	Historic England
HGV	Heavy Goods Vehicle

HRA	Habitats Regulations Assessment
ICPC	International Cable Protection Committee
IPSIP	In Principle Site Integrity Plan
Km	Kilometres
kV	Kilovolt
LAT	Lowest Astronomical Tide
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LiDAR	Light Detection and Ranging
LIQ	Land Interest Questionnaire
LLFA	Lead Local Flood Authority
LMP	Landscape Management Plan
LPA	Local Planning Authority
LSE	Likely Significant Effects
LVIA	Landscape and Visual Impact Assessment
M	Metres
MCA	Marine Coastguard Agency
MCTC	Manual Classified Turning Counts
MHWS	Mean High Water Sprints
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MoU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt Hours
NALEP	The New Anglia Local Enterprise Partnership
NATS	National Air Traffic Service
NCTA	National Coastal Tourism Academy
NE	Natural England
NGET	National Grid Electricity Transmission
Nm	Nautical Miles
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OAMP	Outline Access Management Plan
OCTMP	Outline Construction Traffic Management Plan
OFTO	Offshore Transmission Owner
OLEMS	Outline Landscape and Ecological Management Strategy
OMLP	Outline Management and Landscape Plan
ORJIP	Offshore Renewables Joint Industry Programme
OTP	Outline Travel Plan
PD	Procedural Decision
PEIR	Preliminary Environmental Impact Report
PEMP	Project Environmental Management Plan
PIL	Persons with an interest in Land
PPG	Planning Practice Guidance
PRoW	Public Right of Way
PS	Policy Statements
PTP	Port Travel plan
PVA	Population Viability Analysis
RAG	Red Amber Green
RLoS	Radar Line of Sight
RR	Relevant Representation

RSPB	Royal Society for the Protection of Birds
RTD	Red Throated Diver
RWS	Rijkswaterstaat
SAC	Special Area of Conservation
SCC	Suffolk County Council
SCCAS	Suffolk County Council Archaeology Service
SCHAONB	Suffolk Coats and Heaths Area of Outstanding Natural Beauty
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMP	Shoreline Management Plan
SNS	Southern North Sea
SoCG	Statement of Common Ground
SoS	Secretary of State
SPA	Special protected Area
SPR	ScottishPower Renewables
SSSI	Site of Special Scientific Interest
STEM	Science, Technology and Engineering and Mathematics
SuDS	Sustainable Urban Drainage System
SZC	Sizewell C
TCE	The Crown Estate
TH	Trinity House
TMZ	Transponder Mandatory Zone
TP	Temporary Purchase
TPO	Tree Purchase Order
TWT	The Wildlife Trust
UK	United Kingdom
UKCP	United Kingdom Climate Projections
UXO	Unexploded Ordinance
VP	Viewpoint
WQ	Written Question
WR	Written Representation
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

Glossary of Terminology

Applicants	East Anglia TWO Limited / East Anglia ONE North Limited
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
Construction operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
The Councils	East Suffolk Council and Suffolk County Council
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Generation Deemed Marine Licence (DML)	The deemed marine licence in respect of the generation assets set out within Schedule 13 of the draft DCO.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.

Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Meteorological mast	An offshore structure which contains metrological instruments used for wind data acquisition.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
Marking buoys	Buoys to delineate spatial features / restrictions within the offshore development area.
Monitoring buoys	Buoys to monitor *in situ* condition within the windfarm, for example wave and metocean conditions.
National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia TWO / East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia TWO / East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).

Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction, operation and maintenance platform and the offshore electrical platforms.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO / East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre–planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia TWO / East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia TWO / East Anglia ONE North project.
Platform link cable	Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.
Transmission DML	The deemed marine licence in respect of the transmission assets set out within Schedule 14 of the draft DCO.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.0 Overarching, general and cross-topic questions					
1.0.1	The Applicant (Other Interested Parties (IPs)) with an interest in design are requested to comment at Deadline 2.)	1	2	**Good Design** Section 4.5 of the Overarching National Policy Statement (NPS) for Energy (EN-1) emphasises the importance placed on ensuring good design in the development of infrastructure projects. This matter is cross-cutting in relation to multiple topics identified within the Initial Assessment of Principal Issues. Whilst the NPS is the primary source of policy under which the applications will be considered, policy within the National Planning Policy Framework (NPPF) advocates for good design as do the 'Design Principles for National Infrastructure', developed by the National Infrastructure Commission. Could the Applicant outline their approach to good design in respect of the following key elements, focusing on how each element reflects the principles of development responding to setting/place and people: a) offshore wind turbine generators and associated platforms;	A key factor in the UK's success in delivering offshore wind is the flexibility offered by the Rochdale Envelope approach in the consent process. This is recognised by NPS EN-1 (paragraph 4.2.8) as providing the necessary flexibility for further evolution and refinement of project design within the assessed maximum extents. This allows developers to utilise the most up to date technologies, principles and guidance as part of the final project design and at the construction stage. ***Table 6.1*** Good Design, Alternatives and Adaption Policy Compliance of the ***Development Consent and Planning Statement*** (APP-579) provides detail on design against the relevant sections of NPS EN-1. The layout of the windfarm site, including wind turbines, inter-array, platform link cables and offshore platform locations have not yet been specified. Therefore, exact locations are not included in the Application. This is due to the requirement for flexibility on layout pending further ground investigation, detailed design and commercial negotiations, and is one of the purposes of developing a project design envelope. In developing the final layout, the Applicants would aim to minimise environmental impacts (e.g. to ecology and archaeology) and impacts to other users (e.g. shipping and navigation) whilst maximising energy yield and cost efficiency. The reduction in the northern extent of the East Anglia TWO windfarm site following feedback to the Preliminary Environmental Information Report (PEIR) is a clear response

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					to feedback on potential effects (***Appendix 28.1 Seascape, Landscape and Visual Impact Assessment Consultation Responses*** (APP-556)). The Applicants refined the East Anglia TWO windfarm site area to reduce the magnitude of effect on onshore receptors. The reduction in the northern extent of the windfarm site was achieved whilst maintaining its generation capacity. The change resulted in: • Reduced lateral spread of the proposed East Anglia TWO windfarm site; • Reduced effects due to more concentrated grouping of wind turbines than the 'spread-out' and more varied spacing of the PEIR layout; • Increased offshore distance of the windfarm site for onshore receptors; and • Reduced cumulative landscape and visual effects on the Suffolk Coast and Heaths Area of Outstanding Natural beauty (AONB) due to increase in open sea horizon between the Projects' windfarm sites (see ***section 28.3.3*** of ***Chapter 28 Seascape, Landscape and Visual Impact Assessment*** (APP-076) for further details).
				Could the Applicant outline their approach to good design in respect of the following key elements, focusing on how each element reflects the principles of development responding to setting/place and people: b) onshore substations and grid connections;	With regard to the onshore substations, National Grid's Guidelines on Substation Siting and Design (The Horlock Rules) have been taken into consideration during the site selection process. The selected onshore substation location demonstrates good aesthetic as far as possible. Specifically, the selected location avoids all International, National, county and local landscape designations. It does not affect any ancient woodland and mitigation measures ensure hedgerow

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			loss which would occur is compensated for in new planting around the onshore substation (***Outline Landscape and Ecological Management Strategy*** (APP-584)). The site benefits from existing natural screening provided by Grove Wood and Laurel Covert, as well as other smaller tree blocks and hedgerows surrounding the site. These landscape features provide screening principally from the east and create a wooded backdrop in views from other directions, below which the height of the onshore substation and National Grid substation will be contained and in so doing, make a design based contribution to the mitigation of landscape and visual effects. ***Appendix 4.1 East Anglia TWO and East Anglia ONE North Onshore Substations Site Selection RAG Assessment*** (APP-442) provides a detailed narrative of how the site selection for the onshore substations was undertaken. This incorporates design development considerations relating to archaeology, ecology and nature conservation, landscape and visual, hydrogeology and flood risk, engineering and design, community, property and planning. The final location and design of the onshore substations was further refined through phase 2, 3 and 3.5 consultation, preliminary environmental information and expert topic groups (***section 4.9.1*** of ***Chapter 4 Site Selection and Assessment of Alternatives*** (APP-052)). With regards to the grid connection specifically, in line with their duties under Section 9 of the Electricity Act 1989, National Grid are required to undertake an appropriate review through Connection and Infrastructure Options Note (CION)

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					Process, having regard to the specific statutory duties incumbent upon them. In spring 2017, National Grid advised that, due to the changing contracted background and improvements to transmission technology, connection capacity could be available in the Sizewell area. The CION process reviewed all realistic options, and in summer 2017, concluded that the most economic and efficient connections for the Projects, while considering environmental and programme implications, would be into the circuits in the Sizewell and Leiston area (***section 2*** of the ***Development Consent and Planning Statement*** (APP-579)). Note that Requirement 12 of the ***draft DCO*** (APP-023) provides that no stage of the substation can commence until details of the layout, scale and external appearance of the onshore substation have been submitted to and approved by the relevant local planning authority, and the substation construction must then be carried out in accordance with those approved details. The details must accord with the outline onshore substation design principles statement and be within the Order limits. The ***Outline Onshore Substation Design Principles Statement*** (APP-585) was submitted with the Applications and an ***Outline National Grid Substation Design Principles Statemen***t has been submitted at Deadline 1 (ExA.AS-6.D1.V1)
				Could the Applicant outline their approach to good design in respect of the following key elements, focusing on how each element reflects the principles of development responding to setting/place and people:	With regards to the onshore transmission cable and associated infrastructure, the commitment from the Applicants to bury the cables and have no above ground

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				c) the onshore transmission cable, including any above ground ducting/chambers.	infrastructure is one of the key design choices made to minimise impacts. The route of the onshore cable corridor was influenced from the onset of the project design process by the location of designated sites, specifically Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB), The Sandlings SPA and component Leiston-Aldeburgh SSSI. The project design minimises the overlap of the onshore cable corridor with these designated sites, choosing a crossing of The Sandlings SPA at the narrowest point, within habitat where no records of the SPA interest features were found. The Applicants have committed to a reduced working width of 16.1m (reduced from 32m) within Sandlings SPA for a length up to 300m depending on the exact alignment chosen (***section 22.3.3*** of ***Chapter 22 Onshore Ecology*** (APP-070)). Crossing the SPA at the narrowest point also has the effect of minimising duration of impacts to the Suffolk Coast and Heaths AONB. ES ***Figure 21.2*** (APP-269) shows the land cover and the cable route. It shows the avoidance of Urban/residential areas and other buildings & structures in general. The landfall location is also shown, to the north of Thorpness. As such the cable route completely avoids Aldeburgh (south of Thorpness), ensuring that there is no impact on the historic character setting of the edges of the town.
1.0.2	The Applicant	1	2	**Good Design: Substations and Connections North of Friston**	With regards to good design, the onshore substations and National Grid substation have been sited outside the Suffolk Coast and Heaths AONB. The site selection process

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				EN-1 section 4.5 criteria for 'good design' for energy infrastructure states that applying good design to energy projects should produce infrastructure that is sustainable, sensitive to place, efficient in the use of natural resources and energy used in their construction and operation and be matched by an appearance that demonstrates good aesthetics as far as possible. Paragraph 4.5.3 of EN-1 requires applicants to take into account both functionality and aesthetics (including its contribution to the quality of the area in which it would be located) and encourages an applicant to take opportunities to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. • Explain how the criteria set out in EN-1 have been met in the location, layout, design and proposed mitigation in respect of the EA1N, EA2 and National Grid substations and grid connection location north of Friston.	(***Chapter 4 Site Selection and Assessment of Alternatives)*** (APP-052) indicated the onshore substation and National Grid substation could be accommodated at the Grove Wood, Friston site without significant effects on the special qualities of the AONB. The site benefits from existing natural screening provided by Grove Wood and Laurel Covert, as well as other smaller tree blocks and hedgerows surrounding the site. These landscape features provide screening principally from the east and create a wooded backdrop in views from other directions, below which the height of the onshore substation (eastern) and National Grid substation will be mostly contained and, in so doing, contribute to the mitigation of landscape and visual effects. This however will not mitigate views of the onshore substation (eastern) for residents at B1121 Aldeburgh Road, South of Friston. This will also be the case for residents at Grove Road, near Church Road, Friston for the East Anglia ONE North (western) onshore substation. From the outset, the design approach has included careful siting of the onshore substation and National Grid substation, which has set out to avoid key areas of sensitivity wherever possible. The onshore substation location avoids all international, national, county and local landscape designations. Embedded mitigation has included: • Careful siting of the western onshore substation and National Grid substation to the west and south of existing woodland blocks, to gain maximum benefit from existing screening; and

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			• Careful siting of the western substation and National Grid substation in close proximity to the existing overhead lines, to reduce additional cabling requirements and to minimise proliferation of infrastructure. The sensitivity of the landscape and visual receptors in the Landscape Visual Impact Assessment (LVIA) study area has been a key consideration in the siting and design of the onshore infrastructure (***section 29.4.3.2*** of ***Chapter 29 Landscape and Visual Impact*** (APP-077). Furthermore, the capacity of the landscape to accommodate the onshore infrastructure has been assessed in relation to the natural screening afforded by landform, woodlands, trees and hedgerows. To gain a thorough understanding of the landscape's capacity to accommodate change, an assessment of the existing landscape character has been completed (***section 29.5*** of ***Chapter 29 Landscape and Visual Impact***). Mitigation measures associated with the onshore substation and National Grid infrastructure form part of a strategic approach to enhancing landscape character and biodiversity in the local area. Details of the mitigation planting are presented in ***section 29.3.4*** of ***Chapter 29 Landscape and Visual Impact*** and ***section 4*** of the ***Outline Landscape and Ecological Management Strategy*** (OLEMS) (APP-584). ES ***Figure 29.11 Outline Landscape Mitigation Plan (OLMP) General Arrangement*** (APP-401) shows how mitigation planting would contribute to the wider landscape structure of

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					the area and has been designed to screen the onshore project substation and help consolidate green corridors for wildlife. This includes woodland planting of: • Core native woodland; • Screen native woodland mix; • Native woodland edge mix; • Native wet woodland mix; and • • Native hedgerows. Photomontage visualisations showing predicted views of the onshore substation are shown without mitigation and with the landscape mitigation at 15 years post-planting in ES ***Figures 29.13*** (APP-404) to ***29.25*** (APP-416).
1.0.3	The Applicant, East Suffolk Council (ESC), Suffolk County Council (SCC), Historic England, Natural England, AONB Board, Parish Councils,	1	2	**Design Mitigation: Adverse effects** Are the measures set out in section 6.7 of the Environmental Statements (ES) (Onshore Schedule of Mitigation) sufficient to mitigate any adverse effects from the proposed substations and National Grid substation and enable the projects to satisfy the requirements of EN-1, the NPPF and local policies for visual amenity, landscape, public rights of way and heritage matters? a) Provide reasons for your answer. b) If not, what further measures are required?	Demonstration of compliance with EN-1, NPPF and local policies is set out in ***Tables 6.19*** (Onshore Archaeology and Cultural Heritage) and ***Tables 6.22*** (Human Health), ***Tables 6.23*** (Landscape and Visual Impact), and ***6.24*** (Tourism, Recreation and Socio-Economics) of the ***Development Consent and Planning Statement*** (APP-579). The Applicants are of the view that the measures set out in the ***Onshore Schedule of Mitigation*** (APP-575) and detailed in other certified documents are robust and will mitigate adverse effects as far as possible. Further discussion regarding residual significant effects is provided below. It is the Applicants view that the Projects meet the

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
	SASES, SEAS, SEAS, SoS				requirements of EN-1, NPPF and local policies in respect of the overall planning balance. Visual amenity and landscape During operation, potentially significant impacts at the onshore substations and National Grid substation would be largely contained within the local landscape. Significant operational visual effects would be experienced only at Saxmundham Road, Aldeburgh Road, Friston Area C, Grove Road Section B and Suffolk Coastal Cycle Route Section B (***section 29.1.6.3*** of ***Chapter 29 Landscape and Visual Impact Assessment***). Mitigation planting set out in the figures for the ***Outline LMP General Arrangement*** (APP-401), ***Illustrative Plan*** (APP-402) and ***Timing of Planting*** (APP-403) will be introduced and designed with the aim of reducing the identified impacts. ***The General Arrangement*** (APP-401) shows how mitigation planting would contribute to the wider landscape structure of the area and has been designed to screen the onshore project substation and help consolidate green corridors. The planting includes areas of fast growing woodland species as this will provide the height required, as well as the density, to ensure effective screening. The Applicants are in discussion with the LPA to the extent and delivery of early planting as part of the Projects in locations where it is possible to achieve early planting. A final detailed LMP will be produced post-consent which will be approved by the relevant Planning Authority in order to discharge Requirement 14 of the ***draft DCO*** (APP-023).

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			Requirement 14 states that these plans must be produced in accordance with the ***OLEMS*** (APP-584). Through submission and approval of the final LMP, the provision of landscaping associated with the construction and operation of the onshore infrastructure will be formally controlled and implemented. The Applicants are in discussion with the Councils regarding updates to the ***OLEMS*** (APP-584), which will be updated and submitted at Deadline 3. <u>Public Rights of Way</u> Although not specifically referenced in the ***Onshore Schedule of Mitigation*** (APP-575), Public Rights of Way (PRoW) are covered in ***section 3.5.13*** of the ***OLEMS*** (APP-584). The ***OLEMS*** (APP-584) has been developed to take into consideration potential impacts on users of PRoWs at the onshore substation. The ***Outline Public Rights of Way*** (PRoW) ***Strategy*** (APP-581) outlines the management principles to be adopted in ensuring that PRoW are managed in a safe and appropriate manner during construction and operation. Timings of closures and diversions are discussed in ***section 23.3 and 3.3*** of the ***Outline PRoW Strategy*** (APP-581). There are two PRoW within the onshore development area which interact with the Projects on a permanent basis during construction and also during operation. These will require permanent stopping-up and diversion (as listed in ***Table 3.1*** in the ***Outline PRoW Strategy*** (APP-581)) and as shown on the ***Permanent Stopping up of Public Rights of Way Plan*** (APP-014). For PRoW which will be permanently stopped up,

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			as set out in Article 10 of the ***draft DCO*** (APP-023), the existing PRoW cannot be extinguished until the Local Highway Authority confirms that the alternative PRoW has been created to the standard defined in the final PRoW Strategy. Precise details for the management of each PRoW, including the specification of any PRoW temporary diversions required during construction works, will be agreed with the Local Planning Authority (following consultation with the Local Highway Authority) through approval of the final PRoW Strategy prior to commencement of any stage of the authorised development that would affect a PRoW specified in Schedule 3 or 4 of the draft DCO (APP-023). For temporary stopping up of PRoW, Article 11 of the ***draft DCO*** (APP-023) requires the alternative right of way to be in place to the standard defined in the PRoW Strategy, to the reasonable satisfaction of the Local Highway Authority before the existing PRoW can be temporarily stopped up. The Applicants are in discussion with the Councils regarding updates to The ***Outline PRoW Strategy***, ***Temporary*** (APP-013) and ***Permanent*** (APP-014) ***Stopping Up of Public Rights of Way Plans*** which will be submitted at Deadline 3. <u>Onshore Archaeology and Cultural Heritage</u> As described above, an Outline LMP was submitted as part of the ***OLEMS*** (APP-584). The OLMP seeks, among other objectives, to reduce adverse impacts on the heritage assets at Friston. The OLMP has been developed to take into consideration historic landscape and re-establishing historic

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			field boundaries. In areas to the immediate north of Friston, the re-establishment of historic field boundaries, filling gaps in existing hedgerows and introducing field boundary trees has been proposed to provide layered screening, rather than large-scale woodland planting close to the village. This allows the 'setting' of Friston to be retained (rather than being contained by woodland). Reinstatement of hedges with substantial gaps and new field trees are proposed to north of Friston. These proposals focus on the re-establishment of historic field boundary hedgerows / tree lines; as well as tree blocks set back from farmhouses (e.g. Covert woods). The ***OLEMS*** (APP-584) has proposed planting not to enclose the historic farms in woodland, as this is not how they would have been experienced in the past. The reestablishment of historically mapped tree-lined enclosures close to the farms has been proposed, to retain farms in an open farmed landscape, whilst achieving screening through multiple lines of planting. In the area to the north of the onshore substations and National Grid substation, the ***OLEMS*** (APP-584) has proposed the establishment of larger woodland blocks akin to the existing pattern of woodland blocks within the wider landscape. The capacity of the landscape to accommodate the onshore infrastructure has been assessed in relation to the natural screening afforded by landform, woodlands, trees and hedgerows. The onshore substations and National Grid infrastructure is located within a landscape with extensive mature woodland of large scale, which provides some

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					capacity to absorb and provide screening of the onshore infrastructure (***section 29.10.3*** of ***Chapter 29 Landscape and Visual Impact Assessment*** (APP-077). The Applicants are in discussion with the Councils and Historic England regarding updates to the ***OLEMS*** (APP-584), which will be submitted at Deadline 3.
1.0.4	The Applicant, ESC, SCC, Historic England, Natural England, AONB Board, Parish Councils, SASES, SEAS, SEAS, SoS	1	2	**Design Mitigation: Adverse effects - AONB** Is sufficient weight given to the statutory purpose and need for protection of the landscape, character and special qualities of the Suffolk Coast and Heaths AONB both within and from outside its boundary, in accordance with paragraphs 5.9.9 and 5.9.12 of EN-1? a) Provide reasons for your answer. b) If not, what further measures are required?	It is the Applicants' view that sufficient weight has been given to the statutory purpose and need for protection of the landscape, character and special qualities of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB). The ***Development Consent and Planning Statement*** (APP-579), ***Chapter 4 Site Selection and Assessment of Alternatives*** (APP-052) and ***Chapter 28*** *Offshore Seascape, Landscape and Visual Amenity* (SLVIA) (APP-076) details the consideration of the AONB in the siting of the proposed onshore infrastructure and how the Projects may affect the landscape, character and special qualities of the AONB. A key design decision was the site selection for the onshore substation and National Grid substation outside of the AONB. This process is described in***, section 4.9*** of ***Chapter 4*** (APP-052). One of the key site selection principles was to minimise significant impacts on the 'special qualities' of the AONB. The AONB Special Qualities appraisal (detailed in ***Appendix 4.3*** (APP-444) concluded that if the substation(s) were to be sited in the final selected locations, there is likely to be no

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			significant effects on the special qualities of the AONB from onshore infrastructure. With the exception of small marker posts at intervals along field boundaries to indicate the presence of the onshore cables, there will be no above ground infrastructure within the AONB. It is considered that the Projects' effects on the AONB would be restricted to construction of the onshore cables only. ***Section 29.6*** of ***Chapter 29 LVIA*** (APP-077) provides a specific assessment on Suffolk Coast and Heaths AONB. Potential impacts include: • Effects on landscape character; • Effects on landscape elements; • Effects on special qualities; and • Visual effects. ***Chapter 28 Offshore Seascape, Landscape and Visual Amenity*** (SLVIA) (APP-078) of the East Anglia ONE North Application identifies no significant effects on some specific aspects of special qualities as a result of the East Anglia North windfarm site, as experienced along part of the AONB coast. This conclusion is accepted by Natural England in their relevant representation (RR-059). No further consideration of East Anglia ONE North is therefore provided here. *Chapter 28* ***SLVIA*** (APP-076) for East Anglia TWO identifies significant effects on some specific aspects of special

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			qualities as a result of the East Anglia TWO windfarm site, as experienced along part of the AONB coast, however the conclusion in paragraph 340 of (APP-076) states: '*It is not the overall character or physical features of the coastal edges of the AONB that will be changed, but instead it is specific aesthetic/perceptual aspects of its character relating to panoramic views offshore at the coast that will experience change. The construction and operation of the offshore infrastructure will have a relatively low change to the strong overall character of the AONB and will not result in harm to the special qualities of the AONB in overall terms, with the varied and distinctive landscapes of the AONB continuing to define its overall and fundamental character'.* Regarding the statutory purpose of the AONB, the Applicants' intend to submit a full consideration of potential effects at Deadline 2 (*'Effects with Regard to the Statutory Purposes of the Suffolk Coasts and Heaths Area of Outstanding Natural Beauty and Accordance with NPS Policy'*). In essence, the statutory duty, as defined in the Countryside and Rights of Way Act 2000 is for relevant authorities to <u>have regard</u> to the purpose of conserving and enhancing the natural beauty of the AONB (Section 85). This duty to have regard to the purposes of the AONB also applies to development <u>outside</u> designated areas that might affect them, as defined in NPS EN-1 (Para 5.9.12 – 5.9.13): *'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 <u>avoid</u>*

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints'. The Applicants consider that it has clearly had regard to the purpose of conserving the natural beauty of the AONB. In particular, both the onshore infrastructure of the Projects and offshore infrastructure of East Anglia TWO have been 'designed sensitively' in respect of the purpose of conserving the natural beauty the AONB. Design iteration has taken place which has reduced the effect on the AONB, whilst maintaining the generation capacity and commercial viability of the project. The area of the East Anglia TWO windfarm site, and its lateral spread were reduced following stakeholder feedback. The north-south extent of the East Anglia TWO windfarm site was reduced (by 9.68km on the western boundary and 8.03km on the east) in order to mitigate potential seascape effects, without a reduction in wind turbine numbers or generation capacity. This refinement is shown in ***Figure 4.3: Refinement of the East Anglia TWO Windfarm Site Boundary*** of the ES (APP-082). As a consequence, the magnitude of change on seascape, landscape and visual receptors and on the setting and key coastal viewpoints within the AONB was reduced. ***Chapter 28 SLVIA*** (APP-076), confirms that, while a reduction in the defined magnitude of impact (i.e. low / medium / high) has not occurred from all viewpoints, this refinement has resulted in a reduction in the landscape and visual effect of the

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					offshore elements of the East Anglia TWO project, including a reduction in effects on the AONB. This mitigation applied to the East Anglia TWO windfarm site is recognised by Natural England, particularly in respect of the reduced lateral spread of turbines on the skyline and its reduced cumulative effect with East Anglia ONE North (which as highlighted is accepted by Natural England to have no project-alone significant effects on the AONB). The Applicants also note that the reduced maximum turbine height parameter (from 300m to 282m blade tip) provides further mitigation of the apparent height/vertical scale of turbines visible in views from the AONB. The Applicants consider that the Projects have achieved the aim stated in NPS EN-1 to design sensitively given the relevant constraints onshore and offshore and that the East Anglia TWO windfarm site does not compromise the purposes of the AONB designation.
1.0.5	The Applicant	1	2	**Design Mitigation: built enclosures** To what extent is it possible to contain all the activity and installations at the transmission substations and National Grid substation, including activity and installations envisaged to be in openareas, within buildings? If so, what are the technical and economic implications for the proposed development and what scale or size would such buildings need to be? (See also ExQ1.0.11 below.)	The Applicants consider that it is not feasible to contain all activity and installations at the onshore substation within a building. Such a building would need to accommodate clearance distances from the walls and roof to the electrical equipment; space for access for inspection and maintenance purposes; sufficient space to remove and replace individual components; fire rated walls and ceiling; sprinklers or deluge systems; and typical building services such as heating and ventilation. As a consequence, the overall footprint of the onshore substation and height of the buildings would be materially greater than the current design. It is estimated that

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			an additional 3m to 4m in height would be required for a building over and above the proposed height of the external equipment. The footprint would also need to be enlarged by approximately 10-20% to accommodate the building and services and additional separation requirements. The construction of this building or combination of buildings would add significantly to cost and programme and would increase environmental impact during the construction phase (requiring additional materials to be delivered and significantly increasing the solid appearance of the onshore substations). More specifically, the capital cost increase for a fully enclosed onshore substation is significant, estimated at around 50-70% increase depending on the final design. The Applicants have however opted for an intermediate solution that consists of both indoor/enclosed switching equipment (GIS) and outdoor hardware installations (transformers, reactive power compensation).Regarding the National Grid substation, AIS equipment is installed outdoors to allow circulating air to act as a cooling medium. The AIS maximum building height permitted by the ***draft DCO*** (APP-023) is 6m above finished ground level. It is not practicable to construct a 400kV AIS substation indoors due to the footprint of the substation and the need to accommodate clearance distances from the walls and roof to the electrical equipment; space for access for inspection and maintenance purposes; sufficient space to remove and replace individual components; fire rated walls and ceiling; sprinklers or deluge systems; and typical building services such as heating and ventilation.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					GIS equipment is generally installed within buildings. The GIS maximum building height permitted by the ***draft DCO*** (APP-023) is 16m above finished ground level. As per the ***draft DCO*** (APP-023), an AIS substation would require a footprint up to 44,950 m^2 whereas a GIS substation would require a smaller footprint of up to 16,800 m^2. Construction costs of a GIS substation are estimated to be higher than the construction of an equivalent AIS substation, and is typically specified at coastal locations where additional protection is required against the more corrosive sea air, or where a consent requires a GIS solution on environmental grounds. It is noted that the funding of onshore and offshore electricity transmission is subject to a regulatory regime overseen by Ofgem. So far as onshore transmission is concerned the relevant transmission licensees, National Grid Electricity Transmission plc (the owner of the transmission assets in East Anglia), and National Grid Electricity System Operator Limited (the system operator) are both subject to a duty under section 9(2)(a) of the Electricity Act 1989 "to develop and maintain an efficient, co-ordinated and economical system of electricity transmission." The National Grid substation (and indeed the onshore substations) must therefore be delivered in an efficient and economic basis.
1.0.6	The Applicant	1	2	**Sustainable Design** a) Explain the steps that have been taken to ensure the proposed substations and National Grid substation; their security fences; cable sealing-end compounds, pylons and National Grid	As per ***Chapter 5 Environmental Impact Assessment Methodology*** (APP- 053) the Projects are based on a project design envelope (or 'Rochdale Envelope') approach. It is recognised by the Planning Inspectorate (The Planning

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				connections achieve a good quality of sustainable design and are integrated into the landscape and how these measures are secured? b) Explain the measures to be taken to ensure the standard of sustainable design, how these will be maintained through to construction and operation and how they will be secured?	Inspectorate 2018) that, at the time of submitting the applications, offshore wind developers may not know the precise nature and arrangement of infrastructure and associated infrastructure that make up the proposed development. The Applicants have taken steps to achieve a good quality of sustainable design through the incorporating of a Sustainable Urban Drainage Systems (SuDS), extensive landscaping around the onshore substation and National Grid infrastructure location which is designed (in outline form) to reflect the historic landscape in the immediate area; and the incorporation of various measures within the ***draft DCO*** (APP-023) which require detailed plans to be submitted to the relevant planning authority for approval prior to the commencement of construction to ensure appropriate design and mitigation measures are adopted. Such plans include: • Requirement 12: Detailed design parameters; • Requirement 14: Provision of landscaping; • Requirement 17: Fencing and other means of enclosure; • Requirement 21: Ecological Management Plan; • Requirement 25: Control of artificial light emissions during operational phase; • Requirement 26: Control of noise during operational phase; and • Requirement 32: Public Rights of Way.

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			To refine the design envelope approach, Requirement 12 of the ***draft DCO*** (APP-023) requires details of the layout, scale and external appearance of the onshore substation to be approved by the relevant planning authority and must be in accordance with the ***Outline Onshore Substation Design Principles Statement*** (APP-585). Requirement 12 of the ***draft DCO*** (APP-023) also requires details of the layout, scale and external appearance of the National Grid substation to be approved by the relevant planning authority. The Applicants will submit an Outline National Grid Substation Design Principles Statement to Examination at Deadline 1 and will amend the ***draft DCO*** (APP-023) at Deadline 3 to require the layout, scale and external appearance of the National Grid substation to be in accordance with the ***Outline National Grid Substation Design Principles Statement*** which has been submitted at Deadline 1 (ExA.AS-6.D1.V1). Requirement 12 of the ***draft DCO*** (APP-023) also includes the maximum height of buildings, external electrical equipment, lightning protection masts and the maximum fenced compound area of the onshore substations and the National Grid substation. Requirement 12 is considered by the Applicants to be an appropriate mechanism by which to allow the post consent/pre-construction refinement of the Projects' design which will be influenced by supply chain engagement and engineering parameters such as ground conditions.

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			Acknowledging that the onshore substation and National Grid substation must function efficiently and safely as substations, the ***Outline Onshore Substation Design Principles Statement*** (APP-585) includes for the following measures to be incorporated within the final design process: • Continued engagement with Parish Councils, local residents and the Councils on design and landscape proposals; • A design review of the landscape and building design proposals (i.e. Design Council or Shape East); • Consideration of 'Good Design' in line with the requirements of Overarching National Policy Statement for Energy (NPS-EN-1); • Use of appropriate building design and materials; • Refinement of landscape planting proposals along with the substation building design and layout of ancillary structures; • Incorporation of ecological mitigation and enhancement considerations; • Incorporation of site won material into landscaping bunds; • Improvements or gains relating to PRoW and public amenity; and • Improved biodiversity. Regarding sustainable drainage, the Applicants have allowed sufficient space within the Order limits to accommodate a SuDS and which will incorporate infiltration (subject to

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			confirmation of ground conditions) as a means to promote the sustainability of the surface water management system. A surface water connection to the Friston Watercourse will also be incorporated and the Applicants have committed not to exceeding the existing discharge rate from the onshore substation/National Grid substation location. In addition, the Applicants retain the option to install further surface water attenuation measures along the existing surface water flow route during the detailed design phase to reduce water in-flow rates to the substation area and potentially reduce flood risk for the village of Friston. Confirmation of the size, volume and location of this additional measure will follow establishment of an appropriate catchment hydraulic model and the detailed design of the onshore substation and National Grid substation. The Applicants will submit an updated ***draft DCO*** (APP-023) to the Examinations at Deadline 3 which includes a new Requirement relating to the production of an Operational Drainage Management Plan to be submitted to and approved by the relevant planning authority. The Operational Drainage Management Plan will present the design and maintenance of the SuDS and must accord with an Outline Operational Drainage Management Plan which will also be submitted to the Examinations at Deadline 3. Planting mitigation measures associated with the onshore substation and National Grid infrastructure form part of a strategic approach to enhancing landscape character and bio-diversity in the local area. The ***OLMP*** in ***Figure 29.11a-b***

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					(APP-401 and APP-402) and ***Figure 29.12*** (APP-403) includes embedded mitigation which will be delivered in order to mitigate landscape effects, contribute to the wider landscape structure of the area, screen the onshore project substation and help consolidate green corridors for wildlife. The OLMP is considered within ***Chapter 29 Landscape and Visual Impact Assessment*** (APP-077). Requirement 14 of the ***draft DCO*** (APP-023) requires a landscape management plan to be submitted to and approved by the relevant planning authority. This plan must be in accordance with the ***OLEMS*** (APP-584) submitted with the Applications. Requirement 15 of the ***Draft DCO*** (APP-023) addresses the maintenance of landscaping and requires any tree or shrub planted as part of an approved landscape management plan that, within a period of five years (or ten years in relation to Work No. 33) after planting, is removed, dies or becomes, in the opinion of the relevant planning authority, seriously damaged or diseased must be replaced in the first available planting season with a specimen of the same species and size as that originally planted unless alternative timing or a different specimen is otherwise approved by the relevant planning authority. The Applicants will continue to engage with the Councils during the Examinations to explore means of further reducing the environmental impact of the onshore substations and National Grid substation.
1.0.7	The Applicant	1	2	**Design and plans**	Annex 2, Figure 4 of the ***OLEMS*** (APP-584) provides an overview scale of the outline landscape mitigaiton plan

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				Please provide scale drawings (which may be referred to as outline design and landscape plans) showing the preferred option layouts and three- dimensional design of the substations and National Grid substation to the maximum parameters within the Rochdale envelope and the requirements for design and sustainability set out in the dDCOs, including, but not limited to: the proposed buildings, external electrical transmission equipment, roadways, storage areas, surface treatments, landscaping, attenuation ponds, sustainable drainage systems and fencing. Such plans to include versions at a scale to show the proposed substations and the village of Friston on the same plan, as requested by the Parish Council.	This overview figure has been updated with the Order limits as amended at Deadline 1 and this is presented in ***Figure 1, Appendix 1*** of this document. The Applicants note that details such as storage areas, fencing and surface treatments are not presented within this figure as the specifications and arrangement of these features are not known at this stage. This information will become available post-consent through the detailed design stage. The parameters of the onshore infrastructure as assessed in the Applications was determined through the Rochdale Envelope approach in accordance with The Planning Inspectorate Advice Note Nine: Rochdale Envelope.
1.0.8	The Applicant, ESC, SCC, Historic England, Natural England, AONB Board, Parish Councils, SASES, SEAS, SEAS, SoS	1	2	**Design Principles** a) In the context of EN-1 paragraph 4.5.5, explain how the design of the EA1N and EA2 projects meet the National Infrastructure Commission's Design Principles for National Infrastructure (February 2020) in respect of Climate, Places, People and Value, both offshore and onshore and in all three phases of construction, operation and decommissioning. b) Comment on the desirability of implementing the following measures to ensure that good quality sustainable design and integration of the proposed substations and National Grid substation projects into the landscape is achieved in the detailed design, construction and operation of the projects. How might they be secured? Are any further measures appropriate? i) A 'design champion' to advise on the quality of sustainable design and the	a) Paragraph 4.5.5 of EN-1 states that Applicants should consider taking independent professional advice on the design aspects of a proposal. In particular, Design Council CABE can be asked to provide design review for nationally significant infrastructure projects and applicants are encouraged to use this service. As per ***Chapter 5 EIA Methodology*** (APP- 053) the Projects are based on a project design envelope (or 'Rochdale Envelope') approach. It is recognised by the Planning Inspectorate (The Planning Inspectorate 2018) that, at the time of submitting the applications, offshore wind developers may not know the precise nature and arrangement of infrastructure and associated infrastructure that make up the proposed development.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				spatial integration of energy infrastructure structures, buildings, compounds, security fences, landscape, heritage, woodland, new landscape features, public rights of way and visual amenity. ii) A 'design review panel' to provide informed 'critical-friend' comment on the developing sustainable design proposals; iii) An approved 'design code' or 'design approach document' (as approved in the Hinkley Point C Connector Project (EN020001)) to set out the approach to delivering the detailed design specifications to achieve good quality sustainable design; iv) An outline, including timeline, of the proposed design process, including consultation with stakeholders and a list of proposed consultees. v) In the opinion of the local authorities and other statutory agencies, would the implementation of any or all of the above measures assist in determining post-consent approvals (including the discharge of requirements) in relation to achieving good design?	Acknowledging that the onshore substation and National Grid substation must function efficiently and safely as substations, the ***Outline Onshore Substation Design Principles Statement*** (APP-585) submitted with the Applications, commits the Applicants to (amongst other things): • A design review of the landscape and building design proposals (i.e. Design Council or Shape East); • Consideration of 'Good Design' in line with the requirements of Overarching National Policy Statement for Energy (NPS-EN-1). The Applicants have submitted an ***Outline National Grid Substation Design Principles Statement*** to Examination at Deadline 1 (ExA.AS-6.D1.V1), and the Applicants will amend the ***draft DCO*** (APP-023) at Deadline 3 to require the layout, scale and external appearance of the National Grid substation to be in accordance with the ***Outline National Grid Substation Design Principles Statement.*** The Applicants note that the National Infrastructure Commission's Design Principles for National Infrastructure was published a number of months after submission of the Applications and has therefore not been incorporated specifically within the design principles. There are however a number of common themes that are reflected in the ***Outline Onshore Substation Design Principles Statement*** (APP-585). The Applicants will review the National Infrastructure Commission's Design Principles for National Infrastructure report and consider the updating of the ***Outline Onshore Substation Design Principles Statement*** (APP-585) and

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			Outline National Grid Substation Design Principles Statement. Any updates to these documents will be submitted to Examination on Deadline 3. In response to Question 1.0.8(b) specifically: I. The Applicants consider that sufficient skill and experience rests within the Applicants' design team to achieve the objectives of a 'design champion' and are not supportive of the appointment of a design champion; II. The Applicants consider that sufficient skill and experience rests within the Applicants' design team to achieve the objectives of a 'design review panel' and are not supportive of the appointment of a design review panel. The measures set out in the approved ***Onshore Substation Design Principles Statement*** will provide the framework for delivering sustainable design principles. III. The Applicants consider that the ***Outline Onshore Substation Design Principles Statement*** (APP-585) and ***Outline Onshore National Grid Substation Design Principles Statement*** (to be submitted to Examination at Deadline 1) sets out the Applicants' approach to delivering the detailed design specifications to achieve good quality sustainable design. IV. An update to the ***Outline Onshore Substation Design Principles Statement*** (APP-585) and ***Outline Onshore National Grid Substation Design Principles Statement*** will be submitted at Deadline 3 to provide an outline, including timeline, of the proposed design

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					process, including consultation with stakeholders and a list of proposed consultees. It is the Applicants' intention to progress the detail design with ESC and SCC in the first instance from early 2021. The Applicants consider that the approach adopted within the ***draft DCO*** (APP-023) of requiring the approval (by the relevant planning authority) of an ***Onshore Substation Design Principles Statement*** and ***Onshore National Grid Substation Design Principles Statement*** will achieve the good, efficient, functional, sustainable and grid code compliant design of the onshore substations and National Grid substation.
1.0.9	The Applicant	1	2	**Design: Reasonable measures** SCC and ESC consider that [RR-002, RR-007] all reasonable measures to minimise the impact of the substations have not been demonstrably exhausted. The ExA note the responses of the Applicant to this point of view in their response to the RR [AS-036]. While noting the site selection process undertaken and the National Grid's 'Horlock Rules' more information is requested. • Demonstrate how you have exhausted all reasonable measures to minimise the impact of the proposed substations, with reference to size, layout, building design and materials.	The size of the onshore infrastructure has been determined through the Rochdale Envelope approach in accordance with The Planning Inspectorate Advice Note Nine: Rochdale Envelope. ***Section 3.5 of Chapter 3 Policy and Legislative Context*** (APP-051) sets out a series of realistic design assumptions from which worst case parameters are drawn for the Projects. The project design envelope has a reasoned maximum extent for a number of key parameters. The final design would lie within the maximum extent of the consent. The project design envelope is used to establish the maximum extent to which the Projects could impact on the environment. The detailed design of the Projects could then vary within this 'envelope' without rendering the assessment inadequate. The physical footprint of the onshore substation is determined by:

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			• Feasible technology (e.g. AC or DC transmission); • The size of infrastructure (e.g. the size of cables, size of building or equipment) which is determined by technology; • The number of each element required (e.g. cables, transformers, etc); • Minimum spacings required for safe and efficient construction and operation (e.g. cable spacing); • Required stand-offs or crossing requirements (e.g. to other infrastructure or watercourses); • Other constraints (e.g. hard constraints or required buffers from human or environmental constraints), topography and natural features; • Construction methodology (e.g. open trench or trenchless techniques) and construction sequencing which is dependent upon constraints; • Access and storage (including spoil); • Drainage; and • Welfare and security. The design presented therefore represents the limit of commitments able to be made at the time of the applications, and therefore is exhaustive. Note that given the delay in the examination process, the Applicants have continued to engage with suppliers. The implications of this from a landscape and mitigation perspective will be detailed at Deadline 3.

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			Post consent, the Applicants will refine the design of the onshore substations within the consented envelope dependent upon the limits of what is available on the market and what can be delivered efficiently and in compliance with the DCOs. ***Section 3*** of the ***Outline Onshore Substation Design Principles Statement*** (APP-585) summarises the outline design principles that the Applicants will use as the foundation for developing the final Onshore Substation Design Principles post-consent, as part of the discharging of requirements of the ***draft DCO*** (APP-023). These include: • Continued engagement with the relevant authorities (Suffolk County Council (SCC) and East Suffolk Council (ESC)), Parish Councils and local residents on design and landscape proposals; • The landscape and building design proposals will be subject to design review, in consultation with the relevant local authorities; • Consideration of 'Good Design' in line with the requirements of NPS-EN-1; and • Appropriate building design and materials will be actively sought as part of the procurement process. Requirement 12 of the ***draft DCO*** (APP-023) states that no stage of the onshore substation works may commence until details of the layout, scale and external appearance of the onshore substation have been submitted to and approved by the relevant planning authority.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.0.10	The Applicant	1	2	**Design: Reasonable measures** The ExAs unaccompanied site inspections (USIs) have so far included inspections of the external appearance and settings of constructed and operational Offshore Wind Farm grid connection points and substation infrastructure at Broom Covert (Sizewell) and Burstall (Ipswich) [EV-005], [EV-006], [EV-007]. In principle, these inspections disclose facilities in which the bulk and scale of infrastructure has been managed by techniques including siting (the division of compounds to reduce the apparent visual coalescence of infrastructure) (Burstall), substantial bunding, new planting and the reinforcement of existing tree cover, to a greater extent than is apparently documented to be the case for the substations proposed in these applications. a) Is it anticipated that any of these siting and design mitigation techniques might be used to a similar extent here? b) If the answer to this question is no, why are such design mitigation approaches proposed to be more limited in this location?	Whilst it is instructive to look at other locations to understand what can be ultimately achieved with landscaping, site layout etc, it must be borne in mind that the projects listed are fully operational and therefore have been subject to design iteration from the pre-application stage through to the full detailed design pre-construction. This iterative process allowed for the refinement of the project designs themselves and the incorporation of, for example, detailed geotechnical information. The current form of these projects does not stem from fully formed plans provided at their respective consent application stage, but outline plans as per the current Applications. The mitigation provided in each case is unique to the setting and crucially is dependent upon the size of the infrastructure itself. The substations at Sizewell are for the Greater Gabbard (504MW, 1.5ha compound) and Galloper (353MW, 2.2ha compound) projects. The substation at Burstall is for East Anglia ONE (714MW, 2.9ha compound). Each of these substations are for wind farms of smaller capacity than the Projects. The Applicants also note that Greater Gabbard and Galloper were developed as completely separate projects. The landscape design approach selected for the Projects' onshore substation and National Grid substation is discussed in the ***OLEMS*** (APP-584) in ***section 3***, Outline Landscape Mitigation Plan (OLMP). The approach combines the approaches of hiding and integrating them into the landscape to meet the mitigation requirements and also as a response

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			to the local landscape character and the historic landscape context. This approach results in the onshore substations having a lower landscape and visual impact in the long-term, once woodland and hedgerow planting is maturing (as opposed to an approach where the substations are even more emphasised). Specifically placed woodland blocks/shelterbelts, hedgerows and tree lined field edges are proposed to hide and integrate the onshore substation, reducing the visual impact in specific views towards the onshore substation experienced by people from residences, roads and PRoW, while allowing the function of the onshore substations to be recognised when in closer proximity. This approach acknowledges the key requirement for visual screening of the onshore substations, which has been a clear preference expressed during public and stakeholder consultations (which included an OLMP Working Group with comprised SCC, ESC, Historic England and Natural England, see ***Table 3.1*** of ***OLEMS*** (APP-584)). Due to technical constraints, it would be unrealistic to completely screen the entirety of the onshore substations Bunding could be considered although the potential for bunding is dependent upon the site conditions and how much material is needed to be moved for the substation construction. The soil moved may also not be suitable for planting. Therefore, the OLMP takes a worst case approach of assuming no bunding aside from that associated with the SuDS ponds see ***OLEMS section 3.5.11*** (APP-584). Upon detailed site investigation and design it may be that extensive bunding is possible with the overall earth-balance of the site.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.0.11	The Applicant	1	2	**Design and architecture** The Design and Access Statement [APP-580] states that the onshore substations would have compact layouts, with the majority of equipment contained in "agricultural style buildings". a) In this context define and describe agricultural style buildings. b) How would such buildings be respectful to the local vernacular of agricultural style buildings? Illustrate, by example, the range of architectural typologies that might be appropriate in the proposed location. c) Would the proposed buildings be more closely related to an agricultural or an industrial/logistics type building? Set out the range of architectural typologies, materials and colour palate that could be used for building construction to reflect the local context and how might they be used? How and where could this be secured in the dDCO?	An example of a Substation Detailed Design document prepared for East Anglia ONE is included for information in ***Appendix 2*** of this document. The Applicants have set out in the ES and the ***draft DCO*** (APP-023) how the design process for the onshore substations would be taken forward and the steps are outlined below. As stated in response to **ExA Question 1.0.6**, the Projects are based on a design envelope (or 'Rochdale Envelope') approach and at the time of submitting the applications, the Applicants may not know the precise nature and arrangement of the infrastructure that make up the proposed development. Requirement 12 of the ***draft DCO*** (APP-023) states that no stage of Work No. 30 can commence until details of the layout, scale and external appearance of the onshore substation have been submitted to and approved by the relevant planning authority in accordance with the ***Outline Onshore Substation Design Principles Statement*** [APP-585]. This document commits the Applicants to the following measures to be incorporated within the final design process: • Continued engagement with Parish Councils, local residents and the Councils on design and landscape proposals; • A design review of the landscape and building design proposals (i.e. Design Council or Shape East); • Consideration of 'Good Design' in line with the requirements of Overarching National Policy Statement for Energy (NPS-EN-1);

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					• Use of appropriate building design and materials; • Refinement of landscape planting proposals along with the substation building design and layout of ancillary structures. in order to satisfy Requirement 12 of the ***draft DCO*** (APP-023), a Substation Detailed Design document (as provided in ***Appendix 2*** of this document) similar to that produced for East Anglia ONE will be submitted. This would follow measures as outlined above, demonstrating consideration has been given to the design of the substation in accordance with the ***Outline Onshore Substation Design Principles Statement*** (APP-585). It would set out the site location, context and scale of the proposed substation buildings, along with a range of materials, colours and architectural styles consider in coming to the final design.
1.0.12	The Applicant	1	2	**Design options** In design terms, assess the differences and comparative advantages and disadvantages of the National Grid substation being an Air Insulated Substation or a Gas Insulated Substation, both in terms of scale and mass but also the visual effect of a more open or enclosed layout.	The key parameters of an Air Insulated Switchgear (AIS) National Grid substation are: • Footprint of 44,950m^2; • External equipment with heights of approximately 16m above finished floor level; and • Buildings with heights up to 6m above finished floor level. The key parameters of a Gas Insulated Switchgear (GIS) National Grid substation are: • Footprint of 16,800m^2;

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response
			• GIS building up to 16m in height above finished floor level; and • External equipment with heights up to 16m above finished floor level. A set of visualisations comparing AIS and GIS National Gird substations is provided on ***Figures 29.33 to 29.45*** of the ES (APP-424 to APP-37). An AIS substation will require a larger footprint than a GIS substation. An AIS substation will require a larger area of agricultural land, resulting in a higher change to local landscape character. Use of AIS will also lead to a higher change to visual amenity due to its wider spread in views. Although GIS requires a large building, the containment of switchgear indoors presents a simpler, less complex (albeit more solid) form than the appearance of an AIS substation. The appearance of the external electrical infrastructure of an AIS substation presents a more complex form over a wider spread, with a framework of elements that combine to present more visual complexity than the single mass of a GIS building. Although the buildings within an AIS substation are lower in height than the single GIS building, there would be a requirement for several buildings.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					External AIS electrical infrastructure would generally be at heights not dissimilar to the GIS building, and would also cover a larger footprint. Woodland planting would, from certain views, screen the lower heights of an AIS substation than a GIS building. However, a GIS substation requires a smaller footprint. The reduced spread and greater containment of the GIS options by existing woodland (Grove Wood/Laurel Covert) is notable. Given the above considerations, AIS was selected as reasonable a worst case for the assessment of landscape and visual effects.
1.0.13	The Applicant	1	2	**Design and Statements of Common Ground (SoCGs)** SCC and ESC [RR-002, RR-007] raise concerns over whether the outline design principles also apply to the proposed National Grid substation. The ExA note the responses of the Applicant to this point in their response to the RR [AS-036] and the commitment to discuss this during the production of SoCGs. • Outline the extent of controls and level of design principles that could be provided through the proposed SoCGs and how they might be secured in the dDCOs.	The Applicants agreed with the Councils to submit an ***Outline National Grid Substation Design Principles Statement*** (ExA.AS-6.D1.V1) which has been submitted at Deadline 1. Requirement 12 of the ***draft DCO*** (APP-023) will be updated to provide that the details of the layout, scale, and external appearance of the National Grid substation must be in accordance with this ***Outline National Grid Substation Design Principles Statement***. An updated ***draft DCO*** (APP-023) will be submitted to the Examinations at Deadline 3.
1.0.14	The Applicant	1	2	**Overall design** Outline Landscape Management Plan (OLMP) General Arrangement Plan (Figure 29.11a) [APP-401] shows an overall plan of the proposed development. This appears to show the proposed substations, National Grid substation, and sealing end compounds largely sited as close together as possible, with the three main blocks	Co-location of the onshore infrastructure provides benefits through the efficient and economic siting of infrastructure (in line with the National Policy Statement for Energy (NPS-EN1)). In addition, the consolidation of onshore infrastructure in a single location keeps development within a localised

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				sited adjacent to each other. While this has the effect of concentrating such uses in one overall block of development, a more dispersed arrangement could allow other mitigation and landscaping arrangements to be proposed. • Given the extent of the land proposed to be available, was an alternative more dispersed arrangement considered as part of the design process? What advantages and disadvantages would such an arrangement have when compared to the selected arrangement? Of all the possible arrangements, which represents a 'worst case scenario'?	area and, in so doing, will contain the extent of potential impacts and allows for more effective screening Six alternative layouts to the preferred option were considered for the onshore substations and National Grid substation. These six alternatives are shown on ***Figures 4.8*** to ***4.13*** of the ES (APP-088 to APP-093). The preferred option is shown on ***Figure 4.14*** of the ES (APP-094). The primary driver for the co-location of the onshore substations and National Grid substation is the potential landscape and visual effects. The proximity of Friston to the south, and views from it towards the proposed location of the substations, as well as views from surrounding isolated properties, all favour co-location with the three substations in close proximity to one another. This maximises the potential of the surrounding woodland areas (Grove Wood, Old World Wood and Laurel Covert) to provide natural screening from nearby visual receptors and to utilise these woodland blocks for a sympathetic planting scheme. Finding preferred locations for the three substations was an optimisation process, rather than an exercise aimed at determining the worst case. The preferred option is considered the optimal configuration, but the worst case parameters were selected for assessment.
1.0.15	The Applicant	1	2	**Detailed substation design** Figure 29.33d shows a visual representation of the first year of operational phase for the proposals. a) What are the square stepped towers shown on the south east of the proposed EA1N and EA2	a) With reference to ***Chapter 29 Landscape and Visual Impact Assessment*** (APP-077) ***Plate 29.1***, the 'square stepped towers' are Harmonic Filters (18m), of which there are six within each onshore substation.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				substations and what is their function? (there are 12 shown in total) b) Provide an annotated plan of the proposed substation design to show the different elements of infrastructure/equipment that make up the individual elements of the substation c) Are these the same designs as other recently constructed substations, such as EA1, EA3 or the Galloper substations?	b) An annotated plan of the onshore substation layout is shown in the 3D model view in ***Chapter 29 Landscape and Visual Impact Assessment*** (APP-077) ***Plate 29.1. Plate 29.1*** identifies the different elements of infrastructure / equipment that make up the individual elements of the onshore substations, which are shown in the photomontage visualisations in ***Figure 29.13*** to ***Figure 29.26*** (APP-404 to 417). The substation layout is shown in plan view in ***OLEMS*** (APP-584) Figure 3-5. c) The substation layout shown was defined for the LVIA Rochdale envelope, as a worst-case informed by the maximum parameters of the required electrical infrastructure and was based on preliminary electrical design assumptions guided by the substation design from the East Anglia ONE project. The Galloper substation is not comparable to the Projects onshore substation as it serves a 353MW offshore windfarm (compared to 900MW and 800MW at the point of connection for the East Anglia TWO and East Anglia ONE North respectively) and received power at 132kV (compared to the Projects which receive power at 275kV). The East Anglia THREE project utilises HVDC technology due to its output (1,400MW) and therefore will require a converter station rather than an onshore substation. The substation most similar to the Projects is considered to be the East Anglia ONE substation which has been recently commissioned by East Anglia ONE Limited.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
1.0.16	The Applicant, National Grid	1	2	**Site selection: Friston grid connection point (Grove Wood)** In paragraph 17 of Appendix 4.2 (RAG Assessment for Onshore Substations Site Selection in the Sizewell Area) [APP-443] you say that *"The onshore study area was extended westward following consultation with Suffolk County Council (July, 2017) to look further west by potentially crossing Aldeburgh Road. This area was previously excluded due to the potential interaction with residential titles."* You also note that *"Aldeburgh Road would potentially act as a significant constraint, and that extension (of the study area) westwards would be counter to the achievement of economy and efficiency"* but nevertheless *"the onshore study area was proposed for extension."* a) A substantial apparent reason for extending the study area westwards appears to have been that the Grove Wood pylon, being more substantial, might not require such extensive modification as other straight-through pylons to the east (i.e. towards Sizewell). Were there other technical reasons that bore on location selection? b) Given the impacts on residential property, economy and efficiency, and that the dDCO is principally intended to authorise the construction and operation of an Offshore Wind Farm, please explain why the substation site at Grove Wood was chosen and not a site further east? c) Could the length of the onshore cable route have been reduced, removing or reducing the need to cross the Leiston-Aldeburgh SSSI or	a) The main driver for extending the onshore study area westwards was the avoidance of impacts upon the Suffolk Coast and Heaths AONB. ***Appendix 4.3 Suffolk Coasts and Heaths AONB Impact Appraisal*** of ES (APP-444) sets out the detailed appraisal of the eight zones considered for locating the onshore substations and National Gird substation. This appraisal concludes that the development of substations within any of the eastern zones (zones 1 - 4 and zone 8), which are located within or on the edge of the AONB, would be likely to result in significant effects on some of the special qualities of the AONB. Development of substations in the western zones (zones 5 - 7 (Grove Wood)) would be likely to avoid significant effects on the special qualities of the AONB. b) Whilst the reason for extending the study area to the West relates to the AONB, as outlined above, its extension as far as the Grove Wood tension pylon is that this more substantial pylon may not require such extensive modification to facilitate SPR's connection as other 'straight-through' pylons to the east. With reference to ***Appendix 4.3 Suffolk Coasts and Heaths AONB Impact Appraisal*** of the ES (APP-444) substations at Grove Wood would have notably better regard to the nationally protected landscape status of the AONB. 'Exceptional circumstances' and 'public interest' in line with paragraph 5.9.10 of NPS-EN1 would need to be demonstrated if the substations were to be sited within the AONB or in locations that can be considered as forming parts of the 'setting' of the AONB. Development

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				the Sandlings SPA, and eliminate the need for the remainder of the onshore cable route to follow essentially the existing National Grid overhead lines all the way to Grove Wood, with all the associated impacts, particularly on residents and the natural environment? To the extent that responses to this question rely on any advice to the Applicant from National Grid that this location was broadly preferred by National Grid, the Applicant is asked to document that advice. National Grid may comment at Deadline 2.	at Grove Wood is unlikely to have any significant effects on the special quality of the nationally protected AONB landscape. The Applicants note that some consented and existing offshore wind farm projects have substations at much greater distances inland than is being proposed for the Projects, necessitating cable routes of much greater lengths e.g. Vanguard Offshore Wind Farm (60km onshore cable route) and Dudgeon Offshore Wind Farm (40km onshore cable route). c) As noted, the main driver for selecting the locations of onshore substations and National Grid substation was the avoidance of impacts upon the Suffolk Coast and Heaths AONB. The preferred locations necessitate a longer onshore cable route. An offset between the onshore cable route and National Gird overhead lines is required. From east of Aldringham, 'pinch-points' and residential development prevent the onshore cable route from following near to the National Gird overhead lines any further west. National Grid's role in site selection was to provide the substation parameters that needed to be accommodated by sites under consideration. The Applicants undertook the site selection process.
1.0.17	The Applicant, National Grid	1	2	**Site selection: Friston grid connection point** In OFHs 1 – 2 (7 – 9 October 2020), a common emerging theme from oral submissions was that the Friston connection point location had perhaps been selected at least in part because it offered potential expandability.	a) The Applicants selected the onshore substation and National Grid substation locations to reflect the requirements of the Projects only and did not consider potential expansion of the National Grid substation. Selecting sites for the onshore substations and National

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				a) Do you understand this to be the case? It was suggested that a number of further grid connection offers have either been formally made or informally proposed by National Grid that could have the effect of bringing further transmission connections to this location. b) Please catalogue any additional connection offers that have been made on a formal or informal basis of which you are aware and submit the best available summary descriptions of the name, purpose, developer and effects of any additional connection proposals that might use this location. To the extent that responses to this question by the Applicant rely on any advice to the Applicant from National Grid, the Applicant is asked to document that advice. National Grid may comment at Deadline 2.	Grid substation was a process that considered multidisciplinary principles and criteria that were selected based on well established guidelines. The process, along with the various options considered and the reasons for their dismissal / selection is fully detailed in section 4.9 of ES ***Chapter 4 Site Selection and Alternatives*** (APP-052). b) Connection offers for other projects (those not proposed by the Applicants) are the responsibility of National Grid Electricity System Operator Limited. The Applicants do not have such information.
1.0.18	SCC, ESC, Parish Councils, SASES, SEAS, SEAS, SoS	1	2	**Site selection: Friston grid connection point** To the extent that it was suggested at OFHs 1 – 2 that there may be additional grid connection proposals for this location, please catalogue any additional connection offers of which you are aware that have been made on a formal or informal basis and submit the best available summary descriptions of the name, purpose, developer and effects of any additional connection proposals that might use this location.	Whilst not requested to respond on this question, the Applicants have reviewed the publicly available information for projects which require connection to the national electricity grid and summarise the status of each project in the table below.

ExA. Question Ref.	Question addressed to	ExA. Question	Applicants' Response

Project	Status	Earliest construction start
Gabbard Extension (North Falls)	Not yet scoped	No publicly available information
Galloper Extension (Five Estuaries)	Not yet scoped	No publicly available information
Nautilus	Not yet scoped DCO Application proposed 2022 Financial Investment Decision proposed 2024	2025
Eurolink	No further publicly available information	No publicly available information
SCD1	Decision to progress	2028
SCD2	Project on hold.	

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					The selection of other projects to be considered in the assessment of cumulative impacts followed The Planning Inspectorate Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects. In following the approach set out in Advice Note 17, none of the above projects were identified.
1.0.19	The Applicant	1	2	**Site selection: Thorpeness landfall** Please explain the specific rationale for the location of landfall north of Thorpeness in an area prone to coastal erosion, in circumstances where other landfall locations might have been available?	The principles and process for selecting the landfall location at Thorpeness and assessing the alternatives are set out within ***section 4.8, Chapter 4 Site Selection and Alternatives*** (APP-052). An engineering feasibility study was undertaken to review landfall options in terms of construction and cost, including consideration of geology. The review and assessment of shoreline movement and stability, and the effects of coastal management plans over the next 50 years is presented within ***Appendix 4.6 Coastal Processes and Landfall Site Selection*** (APP-447). Also taken into consideration during the process of selecting a landfall location was the siting of existing infrastructure and land use, such as nuclear energy land (and infrastructure associated with its operation), housing and coastal defences. ***Section 4.8.3*** of ***Chapter 4*** (APP-052) explains how the onshore landfall area was refined and the rationale for selecting an area north of Thorpeness, summarised as follows: • The landfall can accommodate onshore cable requirements for both the Projects;

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					• Direct impacts on Leiston - Aldeburgh SSSI will be avoided through the use of trenchless techniques to bring the offshore export cables ashore; • There is potential to avoid impacts on the Coralline Crag rock formation offshore from the coastline through the use of trenchless techniques to bring the offshore export cables ashore and selection of appropriate 'punch-out' area, and thereby significantly reduce or remove the potential impact on coastal processes in the area (and avoid any impacts on the safe operation of Sizewell B nuclear power station's cooling water intake and outfalls); • There is sufficient space to accommodate set back from the cliff line to reduce risk associated with coastal erosion over the 100-year modelled scenario; and • Direct interaction with the beach can be avoided through the use of trenchless techniques to bring the offshore export cables ashore.
1.0.20	The Applicant	1	2	**Design and Access Statement** Can the Design and Access Statement (DAS) [APP–580] be a certified document included in the list in Art 36 Certification of plans etc. of the dDCO and secured through appropriate reference(s) in R 12? If not, please explain why.	Yes. However, the Applicants consider that the ***Outline Onshore Substation Design Principles Statement*** (APP-585) would perhaps be more appropriate as a certified document included in the list in Article 36 Certification of Plans etc.
1.0.21	The Applicant	1	2	**Finished ground levels** The dDCOs [APP - 023] state (R 12, para. 4 – Detailed design parameters onshore) that ''finished ground level' will be defined in accordance with the outline onshore substation design principles statement' (OOSDPS). Section 4, para. 11 of the OOSDPS [APP – 585] sets	a) The Applicants agree that the finished ground level of the onshore substations and National Grid substation is a key dimension impacting on both the landscape and visual effects of the proposed substations. There is however an overall design concept that must be

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
				out the anticipated finished ground levels and explains that 'The final finished ground level will be established during detailed design post consent'. Finished ground level is a key dimension impacting on both the landscape and visual effects of the proposed substations; but is being established as an outcome of the design process rather than as a design principle. Please: a) Explain the approach taken to establishing the finished ground levels for the proposed substations in relation to the current landform/landscape north of Friston; b) Explain and illustrate the engineering, drainage, landscape and visual effect implications of lowering the current estimated finished ground level by up to 3m in 0.5m stages; and c) Propose a finished ground level dimension as an element of the outline onshore substation design principles to be secured in the dDCO.	achieved in the design of the substations which also considers other factors including: a. Platform levels graded at 1:100 falls to facilitate the drainage of surface water across the platforms and through SuDS treatment before discharge to the Friston Watercourse; b. Minimisation of cut or fill of earthworks materials, particularly to minimise potential need for import or export of excessive amounts of earth via the public road network; and a c. Presumption of achieving the lowest practicable finished ground levels to minimise visual impact. LIDAR data providing existing ground levels across the substation site have been used in combination with a conceptual design of the onshore substations and National Grid substation, and the inlet level of the Friston watercourse in order to establish a concept design for the finished ground level considering the above factors. b) The Applicants will submit a clarification note on the effects of reducing the finished floor level by 3m (in 0.5m increments) to the Examination at Deadline 3. c) The finished floor level can only be fully resolved through a combination of ground investigations and detail design. The Applicants are unable at this stage to confirm the precise finished ground level. It is also likely that the finished ground level will vary across each of

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					the onshore substations and National Grid substation locations. The Applicants confirm the presumption of achieving the lowest practicable finished ground levels within the design to minimise the visual impact, whilst maintain the design integrity of the onshore substation and National Grid infrastructure.
1.0.22	The Applicant	1	2	**Fluorinated gases and Climate Change** The Right Honourable Dr Thérèse Coffey MP [RR-225] raises the issue of SF6 gas cooling for the proposed substations, stating that the use of such gas cannot be taken for granted given the Government's ratification of various amendments to the Montreal Protocol and the Kyoto Protocol, which aim to reduce significantly the use of fluorinated gases as, if released, they are very potent greenhouse gases. She notes that air cooling infrastructure would result in larger infrastructure being required. • Respond to the above point	The deployment of equipment using SF6 in the UK electricity transmission system is controlled by Policy Statements PS(T) 005 and PS(T) 023. The processes for managing and monitoring the use of SF6 within National Grid UK Electricity Transmission are specified in NGUK/PM/SHE/207. SF6 gas is extremely chemically stable, non-flammable and highly electronegative, with an excellent dielectric property of approximately 2.5 times more than air. Therefore, it is commonly used in electrical switchgear (Circuit Breakers), transformers and substations as an electrical insulation, arc quenching (breaking) and cooling medium. SF6-free switchgear does not currently exist for voltage levels above 132kV. It may be several years before an alternative is developed and available to be procured. For the onshore substations, Gas Insulated Switchgear (GIS) will be used, with SF6 likely as the insulating and arc quenching medium as currently permitted. However, should legislation associated with the use of SF6 change, the Applicants will ensure that this is reflected within the design of relevant infrastructure.

ExA. Question Ref.	Question addressed to			ExA. Question	Applicants' Response
					In terms of substation design, as recognised within Requirement 12 of the ***draft DCO*** (APP-023), a National Grid substation utilising AIS technology would be up to 44,950m^2 in footprint, or if utilising GIS technology would be up to 16,800m^2 in footprint. The reason being that GIS systems are significantly smaller and weigh less (despite the gas weighing more than air). It should also be noted that in many cases although AIS uses air as the insulating medium, SF6 is still used for circuit breaking although ultimately in smaller quantities than in GIS. The Applications have allowed for either AIS and GIS technology to be deployed at the National Grid substation.
1.0.23	The Applicant	1	2	**Public sector equality duty (PSED)** Please submit an equality impact assessment to inform the ExA how your proposal would accord with the requirements of the Public Sector Equality Duty.	Can the ExA please provide more information to the Applicants to understand a) The basis on which the ExA considers the Applicants to be a 'public authority' b) How an equality impact assessment would relate to a project rather than a policy