East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER
RENEWABLES

East Anglia THREE

Design and Access Statement

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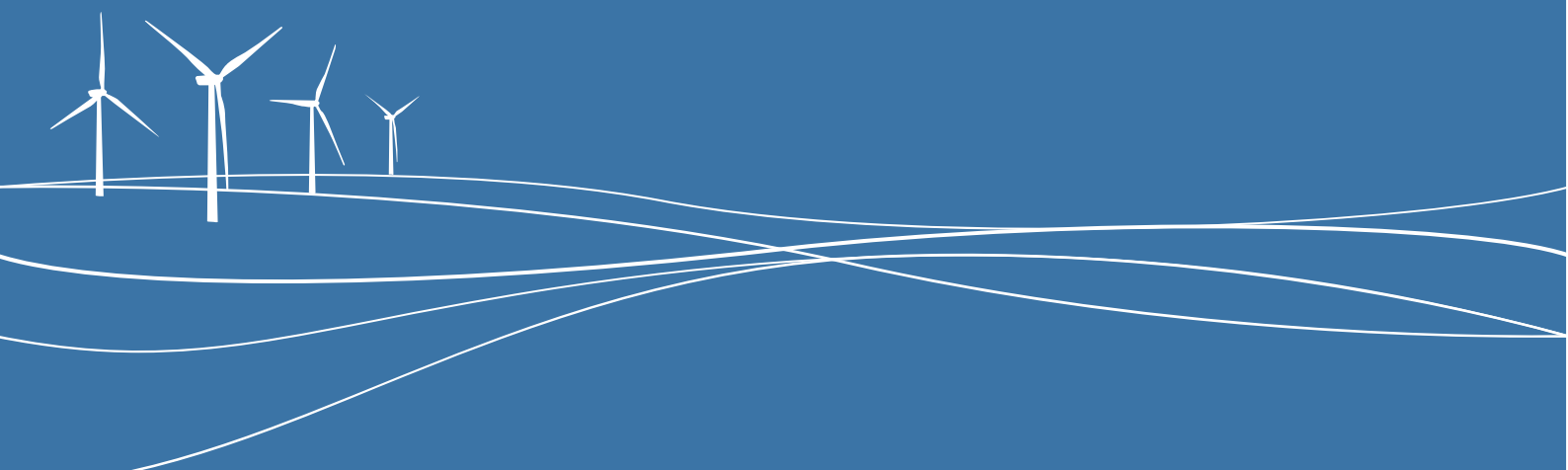

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1 INTRODUCTION

1.1 The Project

1. The proposed East Anglia THREE Offshore Windfarm is located approximately 69km from the closest point of the East Anglia THREE site to Lowestoft and covers an area of around 305 km^2. Once built, it would comprise up to 172 offshore wind turbines and their foundations, up to six converter and collector stations with a network of array cables connecting them. Sub-sea export cables would transport power from the windfarm to a landfall point at Bawdsey, Suffolk, and from there onshore cables would transport power over approximately 37km to the substation at Bramford, Suffolk.

2. EATL submitted an application for Development Consent Order (DCO) to the Planning Inspectorate in November 2015, which seeks authorisation for the project under the Planning Act 2008.

3. Following a period of examination and recommendation by the Planning Inspectorate, a decision will be made by the Secretary of State for Energy and Climate Change (SoS) on whether to grant development consent for the project.

4. The assessment is based on realistic worst case parameters in line with the Rochdale Envelope approach to Environmental Impact Assessment (EIA). This allows for the full range of development options for the proposed East Anglia THREE project to be assessed. The approach also assumes the application of embedded mitigation to ensure that significant impacts will not occur.

1.2 Design and Access Statement

5. The Design and Access Statement (DAS) has been prepared as part of the East Anglia THREE DCO application and has been prepared pursuant to Regulation 5(2)(q) of the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 to assist in the determination of the application. The purpose of this Design and Access Statement is to demonstrate the design process that has been followed during the development of the onshore electrical transmission works.

6. Existing policy set out within Overarching National Policy Statement for Energy (NPS EN-1) makes clear the requirements for good design in energy projects. The DAS explains the principles and concepts that have influenced the form and appearance of the onshore electrical transmission works as currently envisaged and provides a tool to communicate how the requirements for good design and access provision have been considered.

7. In the absence of any specific guidance relating to the preparation and reporting of Design and Access Statements for Nationally Significant Infrastructure Projects (NSIPs), the DAS has been prepared in line with national guidance on the subject, specifically:

- Design and Access Statement: How to Read, Write and Use Them, produced by CABE (2007); and
- Guidance on Information Requirements and Validation, published by the Department for Communities and Local Government (2010)

8. The proposed East Anglia THREE project has been subjected to formal EIA procedures, the outcomes of which have been reported in an Environmental Statement (ES) that accompanies the East Anglia THREE DCO.

9. Information contained in the ES has been used to inform the preparation of the DAS, and reference should be made to this document for full details of both the offshore and onshore project components and their relationship to the receiving environment, the need for the project, and the existing planning policy context.

2 PLANNING CONTEXT

10. National Policy Statements (NPSs) form primary planning policy documents that are specifically provided for by the Planning Act 2008 to guide decision making on NSIP applications.

11. The application for the proposed East Anglia THREE project will be determined in accordance with relevant NPSs.

12. Further detail on the planning policies associated with East Anglia THREE are found in the East Anglia THREE ES, Chapter 3, Policy and Legislative Context.

3 DESCRIPTION OF THE DEVELOPMENT

13. The proposed East Anglia THREE project would consist of between 100 and 172 wind turbines, each having a rated capacity of between 7 and 12MW, with a total installed capacity of up to 1,200MW. Up to four subsea export cables would come ashore at Bawdsey, Suffolk and transport electricity underground in up to 12 onshore export cables, approximately 37km to an onshore substation at Bramford, Suffolk, where the project would connect to the National Grid.

14. EATL are considering both a High Voltage Direct Current (HVDC) and a Low Frequency Alternating Current (LFAC) electrical solution for the proposed East Anglia THREE project. A decision on the final electrical solution for the project will be made post-consent during the final design stage of the project and it will be based on the best available technology at that time.

15. EATL are considering constructing the project in either a Single Phase or in a Two Phased approach. Under the Single Phased approach the project would be constructed in one single build period and under a Two Phased approach the project would be constructed in two phases each consisting of up to 600MW.

16. The DCO for the consented East Anglia ONE Offshore Windfarm includes consent to construct onshore cable ducts for two further projects to connect at Bramford. To minimise disruption to local communities, this ducting will be installed by East Anglia ONE Ltd (EAOL) at the same time as the cables are laid for East Anglia ONE. These would be installed, and then utilised by East Anglia THREE, along the majority of the onshore cable route and all horizontal directional drilling (HDD) operations would be undertaken at the same time. Some intrusive groundworks will be required at 62 jointing bay locations and for new trenches to connect form ducted to the substation and from the substation to the National Grid ducts.

17. The DAS focuses on the onshore elements of the proposed East Anglia THREE project, and in particular the substation. Further details on the proposed East Anglia THREE project characteristics, both onshore and offshore, are available in the East Anglia THREE ES, Chapter 5 Description of the Development.

18. *Table 1* provides a list of key parameters and their associated characteristics for the proposed East Anglia THREE project.

Table 1 Indicative Project Characteristics: Onshore

Parameter	Characteristic
Landfall	Bawdsey
Grid connection location	Bramford substation
Export cable route length	37km
Substation compound area (ha)	3.04
Number of substations within compound	Up to two
Number of onshore cables	Up to 12 (4 x single core for HVDC, or 4 x 3-core i.e. 12 FOR LFAC)
Number of ducts	Up to four (installed by EAOL)
Fibre Optic cables	Up to two

19. The location of the onshore electrical transmission works (i.e. the onshore cable route and substation location) for the proposed East Anglia THREE project is shown in the East Anglia THREE ES, Volume 2: Figures, *Figure 5.2*.

4 SITE SELECTION PROCESS

20. The East Anglia Zone was identified as part of The Crown Estates Round 3 award of offshore windfarm zones. East Anglia Offshore Wind (EAOW) was awarded a Zone Development Agreement in 2010, and was then responsible for identifying sites within the Zone, together with the associated cable corridor.

21. Site selection for the proposed East Anglia THREE project has been guided by five key factors:

- The selection of the East Anglia Zone (and subsequent award of the Zonal Development Agreement to EAOW);
- The Zone Appraisal and Planning (ZAP) process which identified areas of least constraint for windfarms within the Zone;
- The grid connection agreement between EAOW and National Grid in November 2010, which confirmed Bramford, Suffolk as the grid connection point, and therefore enabled identification of offshore and onshore cable corridors and the onshore substation location;
- The site selection process and consideration of alternatives for the East Anglia ONE project which included consideration of the proposed East Anglia THREE project, and a future East Anglia project, specifically in relation to the onshore cable route, landfall, offshore cable corridor and onshore substation location; and
- Consultation and technical investigations which led to site specific refinement of the East Anglia THREE windfarm site, offshore and onshore cable routes and onshore substation location.

22. An iterative process was undertaken to refine wider areas of search to determine the final site selection, requiring both environmental and technical input as well as detailed consultation at each stage. This process is described further in the East Anglia THREE ES, Chapter 4 Site Selection and Alternatives.

5 DESIGN PRINCIPLES

5.1 Design Considerations

23. In relation to the proposed East Anglia THREE project, and the specific components of this project, the key design considerations are as follows:

- Site selection;
- Design of components;
- Integration of components into local site context; and
- Mitigation of potential impacts.

5.1.1 Site Selection

24. The site selection work completed for the consented East Anglia ONE considered how the proposed East Anglia THREE project would be accommodated as a future project, occupying the same or proximate locations to the components of East Anglia ONE. This has meant that the site locations of the onshore components have already been established through East Anglia ONE.

25. The process of site selection carried out through East Anglia ONE took into careful consideration the specific location of the East Anglia ONE and the East Anglia THREE landfall location, onshore cable route and converter station / substation, as well as consideration of the components of a future East Anglia project. In terms of the landfall location and onshore cable route, consideration has been given to how these components would fit best with the existing features and characteristics of the area, avoiding especially sensitive landscape and visual receptors, in both urban and rural areas.

26. In terms of the East Anglia ONE converter station and the East Anglia THREE substation, their location next to the existing National Grid substation near Bramford means that the impacts of this type of development would be concentrated within a localised area already influenced by large scale energy infrastructure. Furthermore, it would be in an area where there is existing woodland cover surrounding most aspects of the site, which would help to screen the East Anglia ONE converter station and East Anglia THREE substation. This concentration of development would, however, have the potential to give rise to cumulative impacts. This matter has been addressed within the East Anglia THREE ES, Chapter 29 Seascape, Landscape and Visual Amenity.

5.1.2 Design of Components

27. As the majority of the components would be procured following consent, their exact dimensions and appearance are unknown at this stage in the project. For the purposes of the EIA, assumptions are made about the components based on a worst case scenario to ensure that all potentially significant effects are reported.

28. The general premise in the design and selection of components would be to minimise the potential landscape and visual impacts by reducing the size and scale of the components and ensuring their colours are subtle, blending in with the natural colours of the rural context. This would reduce the prominence of these components and in so doing reduce their potential impact.

5.1.3 Integration of Components into Local Site Context

29. Consideration of the more detailed location of the components and how they sit in relation to existing landform and other landscape features, most notably trees and hedgerows, has been considered in the design of the layout and will be considered further in the refinement of the layout once the dimensions of the specific components are fixed.

30. The general premise in the detailed layout of components would be to use natural landform and existing tree and hedgerow cover to screen the components of the proposed East Anglia THREE project, where at all possible. This can work in two ways with either, landform and vegetation providing close range screening of the components, or landform and vegetation providing medium range screening of the components to visual receptors.

5.1.4 Mitigation of Potential Impacts

31. The mitigation of potential impacts has been considered through embedded mitigation in the form of proposed planting and earth mounding. In respect of the East Anglia THREE substation, the majority of the mitigation measures would be undertaken, prior to the commencement of the proposed East Anglia THREE project, as part of East Anglia ONE. East Anglia ONE mitigation would involve the implementation of substantial woodland planting to the south-west, immediate north, and east of the East Anglia THREE substation, with the planting to the south-west and east taking place on earth bunds 5m and 2m high respectively.

32. While existing woodland currently screens those aspects to the west, north-west and north-east, the proposed mitigation planting would provide visual screening for the East Anglia THREE substation from all aspects. The mitigation planting to the south-west would be set on a 5m high bund which would add to the relative height of the trees.

33. The mitigation planting would be designed to comprise a mix of faster growing 'nurse' species and slower growing core 'species'. The core species would comprise a mix of preferred native species that would outlive the nurse species and characterise the woodland structure over the longer term. It is anticipated that the growth rate of these species would be 200-300mm per annum taking into account the clay soils and the 'made' nature of the land. The nurse species would be faster growing and shorter-lived, providing shelter to bring on the core species. The mix may contain species such as alder, birch, poplar and rowan, with average growth rates of 400mm per annum. It is anticipated that 8m growth would take 20 years and that at the end of the 25 year consent period the trees would have reached approximately 11m (assuming planting height of 1m). The nurse species would be sufficiently fast growing to provide substantial screening of the East Anglia THREE substation towards the last 5 to 10 years of the consent period.

34. It is anticipated that the construction of East Anglia ONE, including mitigation planting, would commence in 2017. As the construction of the proposed East Anglia THREE project is due to commence at the earliest between 2020 and 2025, the mitigation planting would already have had a minimum of three years of growth which equates to approximately 1.2m in height on top of a base height of approximately 1m (for the faster growing nurse species). The mitigation planting to the south-west would be set on a 5m high bund, and to the east on a 2m high bund, which would add to the relative height of the trees. This would mean by the time the proposed East Anglia THREE project would be constructed, the nurse species in the mitigation planting would be at a height of approximately 7.2m in the area to the south-west, 4.2m in the area to the east and 2.2m in the area to the immediate north. It is anticipated that by the end of the 25 year consent period, the planting to the south-west, immediate north and east would be at a height of approximately 12.2m, although with the bunding to the west and east the total height would be 17.2m and 14.2mDetailed information on embedded mitigation in relation to the East Anglia THREE substation is contained within an Outline Landscape and Ecological Management Strategy (OLEMS).

35. In respect of the East Anglia THREE landfall location and onshore cable route, again, the majority of the mitigation planting would take place prior to the commencement of the proposed East Anglia THREE project, as part of East Anglia ONE. Note that this planting comprises infill of affected hedgerows and planting of removed trees.

36. As the proposed East Anglia THREE project will only require the pull-through of cables the impact of the construction works will be greatly reduced in terms of geographical extent. This means than much of the East Anglia ONE replacement

planting will remain undisturbed and therefore be able to grow and become well established. The mitigation planting in specific areas required for the proposed East Anglia THREE project construction will be removed and replanted following completion of the construction stage. The effects of a scenario in which East Anglia ONE infrastructure is retained to be used as part of the proposed East Anglia THREE project is addressed in *Appendices 23.7* and *29.5*.

5.2 Baseline Considerations

37. The majority of the landscape throughout the study area is agricultural, with intensive arable production being the main type of farming. While the majority of the landscape has been modified by agricultural practices, there are a number of areas where the special qualities of the natural landscape are evident, such as the beaches and cliff faces, the estuarine marshes and flats, the riverside edges and the woodlands, many of which are ancient and which occur repeatedly across the wider landscape. The prolific extent of hedgerows and trees play an important role in providing enclosure and adding visual interest in an otherwise low and predominantly open landscape.

38. More sensitive landscapes are denoted by the national Area of Outstanding Natural Beauty (AONB) designation and the local Special Landscape Area (SLA) designation. The AONB is associated with the coast and heathlands in the east of the county while the SLA designations are typically associated with the more rural valleys and meadowlands.

39. The presence of existing large scale energy infrastructure is part of the baseline character of this landscape. The National Grid Substation near Bramford marks a convergence of electricity transmission lines, which approach from many different directions. Whilst this effect dissipates with distance, electricity transmission lines are a typical feature of many of the surrounding landscapes. Furthermore, the East Anglia ONE converter station forms part of the predicted baseline for the proposed East Anglia THREE project. Without the construction of East Anglia ONE, the proposed East Anglia THREE project would be unlikely to be implemented as it needs to utilise much of the infrastructure that will be implemented through East Anglia ONE.

5.2.1 Characteristics and Design Opportunities

40. A key feature of the Suffolk landscape, is the extent of mature woodland and hedgerow cover. This comes in the form of woodland blocks, copses, tree belts and hedgerows. This creates a pattern of enclosure across much of the landscape and contributes to the intimate and enclosed character of the countryside. This is

especially evident in the local landscape around the East Anglia THREE substation site. In the coastal areas, where the landscape typically comprises fewer and less dense hedgerows, a more open and exposed character is experienced. The pattern of enclosure is also lost in areas where hedgerows have been removed to create larger fields and this has detracted from the rural character.

41. The enclosed pattern of the landscape often restricts views to within the close range and greatly reduces the potential for landscape and visual impacts to arise from beyond this close range. The enclosure would help to screen the components of the proposed East Anglia THREE project, although the scale of the larger components, most notably the East Anglia THREE substation, would potentially be accentuated by the contrast with the smaller scale trees and hedgerows.

5.3 Design Principles and Recommendations

42. As the onshore works comprise a range of specific components with specific features and characteristics, specific design principles and recommendations are required for these different components. The potential impacts of the landfall location and onshore cable route would be very different from the potential impacts of the substation and this is reflected in the information presented in section 5.3.1 and 5.3.2.

5.3.1 Landfall Location and Onshore Cable Route

43. The key principles in the design of the landfall location and onshore cable route have been as follows:

- To keep the components concentrated in a localised area in order to minimise the geographical extent of their impact;
- To use existing woodland and hedgerows to screen and, therefore, reduce the potential impacts of the haul roads and construction consolidation sites (CCSs); and
- To manage the layout of the components and construction works to ensure the optimum extent of East Anglia ONE mitigation planting remains undisturbed.

44. The potential impact of the East Anglia THREE landfall location and onshore cable route has been greatly reduced by the pull through method for the installation of cables. In terms of design considerations, this in turn, has greatly reduced the need to mitigate potential impacts.

5.3.2 Substation

45. The key principles in relation to the East Anglia ONE converter station were agreed with Suffolk County Council and Mid Suffolk District Council. These principles are equally applicable to the East Anglia THREE substation and have been considered throughout. The principles are set out in Table 2 below.

46. The following design principles emphasise the need for substation design to be sensitive to place and minimise visual impacts as far as possible. They reference the need to consider appropriate building design and material, to ensure blending with the local environment and minimisation of visual clutter. The principles also reference a desire to have regard to ecological mitigation and enhancement which dovetails with a sustainable drainage strategy. Lastly, the design principles from the Local Planning Authorities highlight the need for full engagement with local communities and for the substation to be exemplar in terms of design.

Table 2 Design Principles for the East Anglia THREE substation.

Principle	Description
1	EATL is committed to engagement with Parish Councils, local residents and relevant authorities (Suffolk County Council, Mid Suffolk District Council and Babergh District Council) on design and landscaping in order to discharge DCO Schedule A, Part 3, Requirements 10 and 12.
2	Appropriate building design and materials will be actively sought as part of the procurement process. The East Anglia THREE substation must be sensitive to place, with visual impacts minimised as far as possible by the use of appropriate design, building materials, shape, layout, coloration and finishes.
3	The height of the substation hall and ancillary equipment will be kept to a minimum and the slab level will be lowered to the most practical level.
4	Landscaping to minimise the visual intrusion, and respond to local landscape character and biodiversity will be undertaken and considered with building design and layout of ancillary structures. Delivery of this principle will be guided by implementation of the Outline Landscape and Ecological Management Strategy..
5	Design should have regard to the potential for embedded ecological mitigation and enhancement (excluding green and brown roofs and green walls), with particular attention to lighting, large areas of glass and baffling of noise sources. Examples of items of ecological enhancement which could be considered include: 1. Reptiles and amphibians - refugia and hibernacula in habitats around station 2. Bird boxes (e.g. Barn Owl boxes) in surrounding habitat and on site 3. Swift bricks installed into buildings 4. Bat boxes in planting around site 5. Insect boxes on site 6. Hedgehog hibernation boxes on site In addition, the sustainable drainage system (SuDS) solution for the site as a minimum would be likely to include a ponded area, which could represent habitat creation on the site.

Principle	Description
6	A SuDS drainage strategy will be developed in accordance with DCO Requirement 16 relating to a Surface Water and Drainage Management
7	Opportunity will be provided through development of the final design and landscaping proposals to engage with, and seek feedback from, local communities who will be directly affected by the substation.
8	The design should be subject to design review, in consultation with the relevant local authorities. This could involve the Design Council or Shape East. The output of which, if it is appropriate to do so, will form part of the procurement process, as set out in Figure 2.

47. The site for the East Anglia THREE substation benefits from the screening effect of existing woodland. Mitigation planting is proposed as part of East Anglia ONE which will occur to the south-west, immediate north and east, with further mitigation planting proposed as part of the proposed East Anglia THREE project to the north. The potential impact of ash die back to the screening effect of existing woodland for the proposed East Anglia THREE project, and the management strategies that aim to mitigate these effects, are set out in the OLEMS

48. In terms of the design of the substation halls (LFAC solution) or converter halls (HVDC solution), the aim would be to ensure the appearance of the buildings are as subtle and well integrated with the rural character as possible. It is recognised that owing to the scale of the buildings and their specific function, they will not follow any traditional precedent in the local context, but will instead establish a carefully considered and responsive design that relates to the other large scale energy infrastructure in the vicinity. Consideration will be given to the use of form and how this relates to the form of the East Anglia ONE converter station, as well as the use of colour and texture and how the detailed design of mitigation planting and boundary treatments will contribute to the overall appearance. A typical converter layout is shown in *Diagram 2*.

49. Integration of the building into the local landscape will be further assisted by detailed landscape planting using a selection of appropriate indigenous species to increase site biodiversity.

50. Examples of the baseline context for buildings within the local area are provided in *Figure 1*.

Figure 1 Examples of Baseline Context

The distinct style for the wall treatment in the local area is weather board cladding as stand alone or in combination with either rendered walls or brick walls.

Surrounding areas are predominantly rural in nature; however some areas do exhibit a mix of rural and urban due to the existing sub-station, transmission lines and pylons.

Different architectural styles and materials for external facades for residential areas, recreational buildings, barn conversions and barns in local area.

Contemporary barn buildings are generally clad in steel. The cladding are either vertical or horizontal. Many of the recent developments have traditional weather- boarding. (e.g. the Waterfront Café near Bramford)

6 ONSHORE PROJECT DESIGN

6.1 Design and Access Principles

51. The key onshore components of the proposed project comprise:

- The landfall location;
- The onshore cable route; and
- The substation.

52. The design of the onshore components presents an indicative design solution that takes account of: local site context, constraints and opportunities; stakeholder responses; planning policy objectives; and the outcomes of various environmental assessments undertaken (e.g. landscape, visual and ecological surveys).

6.2 Landfall Location and Onshore Cable Route Design

6.2.1 Use

53. In relation to the proposed East Anglia THREE project, it is assumed that East Anglia ONE would be constructed. Horizontal Directional Drilling (HDD) construction works would already have taken place at the landfall location, and as a result the impact of the East Anglia THREE construction works would be greatly reduced, requiring smaller scale of works than that required for East Anglia ONE. As the cable ducts would already be installed, the main feature of the construction process would be construction of the transition bays and pulling through of the onshore cables.

54. Cable pulling operations would be undertaken at up to 62 locations along the onshore cable route. At each of these locations, there would be a requirement to construct up to two jointing bays and four kiosks, and in addition access would be required to these locations. This would be either via haul road for isolated jointing bay locations, upgraded track access or directly from the public highway wherever possible. A diagram showing the cross section of an installed haul road is shown in Diagram 1. In some locations, removal of hedgerows and other types of vegetation would be required for the construction of the jointing bays. Under the Single Phase approach both jointing bays would be constructed in one construction period, while under the Two Phased approach, one would be constructed in the first phase and the other in the second phase.

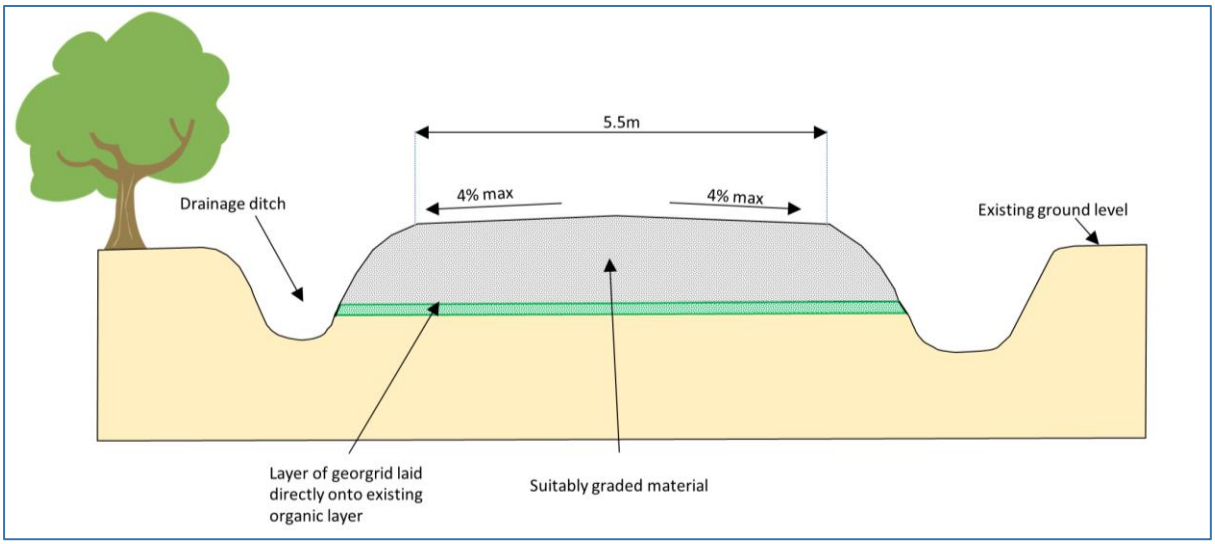


Diagram 1 Cross Section of Installed Haul Road

55. Two primary construction consolidation sites (CCSs) have been identified; Top Street, Martlesham and Paper Mill Lane, Bramford. Both primary construction consolidation sites will likely form the principal means of access along the onshore cable route, and will also act as an interchange hub for deliveries.

56. Up to five secondary CCSs will also be formed along the onshore cable route. These will act as secondary access / interchange hubs and will be located at:

- Bramford substation site;
- B1077 Witnesham Road;
- Playford;
- North of Newbourne; and
- Park Lane, north-west of Kirton.

6.2.2 Amount and Scale

57. The landfall location would occupy a short section of beach near Bawdsey with up to four offshore export cables making landfall.

58. The East Anglia THREE onshore cable route would be approximately 37km in length, following the East Anglia ONE onshore cable route from the landfall to the substation at Bramford. Under either the HVDC or LFAC electrical solutions cables would be installed in up to four ducts (up to four cables for HVDC and up to 12 cables in the LFAC solution).

59. Sections of cabling would be connected together in jointing bays along the route. Under a Single Phase approach, two jointing bays each containing two HVDC cables or six LFAC cables would be created side by side during the same construction period. This will occur at up to 62 locations, therefore creating 124 jointing bays along the cable route. Under a Two Phased approach a single jointing bay containing two or six cables would be constructed at each location during each phase, also resulting in 124 jointing bays.

60. Where possible jointing bays would be located at the edges of field boundaries or roads to facilitate future access for maintenance and inspection purposes, and to reduce visual intrusion. These would be secured by fencing during the construction phase to prevent unauthorised access.

6.2.3 Layout

61. From the identified landfall point, the proposed onshore cable route would run in a north-westerly direction through predominantly agricultural land. Approximately 3.5km from the landfall the onshore cable route heads south-westerly, crossing the designated River Deben and continuing across agricultural land in a westerly direction for approximately 1.25km.

62. The cable route then bears north past the settlement of Falkenham for approximately 1.25km. The route continues north-east of the settlement of Kirton for approximately 6.23km, passing the settlement of Newbourne and west of Waldringfield, and passing Martlesham to the west.

63. The onshore cable route then turns west, passing between the settlements of Great Bealings and Little Bealings before heading north of Ipswich. West of Tuddenham St. Martin, the route turns in a north-westerly direction for approximately 1.25km before turning south-westerly to cross the border between Suffolk Coastal District and Mid Suffolk District.

64. The route continues in a westerly direction for 3km to the south of Claydon, before travelling in a south-westerly direction for approximately 3km before reaching the East Anglia THREE substation site.

6.2.4 Access

65. Land access to the beach may be required for construction of the landfall location; this would require the use of tracked vehicles and the construction of a temporary ramp constructed over the existing cliff at the landfall location.

66. During the construction of the proposed East Anglia THREE project it would only be necessary to access the jointing bay locations to construct the bays themselves and

pull through the cables. Therefore East Anglia THREE accesses are not the same as those required for East Anglia ONE, where a haul road will be built along the entire length of the onshore cable route. This has provided EATL with the opportunity to reduce the amount of haul road required for the construction process. EATL will look at any opportunities to leave the haul road in place between projects or phases to further minimise impacts.

67. In order to facilitate construction traffic and construction related deliveries, temporary modifications may be required at locations on the existing public road network. It is anticipated that the works would be concentrated at junctions and would allow larger vehicles than normal to access certain parts of the public road network.

68. Where possible, accesses would make use of existing tracks to link between the public road network and the onshore cable route. There may be a requirement to upgrade some existing tracks to make them suitable for the transportation of large vehicles. This would be completed by using a method which is both suitable for EATL and is agreed by the landowner, and in the case of PRoW, agreed by SCC.

69. The road will be formed of imported material on a geo-textile base, with the use of temporary matting (bog mats) possible. This will be accessible from agreed locations on the surrounding local road network, such as the primary construction consolidation sites described earlier in this DAS, and from locations commonly used for agricultural vehicles and machinery.

70. The eventual length of temporary haul road required will be dependent on the detailed design and final location of the jointing bays. However it is estimated that using the indicative jointing bay locations, the total length of temporary haul road would be up to 17.8km in length and 5.5m in width.

71. At locations interfacing with the existing public rights of way (PRoW) network, there will be two approaches taken.

72. It is considered that where the PRoW interaction is limited to the installation of haul road across the PRoW, then no closure and diversion would be required whilst the short section of haul road is laid (and removed at the end of the construction period). During the installation and removal of the haul road, the ongoing use of the PRoW by the public would be maintained by the use of banksmen to ensure temporary cessation of haul road laying works and safe passage of users. Once the haul road is installed across the PRoW, further management measures (i.e. signage) would ensure that haul road users are aware of the potential for PRoW users to

cross their path, and PRoW users are aware of the hazards to allow both to operate together safely.

73. It has been agreed between SCC and EATL that only where a haul road or upgraded access track is formed from an existing PRoW would there need to be a diversion. PRoW requiring closure will be closed for the minimum time practical and commensurate with the work requirements and restoration proposed. Diversionary routes will be agreed with the relevant Highways Authority.

74. Post construction, future access to the jointing bays will either be provided via a small kiosk; this will be undertaken on an annual basis using off-road vehicles to reach each location where required.

6.2.5 Appearance and Landscaping

75. Temporary fencing will be installed along the working width boundaries, with gates and stiles incorporated where access is required to be maintained for landowners and PRoW users.

76. High visibility fencing would be installed to clearly demarcate infrastructure crossings (such as gas pipelines or overhead power lines). Temporary fencing will also be established around existing trees and vegetation to provide protection during the construction phase.

77. Separation of topsoil and subsoil through stripping and careful storage to heights no greater than 2m will ensure soil qualities and properties are maintained.

78. Post installation of the onshore cable, the working width and any associated compound areas would be reinstated to their previous condition. Works would typically include topsoil reinstatement, reseeding of grassland, margins and banks, and planting in line with the Landscape Strategy currently under development through discussion with local authority stakeholders.

79. As the onshore cables will be buried below ground, the only visible elements of onshore cable route infrastructure following construction will be those associated with access and inspection arrangements to the jointing bays or kiosks.

6.3 Substation Design

6.3.1 Use

80. Under either the HVDC or LFAC electrical solutions, the maximum case for the proposed East Anglia THREE project is for two adjacent onshore substations within the same compound.

81. The uses associated with the substation are dictated by the functional requirement of the operations that will be undertaken. The design and engineering processes have identified the need for electrical plant and equipment to control and facilitate the export of electricity from the windfarm to the national electricity transmission network.

6.3.2 Amount and Scale

82. At this stage in the development of the proposed East Anglia THREE project, EATL have not yet decided whether to use the LFAC or the HVDC electrical solution. Procurement activities to appoint a supplier of the substation have not commenced. As such, the exact scale and form of the East Anglia THREE substation cannot yet be confirmed. For the purposes of the ES an indicative design for the East Anglia THREE substation has been provided with reference to a Rochdale Envelope approach in terms of realistic worst case design parameters.

83. On this basis, it is proposed that the East Anglia THREE substation will be located within a single compound of maximum dimensions 150m wide x 190m long. Within this compound, from a worst case visual impact perspective two substation buildings would be constructed to a height not exceeding 25m (to ridge line). These buildings themselves will be of maximum width of 58m wide and 85m in length. The maximum height of equipment and ancillary buildings generally would be 15m or lower.

6.3.3 Layout

84. For both the HVDC and LFAC solutions up to two substations would be built under the Single Phase and one substation would be built during each phase under a Two Phased approach.

85. In the HVDC electrical solution, in addition to the main converter halls, the onshore converter station compound would contain electrical equipment including power transformers, switchgear, reactive compensation equipment , harmonic filters, cables, lightning protection masts, control buildings, communications masts, backup generators, access, fencing and other associated equipment, structures or buildings. The station would have a compact layout, with the majority of equipment contained in typical agricultural style buildings.

86. The substation(s) would be enclosed by a fence surrounding the external equipment outlined above. Other infrastructure and equipment will be included within the compound such as interconnecting cables, access tracks, hard standing, car parking, water tanks, communications mast, diesel generators and welfare facilities.

87. The proposed substation would be connected to the existing National Grid substation at Bramford by means of underground cables to be installed within ducts prelaid by National Grid. Space will also be required for the HVAC equipment to link the substation to the existing National Grid Equipment.

6.3.4 Access

88. Access to the substation compound will be served from Bullen Lane, which leads eastwards to the B1113. This road already serves the existing Bramford substation and is suitable for use as a means of permanent access.

89. The road is considered suitable to carry the vehicles anticipated to be associated with the construction of the substation, and the alignment of Bullen Lane from its eastern end with the B1113 is adequate to accommodate abnormal loads.

90. Mitigation for aspects such as the movement of abnormal loads on the local highway network will be set out within a Traffic Management Plan and agreed with the relevant highway authorities.

91. The substation has been designed as an industrial development and has not therefore been designed to be fully accessible by the public. Internal access within the substation will be achieved by a dedicated access road circumventing the buildings and equipment within the compound.

6.3.5 Appearance and Landscaping

92. Enabling works will be undertaken to level the site in advance of the main construction works, with any materials being retained on site for reuse as part of the Landscaping Strategy, where possible.

93. A temporary fence will be erected along the boundaries of the proposed substation site following site clearance; and will remain in place throughout the duration of the construction works.

94. The external appearance of the substation has been driven by a need to achieve the desired functionality whilst giving due regard to the overall character of the receiving environment. The substructures of the substation halls will be formed of steel and composite cladding set around prefabricated steel framework. The control building would also include brickwork / blockwork, internal partitioning and utility connections. It is anticipated that the substation will have olive green facades and a grey roof.

95. Based on the indicative dimensions of the substation buildings stated as 58m wide, 85m long and with height to eves and roof-line of 21.35m and 25m respectively, a

roof profile of 6.6 degrees would result. The roof would be constructed from profile metal sheeting. Again this scenario is assessed to represent the worst case in terms of visual impact.

96. The design of the HVDC or LFAC substation will be the subject of discussion with the relevant local authorities who will be required to approve the final proposal before construction can commence.

97. Areas not covered by hardstanding within the compound will be finished in stone chippings over an appropriate sub-base surface.

98. Landscaping forms an integral part of the design of the substation. A combination of earthworks and planting measures will be implemented in order to provide visual screening and containment of the compound and the visually intrusive outside air insulated switchgear from properties to the south-west. A landscape strategy is under development with local authority stakeholders.

6.3.6 Lighting

99. As a worst case scenario it has been assumed that some periods of 24 hour construction may be required, for which task related flood lighting may be necessary.

100. Security has been a key consideration during the initial design phase of the substation. With this in mind operational lighting requirements at the substation site may entail:

- Security lighting round perimeter fence of compound, to allow CCTV coverage;
- Car park lighting – as per standard car park lighting, possibly motion sensitive; and
- Repair / maintenance – if large works, then task related flood lighting may be necessary.

101. No additional lighting is proposed along Bullen Road or along the additional access roads within the substation location. Note that no works may commence until written details of any external lighting have been submitted to and approved by the relevant planning authority.

7 SUMMARY

102. This DAS forms part of the suite of documents submitted as part of the DCO for the project, and sets out the various principles, concepts and considerations incorporated into the design of the onshore electrical transmission works.

103. The design of the proposed East Anglia THREE project is part of an ongoing process in which EATL is committed optimising the quality of the design following the principles set out in this DAS. The design-development process has built upon advice received by the East Anglia ONE project and has been informed by targeted consultation with key stakeholders, the responses of whom have influenced site selection, design evolution and accessibility considerations.

104. The site for the East Anglia THREE substation building benefits from excellent existing screening and also from additional screening proposed by the East Anglia ONE project. Further screening can easily be accommodated within the site which is in keeping with the existing landscape character.

105. Although indicative at this stage, the design for the converter station will set out to achieve a high standard of design whilst at the same time balancing the operational requirements of the facility with the character and appearance of the existing environment.

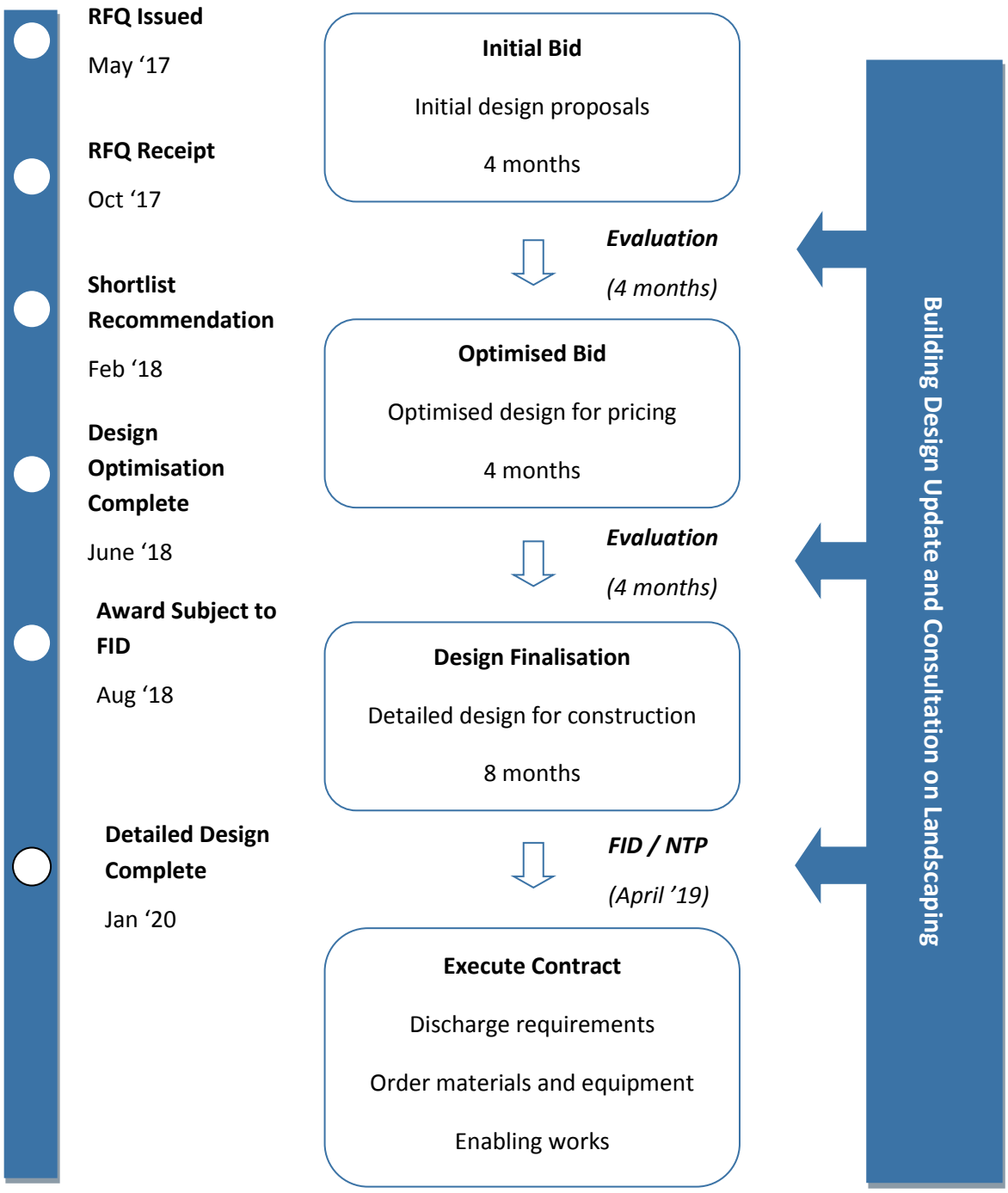
106. It is considered that a simple agricultural form of building is appropriate for this location and that design considerations should focus on choice and articulation of facing materials. Planting incorporated into the overall design will ensure the various project components successfully integrate with the local landscape pattern over time.

107. There will be no requirement for public access to the converter station compound, and appropriate security measures will be installed to prevent unauthorised access to the onshore electrical transmission works once operational.

108. Integration of the building into the local landscape will be further assisted by detailed landscape design including the planting using a selection of appropriate indigenous species to increase site biodiversity.

Diagram 2 Typical Layout of a 1000MW HVDC Converter Station

Figure 2 Grid Transmission Procurement – Indicative Timing



Document 8.3 Ends Here