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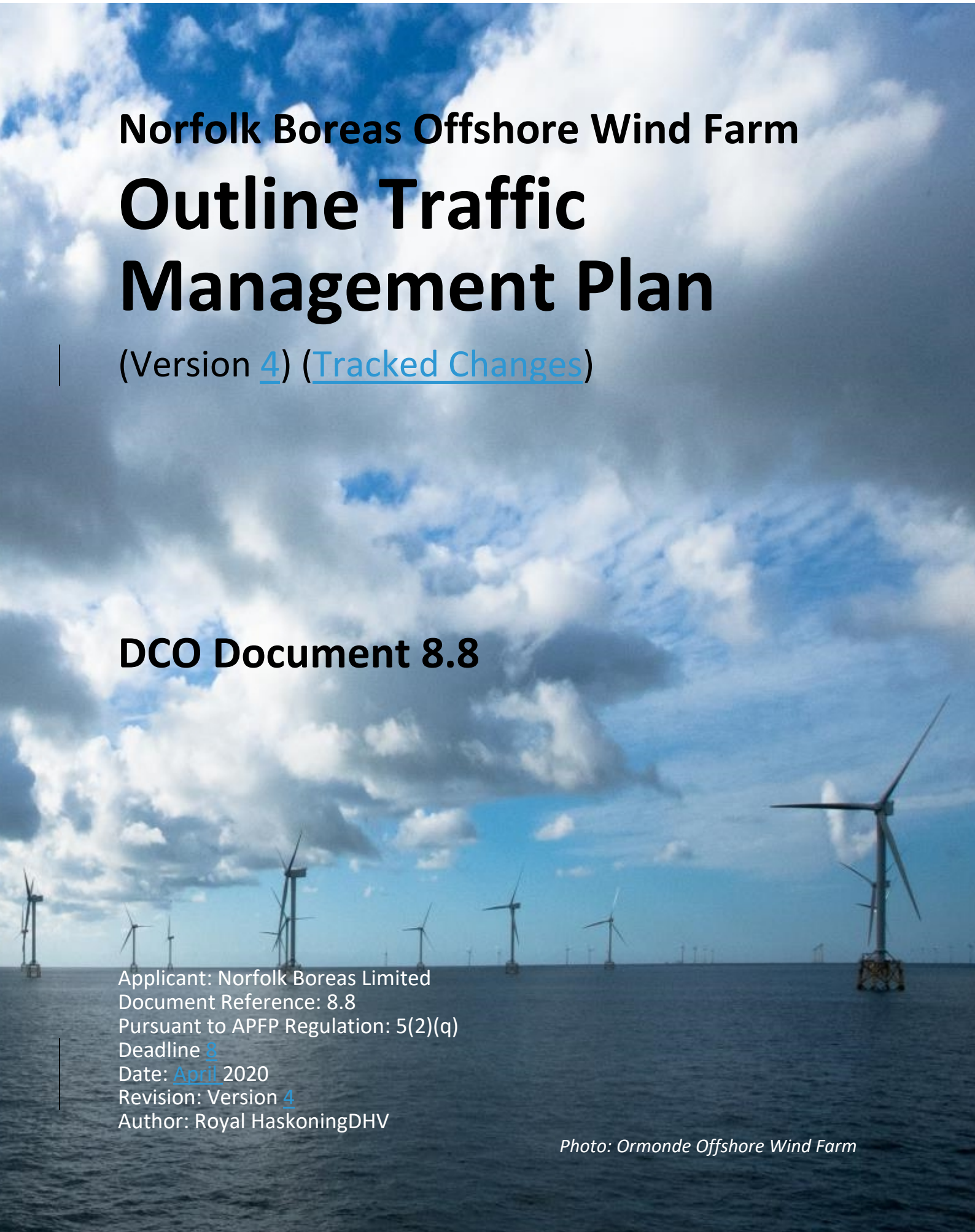

Norfolk Boreas Offshore Wind Farm

Outline Traffic Management Plan

(Version 4) (Tracked Changes)

DCO Document 8.8

Applicant: Norfolk Boreas Limited
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07/04/20	04F	Final for Deadline 8 submission	RE/CD/AR	JT	JL

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Glossary of Acronyms

AADT	Annual Average Daily Traffic
AC	Access
AILs	Abnormal Indivisible Loads
AMP	Access Management Plan
CIA	Cumulative Impact Assessment
DCO	Development Consent Order
EIA	Environment Impact Assessment
ES	Environmental Statement
ESDAL	Electronic Service Delivery for Abnormal Loads
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
HVDC	High Voltage Direct Current
MA	Mobilisation Area
NCC	Norfolk County Council
OAMP	Outline Access Management Plan
OTMP	Outline Traffic Management Plan
OTP	Outline Travel Plan
RSA	Road Safety Audit
TC	Trenchless Crossing Point
TMP	Traffic Management Plan
VWPL	Vattenfall Wind Power Ltd

Glossary of Terminology

Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
Control Point	A location that provides the checks and controls for the movement of HGVs and employees.
Delivery	A delivery is the process of transporting goods from a source location to a predefined destination. A delivery will generate two vehicle movements (an arrival and departure)
Ducts	A duct is a length of underground piping, which is used to house electrical and communications cables.
Jointing pit	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts
Landfall	Where the offshore cables come ashore at Happisburgh South
Landfall compound	Compound at landfall within which HDD drilling would take place
Landfall zone	Area within which the landfall would be located
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing low voltage electrical earthing links.
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
National Grid new / replacement overhead line tower	New overhead line towers to be installed at the National Grid substation.
National Grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
National Grid temporary works area	Land adjacent to the Necton National Grid substation which would be temporarily required during construction of the National Grid substation extension.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard
Onshore 400kV cable route	Buried high-voltage cables linking the onshore project substation to the Necton National Grid substation
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation
Onshore infrastructure	The combined name for all onshore infrastructure associated with the project from landfall to grid connection.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to

	HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Running track	The track along the onshore cable route which the construction traffic would use to access work areas.
The Applicant	Norfolk Boreas Limited
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Trenchless crossing zone	Areas within the onshore cable route which will house trenchless crossing entry and exit points.
Vehicle (HGV, Traffic) movement	A single trip (i.e. either an arrival to, or departure from site) for the transfer of employees or goods.
Vehicle (HGV, Traffic) flow	Total vehicle movements on a road (highway link).

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1 INTRODUCTION

1.1 Background

1. This document forms part of the Development Consent Order (DCO) application for the onshore project area of the Norfolk Boreas Offshore Wind Farm (herein 'the project').

2. A traffic and transport impact assessment has been undertaken for the project and is detailed in Chapter 24 Traffic and Transport of the Environmental Statement (ES) (document reference 6.1.24).

3. In respect of traffic and transport, the certified plans referred to in the DCO are outlined below:

   - Outline Traffic Management Plan (OTMP) (document reference 8.8): the OTMP sets out the standards and procedures for managing the impact of Heavy Goods Vehicles (HGV) traffic during the onshore construction period, including localised road improvements necessary to facilitate the safe use of the existing road network;
   - Outline Travel Plan (OTP) (document reference 8.9): the OTP sets out how onshore construction employee traffic would be managed and controlled; and
   - Outline Access Management Plan (OAMP) (document reference 8.10): the OAMP sets out details on the location, frontage, general layout, visibility and embedded mitigation measures for access for the onshore project substation, landfall and points of access to the onshore cable route. It presents the requirements and standards that will be incorporated into the final access design.

4. Final plans which accord with these outline documents must be submitted to and approved by the relevant local planning authority (in consultation with Norfolk County Council (NCC) and Highways England (HE)) prior to commencement of any relevant works, as per Requirements 21 and 22 of the Draft DCO.

5. The OTMP is complimented by the OAMP which details additional measures to facilitate vehicles (particularly HGVs) to safely access the main distributor highway network via the identified accesses and minor routes during the onshore construction period.

6. The OTMP does not consider the operational period of the onshore infrastructure as minimal traffic would be generated by the daily operation and periodic maintenance at the onshore project substation and at link boxes along the onshore cable route.

7. Following appointment of a contractor, the measures outlined in the respective plans would be validated and optimised during the detailed design phase post

consent in consultation with NCC and HE.

1.2 Development Scenarios

8. Vattenfall Wind Power Limited (VWPL), the parent company of Norfolk Boreas Limited, is also developing Norfolk Vanguard, a 'sister project' to Norfolk Boreas. The Norfolk Vanguard project is approximately one year ahead of Norfolk Boreas in its development programme having submitted its DCO application in June 2018. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking consent to undertake the duct installation and some enabling works for both projects at the same time. This is the preferred option and considered to be the most likely however, Norfolk Boreas needs to consider the possibility that Norfolk Vanguard may not proceed to construction.

9. Therefore, it is necessary for this OTMP to consider the following two alternative scenarios:

- **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
- **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.

1.3 OTMP Approach to Development Scenarios

10. This OTMP is an outline strategy and takes account of both potential development scenarios for the project as discussed in section 1.2.

11. Where proposed mitigation measures would differ under Scenario 1 or Scenario 2, this is explicitly stated and mitigation measures are provided for both scenarios. Otherwise the mitigation detailed is applicable to both scenarios.

12. The final OTMP for the project will be drafted post consent, in consultation with NCC and HE, and drafted based on the final adopted scenario which would be taken forward to construction.

1.4 Purpose of the OTMP

13. The purpose of the OTMP is to capture and secure the mitigation principles that, for the construction phase of the onshore elements of the project, are to be included in the final Traffic Management Plan (TMP) to be submitted pursuant to the discharge of Requirement 21(a) of the Draft DCO.

14. During the operational phase, traffic movements would be limited to periodic maintenance at the substation and link boxes/test pits along the onshore cable

route. Due to the limited nature of these operations, the OTMP does not consider operational traffic movements.

1.5 Consultation

15. Norfolk Boreas Limited has undertaken pre-application consultation on the project in accordance with the requirements of the Planning Act 2008.

16. Consultation regarding traffic and transport has been conducted through a Scoping Report (Royal HaskoningDHV, May 2017), a Traffic and Transport Method Statement (Royal HaskoningDHV, 2018, unpublished) and the Expert Topic Group Meeting held in May 2018. Consultation has also been undertaken through the publishing of the Preliminary Environmental Information Report (Norfolk Boreas Limited, 2018) and subsequent public Drop In Events in November 2018.

17. The ETG included transportation professionals from NCC, HE and Norfolk Boreas Limited. Whilst not a member of the ETG, Suffolk County Council were kept informed of developments, noting that the south east tip of the traffic and transport study area encompassed two roads within their administration area.

18. Further ongoing consultation has been undertaken through the Norfolk Vanguard DCO examination process which in turn has informed the development of this document and the refinement of the mitigation measures presented. Information presented as part for the Norfolk Vanguard examination process up to Examination Deadline 7 (2nd May 2019) has been included in this document. However, at the time of writing it is recognised that a number of items are still under discussion and the intention is this document will be updated, if required, during examination.

19. Further details of consultation undertaken to date is outlined within Chapter 24 Traffic and Transport of the ES (document reference 6.1.24).

1.6 Interactions with Other Projects

1.6.1 Hornsea Project Three

20. The Hornsea Project Three application for development consent was submitted in May 2018 setting out a proposal to develop an offshore wind farm located in the southern North Sea, with a total generating capacity of up to 2,400MW.

21. The outline Export Cable Route (ECR) of Hornsea Project Three will make landfall at a location between Sheringham and Cley next the Sea. From the landfall location, the ECR heads approximately 55km south to connect to the Norwich Main National Grid Substation. A high level construction programme indicates that onshore construction is currently planned to commence in 2021 and last for a period of six years. Hornsea Project Three's construction could coincide with Norfolk Boreas's Scenario 2 duct

installation and onshore project substation construction works period should both projects proceed to construction on forecasted programmes.

22. This OTMP identifies the highway links that would be shared by both projects (in accordance with the CIA within ES Chapter 24 Traffic and Transport) which considers the final traffic numbers presented for Hornsea Project Three and sets out the measures and commitments to ensure the cumulative traffic impacts would be managed below significant (environmental impact) levels (in accordance with the EIA Methodology set out in ES Chapter 6, major and moderate impacts are deemed to be 'significant').

23. The respective Outline Code of Construction Practice (OCoCP) as submitted for both Norfolk Boreas (document reference 8.1) and Hornsea Project Three both include commitments to developing project specific Communication Plans post-consent and include a framework to set out the key points of how communications will be delivered. In order to ensure communication between the respective projects, the Communication Plans will set out the process of continued engagement between Norfolk Boreas, Hornsea Project Three and the Local Highway Authority. This will ensure that as construction programmes are refined post-consent this information is regularly shared between parties, particularly traffic demand on shared road links and that commitments to manage cumulative construction traffic demand are fully delivered; for example on a given road the two projects may have committed to programme works that ensure each scheme's peak traffic does not overlap.

1.6.2 Strategic Road Network

24. HE has proposed six improvement schemes for the A47 as part of the Road Investment Strategy (RIS) announced in 2014. Current timescales estimate that the DCO applications for these separate schemes will be submitted in either 2019 or 2020.

25. The schemes that could potentially impact on the project are:

- A47 North Tuddenham to Easton dualling;
- A47 / A11 Thickthorn Junction;
- A47 Blofield to North Burlingham dualling;
- A47 Third River Crossing (Great Yarmouth); and
- A47 Great Yarmouth junction improvements.

26. These schemes are expected to start construction in 2021 and predicted to end in 2023. The peak construction activity for these schemes is expected to finish before the commencement of construction works for Norfolk Boreas. Norfolk Boreas is scheduled for construction between 2023 and 2024 (Scenario 2) and as such, any

slippage in the programme for these separate schemes could potentially lead to cumulative impacts with the peak Scenario 2 traffic for Norfolk Boreas.

27. At this stage, three of the identified schemes have announced their preferred scheme options and further consultation is ongoing. DCO applications for these schemes have not yet been submitted and therefore it is not possible to determine the scope and scale of the construction traffic demand associated with the RIS schemes at this stage.

28. To manage potential cumulative traffic impacts, it has been agreed with HE that the management of the potential cumulative impacts can be addressed in the final submitted Traffic Management Plan (post consent) when there is greater certainty with regard to RIS scheme construction traffic data.

29. Norfolk Boreas's commitment to engage with HE to establish opportunities to co-ordinate activities and avoid significant impacts resulting from cumulative peak traffic is captured in the OCoCP (document reference 8.1) through the development of a Communication Plan.

1.7 Project Description

30. A comprehensive project description of the onshore project area is contained within Chapter 5 Project Description of the ES (document reference 6.1.5), this includes a detailed comparison of the scenarios provided in Appendix 5.1 (document reference 6.3.5.1).

31. The onshore cable route is approximately 60km in length and travels west from the landfall at Happisburgh South towards the northern edge of North Walsham before bearing southwest to the onshore project substation near Necton as shown in Figure 1.

32. The project is considering either two phases or one continuous construction phase for the cable pulling. For the purposes of the EIA, a two phase approach was assessed as the worst case for both scenarios.

1.7.1 Scenario 1

33. Under Scenario 1 Norfolk Vanguard proceeds to construction and would have undertaken the following to benefit Norfolk Boreas:

- Installation of ducts to house Norfolk Boreas cables along the entirety of the onshore cable route from the landfall zone to the onshore project substation;
- A47 junction works for both projects and installation of a shared access road up to the Norfolk Vanguard substation; and

- Overhead line modifications at the Necton National Grid substation, which will accommodate both projects.

34. Under Scenario 1 the following onshore elements of the project will be constructed by Norfolk Boreas:

- Installation of cables and ducts at the landfall;
- Cable pulling through pre-installed ducts, including reinstallation of up to approximately 12km of temporary running track;
- Construction of onshore project substation, including extension of the access road from the A47 (installed by Norfolk Vanguard);
- Extension of the Necton National Grid Substation in an easterly direction, with a footprint of approximately 135m by 150m; and
- Landscape mitigation planting.

35. There are considered two discrete stages in the Scenario 1 construction, namely;

- Stage 1: Landfall and onshore project substation primary works (including National Grid substation extension); and
- Stage 2: Two phase cable pulling, jointing and commissioning.

36. Table 1.1 details an indicative onshore construction programme for Scenario 1.

Table 1.1 Indicative project construction programme Scenario 1

Activity	Year					
	2022	2023	2024	2025	2026	2027
Landfall						
Duct Installation Option A[1]						
Duct Installation Option B[1]						
Cable pulling, jointing and commission						
Phase 1[2]						
Phase 2[2]						
Onshore Cable Route						
Cable pulling, jointing and commission						
Phase 1[2]						
Phase 2[2]						
Onshore Project Substation						
Preconstruction works						

[1]Two potential options for landfall duct installation: Option A install ducts prior to cable pulling; and Option B install ducts at the same time as Norfolk Vanguard

[2] In the two phase option, cables are installed in two consecutive years to facilitate the commissioning of the offshore wind turbine planting.

Activity	Year					
	2022	2023	2024	2025	2026	2027
Primary works						
Electrical plant installation and commission						
Phase 1[2]						
Phase 2[2]						

1.7.1.1 Scenario 1 - Stage 1: Landfall and onshore project substation primary works

37. The onshore project substation would be accessed from A47 via a permanent access which would have been constructed for the Norfolk Vanguard project and construction activities would be served by a Mobilisation Area (MA1a) and a temporary works area. The construction of the National Grid substation extension would be served by an alternative upgraded existing access undertaken by Norfolk Vanguard and would be served by a temporary works areas.

38. The landfall would be accessed via a preconstructed Norfolk Vanguard running track which would either be kept in situ for the Norfolk Boreas works or be required to be reinstalled (if reinstated by Norfolk Vanguard).

1.7.1.2 Scenario 1 - Stage 2: Cable pulling, jointing and commission

39. Cables would be pulled through the pre-installed ducts (installed by Norfolk Vanguard) in a two phase approach. This approach would allow the main civil works to be completed in advance by Norfolk Vanguard, preventing the requirement to reopen the land on a wholesale basis and minimising potential environmental impacts and disruption.

40. The cables would be pulled through the pre-installed ducts at jointing pit locations located along the onshore cable route. The jointing pits and associated accesses would be constructed to facilitate the cable pulling activities.

41. Access to the onshore cable route would be directly from the highway network (at running track crossing locations) or existing local access routes where possible. In some locations, isolated sections of the running track would be left in place from the Norfolk Vanguard duct and cable installation works or be reinstalled (if reinstated by Norfolk Vanguard) to allow access to more remote jointing pits. It is estimated that a running track would be required for up to 20% of the total onshore cable route length for the cable pulling works.

42. A review of over 200 access tracks, public highway roads and running track crossing points has been undertaken taking into account potential jointing pit locations. This has narrowed down the potential access points to the 75 locations as presented in this plan (refer to Table 3.2).

43. Figure 2 details the key components of the Scenario 1 onshore infrastructure.

1.7.2 Scenario 2

44. Under Scenario 2, the onshore elements of the project will be constructed by Norfolk Boreas:

- Installation of ducts and cables at the landfall;
- Duct installation via open trenching and trenchless crossings, including installation of 60km of temporary running track;
- Installation of mobilisation areas and trenchless crossing compounds;
- Cable pulling through pre-installed ducts, including retaining or reinstalling up to approximately 12km of temporary running track;
- Construction of onshore project substation, including installation of new permanent access road from A47 and associated junction improvement works;
- Extension of the Necton National Grid Substation in a westerly direction, with a footprint of approximately 200m by 150m;
- Modifications to the existing National Grid overhead lines; and
- Landscape mitigation planting.

45. The onshore cable route would require trenches (within which ducts would be installed to house the cable circuits), a running track to deliver equipment to the installation site from mobilisation areas and separate storage areas for topsoil and subsoil.

46. The main installation method would be through the use of open cut trenching. Ducts would be installed within the trenches and the soil backfilled. Cables would then be pulled though the pre-laid ducts at a later stage in the programme.

47. There are three discrete stages in Scenario 2 construction, namely:

- Stage 1: Pre-construction works e.g. pre-construction surveys;
- Stage 2: Duct installation works, landfall and onshore project substation primary works (including National Grid substation extension); and
- Stage 3: Cable pulling, jointing and commission.

48. Table 1.2 details an indicative construction programme for Scenario 2.

Table 1.2 Indicative project construction programme under Scenario 2

Activity	Year					
	2021	2022	2023	2024	2025	2026
Landfall						
Duct Installation						
Cable Pulling, Jointing and Commission						
Phase 1[3]						
Phase 2[3]						
Onshore cable route						
Pre-construction works						
Duct installation works						
Cable pulling, jointing and commission						
Phase 1[3]						
Phase 2[3]						
Onshore project substation						
Pre-construction works						
Primary works						
Electrical plant installation and commission						
Phase 1[3]						
Phase 2[3]						

1.7.2.1 Scenario 2 - Stage 1: Pre-construction works

49. The pre-construction stage represents a number of activities with limited traffic demand (e.g. pre-construction surveys). Access to the onshore project area would be via existing tracks; however, some new accesses may be constructed during this phase to facilitate construction at Stage 2.

1.7.2.2 Scenario 2 - Stage 2: Duct installation works and onshore project substation primary works

50. The access strategy for Scenario 2 Stage 2 has been developed to accommodate the following requirements:

- Access to mobilisation areas (MA);
- Crossing of the highway by the project 'running track'; and
- Access to trenchless crossing locations.

[3] In the two phase option, cables are installed in two consecutive years to facilitate the commissioning of the offshore wind turbine planting.

51. The onshore duct installation and onshore project substation primary works are serviced by 14 mobilisation areas. The main function of the mobilisation areas is to provide a control point for HGVs delivering to the onshore cable route, as well as providing welfare facilities, parking for staff and storage areas for materials, plant and equipment.

52. The mobilisation areas are located in close proximity to A roads and B roads to concentrate traffic demand away from minor routes. They are located away from settlements to minimise disruption to local communities.

53. The onshore cable route has been separated into 20 cable route sections, which would be accessed from the mobilisation areas via a running track. The running track would provide safe access for construction vehicles along the onshore cable route, from mobilisation areas to duct installation sites and would serve to significantly reduce the number of trips on the local highway network.

54. The running track would be up to 6m wide and may ultimately extend along the majority length of the onshore cable route, crossing the public highway in a number of locations.

55. There are a number of physical features which cannot be disturbed by trenching methods or the running track; examples of this include rivers and railway lines. To install the onshore cable route across such features, a trenchless crossing technique[4] would be employed.

56. Each trenchless crossing[4] location would require access to the 'drive' and 'reception' zone of the crossing. Access would be via the running track in the majority of cases, however some locations may be totally 'land locked' and therefore require direct access either via a private track from the public highway (referred to as a 'side access') or via a road crossing access direct into the cable route.

57. Figure 3 details the key components of the stage 2 construction phase.

1.7.2.3 Scenario 2 - Stage 3: Cable pulling, jointing and commission

58. Details of Scenario 2 Stage 3: cable pulling, jointing and commission follows the assumptions set out within paragraphs 39 to 43 of Scenario 1 Stage 2.

59. Cable pulling would not require the trenches to be re-opened. The cables would be pulled through the pre-installed ducts installed during the duct installation works at jointing pit locations located along the onshore cable route. The jointing pits and associated accesses would be constructed during the cable pull phase which would facilitate the cable pulling activities.

[4] Trenchless crossing techniques include Horizontal Directional Drilling/Auger Bore/Micro Tunnel

60. This would be achieved through access to the onshore cable route directly from the highway network (at running track crossing locations) or existing local access routes where possible. In some locations, isolated sections of the running track would be left in place from the duct installation works or be reinstalled to allow access to more remote joint locations. It is estimated that a running track would be required for up to 20% of the total onshore cable route length for the cable pulling works.

61. The development of the access strategy for this stage has been informed by a reduced demand for materials and employees (relative to stage 2) leading to a substantial reduction in forecast traffic demand.

62. A review of over 200 access tracks, public highway roads and running track crossing points (from the previous construction stage) has been undertaken taking into account potential joint pit locations. This has narrowed down the potential access points to the 75 locations as presented in this OTMP (refer to Table 3.2).

2 EMBEDDED MITIGATION

63. Norfolk Boreas Limited has committed to a number of techniques and engineering designs/modifications as part of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process.

64. A range of different information sources have been considered as part of embedding mitigation into the design of the project including engineering requirements, feedback from communities and landowners, ongoing discussions with stakeholders and regulators, commercial considerations and environmental best practice.

65. With specific regard to traffic and transport, the assessment has been a culmination of an interactive process with the project engineering consultants. This involved developing construction methodologies, undertaking a preliminary impact assessment and revising as necessary to minimise the potential impacts. This has led to a comprehensive suite of 'designed in' mitigation measures to addresses potential significant traffic and transport impact before it can manifest.

66. Full details of the embedded mitigation can be found within Chapter 6 EIA Methodology of the ES (document reference 6.1.6).

67. Table 2.1 outlines the key embedded mitigation measures relevant for this assessment. Where embedded mitigation measures have been incorporated into the design of the project with specific regard to the traffic forecasts contained in this OTMP these are described in Table 2.2.

Table 2.1 Embedded mitigation

Parameter	Mitigation measures embedded into the project design	Notes
Project Wide		
Commitment to HVDC technology	Commitment to HVDC technology minimises environmental impacts through the following design considerations; • HVDC requires fewer cables than the HVAC solution. During the duct installation phase in Scenario 2 this reduces the cable route working width to 35m from the previously identified worst case of 50m. As a result, the overall footprint of the onshore cable route required for the duct installation phase is reduced from approx. 300ha to 210ha; • The width of permanent cable easement is also reduced from 25m to 13m; • Removes the requirement for a cable relay station;	Norfolk Boreas Limited has reviewed consultation received and in light of the feedback, has made a number of decisions in relation to the project design. One of these decisions is to deploy HVDC technology as the export system.

Parameter	Mitigation measures embedded into the project design	Notes
	• Reduces the maximum duration of the cable pulling phase from three years down to two years; • Reduces the total number of jointing bays for Norfolk Boreas from 450 to 150; and • Reduces the number of drills needed at trenchless crossings (including landfall).	
Site Selection	The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules for the onshore project substation and National Grid infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts. Key design principles from the outset were followed (wherever practical) and further refined during the EIA process, including; • Avoiding proximity to residential dwellings; • Avoiding proximity to historic buildings; • Avoiding designated sites; • Minimising impacts to local residents in relation to access to services and road usage, including footpath closures; • Utilising open agricultural land, therefore reducing road carriageway works; • Minimising requirement for complex crossing arrangements, e.g. road, river and rail crossings; • Avoiding areas of important habitat, trees, ponds and agricultural ditches; • Installing cables in flat terrain maintaining a straight route where possible for ease of pulling cables through ducts; • Avoiding other services (e.g. gas pipelines) but aiming to cross at close to right angles where crossings are required; • Minimising the number of hedgerow crossings, utilising existing gaps in field boundaries; • Avoiding rendering parcels of agricultural land inaccessible; and • Utilising and upgrading existing accesses where possible to avoid impacting undisturbed ground.	Constraints mapping and sensitive site selection to avoid a number of impacts, or to reduce impacts as far as possible, is a type of primary mitigation and is an inherent aspect of the EIA process. Norfolk Boreas Limited has reviewed consultation received to inform the site selection process (including local communities, landowners and regulators) and in response to feedback, has made a number of decisions in relation to the siting of project infrastructure. The site selection process is set out in Chapter 4 Site Selection and Assessment of Alternatives.
Long HDD at landfall	Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain open access to the beach during construction. Norfolk Boreas Limited have also agreed to not use the	Norfolk Boreas Limited has reviewed consultation received and in response to feedback, has made a number of

Parameter	Mitigation measures embedded into the project design	Notes
	beach car park at Happisburgh South.	decisions in relation to the project design. One of those decisions is to use long HDD at landfall.
Scenario 1		
Strategic approach to delivering Norfolk Vanguard and Norfolk Boreas	Subject to both Norfolk Vanguard and Norfolk Boreas receiving development consent and progressing to construction, onshore ducts will be installed for both projects at the same time, as part of the Norfolk Vanguard construction works. This would allow the main civil works for the cable route to be completed in one construction period and in advance of cable delivery, preventing the requirement to reopen the land in order to minimise disruption. Onshore cables would then be pulled through the pre-installed ducts in a phased approach at later stages. In accordance with the Horlock Rules, the co-location of Norfolk Vanguard and Norfolk Boreas onshore project substations will keep these developments contained within a localised area and, in so doing, will contain the extent of potential impacts.	The strategic approach to delivering Norfolk Vanguard and Norfolk Boreas has been a consideration from the outset of the project.
Scenario 2		
Duct Installation Strategy	Under Scenario 2 the onshore cable duct installation strategy is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) and once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise disruption.	This has been a very early project commitment. Chapter 5 Project Description provides a detailed description of the process.
Trenchless Crossings	Under Scenario 2 a commitment to trenchless crossing techniques to minimise impacts to the following specific features; • Wendling Carr County Wildlife Site; • Little Wood County Wildlife Site; • Land South of Dillington Carr County Wildlife Site; • Kerdiston proposed County Wildlife Site; • Marriott's Way County Wildlife Site / Public Right of Way (PRoW); • Paston Way and Knapton Cutting County Wildlife Site; • Norfolk Coast Path;	A commitment to a number of trenchless crossings at certain sensitive locations was identified at the outset of the Project. However, Norfolk Boreas Limited has committed to certain additional trenchless crossings as a direct response to stakeholder requests.

Parameter	Mitigation measures embedded into the project design	Notes
	• Witton Hall Plantation along Old Hall Road; • King's Beck; • River Wensum; • River Bure; • Wendling Beck; • Wendling Carr; • North Walsham and Dilham Canal; • Network Rail line at North Walsham that runs from Norwich to Cromer; • Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham; and • Trunk/Principal Roads including A47, A140, A149, A1067.	

Table 2.2 Embedded mitigation for traffic and transport

Parameter	Embedded mitigation for traffic and transport	Applicable to Scenario 1	Applicable to Scenario 2	Notes
Mobilisation Areas	Mobilisation areas located close to main A-road and B-roads where possible, minimising impacts upon local communities and utilising the most suitable roads. Mobilisation areas located away from population centres where practical to reduce impact on local communities and population centres.	✗	✓	
Duct Installation	Suitable access points and identification of optimum routes for construction traffic to use. This minimises impacts on sensitive receptors.	✗	✓	Details contained within the OAMP (document reference 8.10)
Cable Pulling and Jointing Stage access	Suitable side accesses and road crossing locations reviewed from initial schedule of 200+ access points to 70+ realistic potential access points to minimise local route impacts.	✓	✓	Details contained within the OAMP (document reference 8.10)
HGV Vehicle Movement	Construction of an (up to) 6m wide running track with a maximum approximate length of 60km. This would reduce the number of access points required and HGV movements on the local road network.	✓ (12km)	✓ (60km)	Details contained within the OAMP (document reference 8.10)
	Consolidating HGVs at mobilisation areas to reduce vehicle movements along more sensitive local routes.	✓ (Ma1b only)	✓	

Parameter	Embedded mitigation for traffic and transport	Applicable to Scenario 1	Applicable to Scenario 2	Notes
	Carefully selected delivery routes utilising predominately A and B-roads acknowledging the sensitive receptors within the traffic and transport study area. Management measures to control timing of deliveries.	✓	✓	
Employee Vehicle Movement	Consolidating onshore cable route section construction employee movements at mobilisation areas. Onward travel along the running track to place of work reducing vehicle movements along local routes.	✓ (Ma1b only)	✓	Details contained within the OTP (document reference 8.9)

68. Where, after taking into account embedded mitigation, significant impacts were identified 'additional mitigation' was proposed in the ES and is captured in further detail in this OTMP. This 'additional mitigation' includes proposed 'specific mitigation' and in some cases 'enhanced mitigation'.

3 ENVIRONMENTAL IMPACT CONTROLS

3.1 General Principles

69. Chapter 24 Traffic and Transport of the ES assesses the environmental impact of traffic on the routes within the traffic and transport study area across a range of effects, namely:

- Severance;
- Pedestrian amenity;
- Driver delay; and
- Road Safety

70. The traffic and transport assessment is predicated on the final TMP being implemented as embedded mitigation (as required under DCO Schedule 1, Part 3, Requirement 21) to manage the daily delivery profiles and control movements and routing.

71. In addition to the powers set out in the draft DCO, relevant powers under the Highways Act (1980), the Road Traffic Regulation Act (1984) and the New Roads and Street Works Act (1991) may also be relied upon to implement the final agreed TMP (e.g. to implement temporary speed limits).

3.2 HGV Demand

72. During the development of the EIA, HGV routes were carefully selected (in liaison with highway stakeholders) to minimise the potential for adverse environmental impacts.

73. The daily HGV demand set out in Appendix 1 and Appendix 2 represents the maximum HGV level for the project alone not to be exceeded by the appointed contractor.

74. The EIA (Chapter 23 Onshore and Ecology and Chapter 26 Air Quality) considered the potential impacts of emissions from road traffic during the construction on designated sites for nature conservation and were found to be not significant. The following links are in proximity to the designated sites; Link 1b, Link 6, Link 7, Link 8, Link 9, Link 14, Link 16, Link 29, Link 30, Link 32, Link 36, Link 41, Link 42, Link 53, Link 54, Link 56, Link 57 (shown on ES Figure 26.5, Appendix 8 of this document). In the event that the final vehicle movements differ from those set out in Appendix 1 and Appendix 2 on these links, then the assessment of air quality impacts upon designated sites presented within the Environmental Statement will be revisited to ensure that the impact level upon designated sites remains not significant.

75. Appendix 2 includes refinements to the numbers submitted in ES Chapter 24 Traffic and Transport (document reference 6.1.24) based on the CIA and subsequent agreements with highway stakeholders. For clarity, these are identified in Table 3.1.

Table 3.1 Capped HGV routes Norfolk Boreas in isolation

Link ID	Route	Max. Daily NB HGV movements	Notes
13b	A148	379	Refined primary peak
32	B1149	184	In accordance with Norfolk Vanguard OTMP Cap.
34	B1145: High Street	112	In accordance with Norfolk Vanguard OTMP Cap.
36	B1149	0	In accordance with Norfolk Vanguard OTMP Cap. NCC requested the use of an alternative route (Shorthorn Road) to avoid the village of Horsford along Link 36 (B1149). As this proposed diversion would take traffic off the B1149 and onto a lower classification road the Applicant has proposed an alternative diversion. This alternative diversion would use Link 39 (A140) and Link 37 (B1145) and ensure that traffic remains on a road of similar or greater standard, in terms of the road hierarchy, compared to the B1149
41	B1436 – Felbrigg Road	287	Refined primary peak A further cap (128 daily HGV movements for Norfolk Boreas) will apply during the six week school summer holidays.

76. The maximum HGV movements will be controlled by the contractor at the point of destination on the onshore cable route by monitoring the number of deliveries. To facilitate this Table 3.2 provides a summary of the peak daily HGV movements to each of the construction accesses for both Scenario 1 (Stage 1 and 2) and Scenario 2 (Stage 2 and Stage 3). Further details regarding these accesses are set out in the OAMP (document reference 8.8) and the Access to Works Plan (document reference 2.5) submitted as part of the DCO application.

Table 3.2 HGV movements per construction access

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC3	Landfall	34	Cable Section 16	31	Landfall	30	Cable Section 16	31
AC5, AC10	Not required	-	Cable Section 16	31	Crossing only	-	Cable Section 16	31
AC12	Not required	-	Cable Section 16	31	Not required	-	Cable Section 16	31
AC13	Not required	-	Cable Section 15 & 16	33	MA11 (Cable section 17 & 18)	80	Cable Section 15 & 16	33
AC16	Not required	-	Cable Section 15	33	Crossing only	-	Cable Section 15	33
AC18	Not required	-	Cable Section 15	33	Crossing only	-	Cable Section 15	33
AC20	Not required	-	Cable Section 15	33	Not required	-	Cable Section 15	33
AC21, AC22	Not required	-	Cable Section 15	33	Crossing only	-	Cable Section 15	33
AC24	Not required	-	Cable Section 14	33	TC16(e)	72	Cable Section 14	33
AC25	Not required	-	Cable Section 14	30	MA10a Cable Section 17a	72	Cable Section 14	30

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
					TC16(w)			
AC28, AC32	Not required	-	Cable Section 14	30	Crossing only	-	Cable Section 14	30
AC34	Not required	-	Cable Section 14	30	TC15(e)	72	Cable Section 14	30
AC35	Not required	-	Cable Section 14	30	TC15(e)	72	Cable Section 14	30
AC37	Not required	-	Cable Section 14	30	TC14(e), TC15(w)	48	Cable Section 14	30
AC38	Not required	-	Cable Section 14	30	MA10 (Cable Section 15 & 16a) TC13(e)	152	Cable Section 14	30
AC47	Not required	-	Cable Section 13	37	MA9 (Cable Section 14) TC12(e)(w), TC13(w)	112	Cable Section 13	37
AC49	Not required	-	Cable Section 13	37	Crossing only	-	Cable Section 13	37
AC50, AC51	Not required	-	Cable Section 13	37	Not required	-	Cable Section 13	37

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC55	Not required	-	Cable Section 12	31	TC11(e)	72	Cable Section 12	31
AC57	Not required	-	Cable Section 12	31	TC11(w)	72	Cable Section 12	31
AC58	Not required	-	Cable Section 12	31	Crossing only	-	Cable Section 12	31
AC62	Not required	-	Cable Section 11	34	Crossing only	-	Cable Section 11	34
AC66	Not required	-	Cable Section 11	34	MA8 (Cable section 13) TC10(w)(e), TC9(w)	136	Cable Section 11	34
AC75	Not required	-	Cable Section 11	34	TC9(w)	72	Cable Section 11	34
AC77	Not required	-	Cable Section 10 & 11	37	Crossing only	-	Cable Section 10 & 11	37
AC78	Not required	-	Cable Section 10	37	Not required	-	Cable Section 10	37
AC84	Not required	-	Cable Section 10	37	MA7 (Cable Section 11 & 12)	80	Cable Section 10	37
AC85	Not required	-	Cable Section 10	35	Not required	-	Cable Section 10	35

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC88	Not required	-	Cable Section 9	29	Not required	-	Cable Section 9	29
AC89	Not required	-	Cable Section 9	29	Crossing only	-	Cable Section 9	29
AC91	Not required	-	Cable Section 9	29	Not required	-	Cable Section 9	29
AC92, AC96	Not required	-	Cable Section 9	29	Crossing only	-	Cable Section 9	29
AC101	Not required	-	Cable Section 8	32	MA6 (Cable section 9 & 10)	80	Cable Section 8	32
AC103	Not required	-	Cable Section 8	32	TC8(e)	72	Cable Section 8	32
AC104	Not required	-	Cable Section 8	32	Cable Section 9a TC7(e), TC8(w)	112	Cable Section 8	32
AC106	Not required	-	Cable Section 8	32	Crossing only	-	Cable Section 8	32
AC107	Not required	-	Cable Section 8	32	Not required	-	Cable Section 8	32
AC109	Not required	-	Cable Section 7	40	Cable Section 8a TC7(w)	72	Cable Section 7	40

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC110	Not required	-	Cable section 7	40	Cable Section 8a TC6(n)	72	Cable section 7	40
AC111	Not required	-	Cable Section 7	40	TC6(s)	72	Cable Section 7	40
AC120	Not required	-	Cable Section 6	34	MA 5b (Cable Section 8)	40	Cable Section 6	34
AC121	Not required	-	Cable Section 6	34	MA5a (Cable Section 7)	40	Cable Section 6	34
AC125	Not required	-	Cable Section 5	30	Crossing only	-	Cable Section 5	30
AC126	Not required	-	Cable Section 5	30	Cable Section 16a TC5(e)	72	Cable Section 5	30
AC127	Not required	-	Cable Section 5	30	Not required	-	Cable Section 5	30
AC130	Not required	-	Cable Section 5	30	TC5(w)	72	Cable Section 5	30

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC131	Not required	-	Cable Section 5	30	Not required	-	Cable Section 5	30
AC134	Not required	-	Cable Section 4	29	Not required	-	Cable Section 4	29
AC135	Not required	-	Cable Section 4	29	Crossing only	-	Cable Section 4	29
AC136	Not required	-	Cable Section 4	29	MA4 (Cable section 5 & 6)	80	Cable Section 4	29
AC137	Not required	-	Cable Section 4	29	Crossing only	-	Cable Section 4	29
AC141, AC142	Not required	-	Cable Section 4	29	Not required	-	Cable Section 4	29
AC143	Not required	-	Cable Section 4	29	TC4(w)(e)	96	Cable Section 4	29
AC144	Not required	-	Cable Section 4	29	Crossing only	-	Cable Section 4	29
AC146	Not required	-	Cable Section 3	34	MA4 (Cable Section 3 & 4)	80	Cable Section 3	34
AC147	Not required	-	Cables Section 3	34	Not required	-	Cables Section 3	34
AC150	Not required	-	Cable Section 3	34	TC3b(e)	72	Cable Section 3	34

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
AC151	Not required	-	Cable Section 3	34	TC3b(w)	72	Cable Section 3	34
AC152	Not required	-	Cable Section 3	34	TC3a(w)	72	Cable Section 3	34
AC159	Not required	-	Cable Section 2	34	MA2 (Cable Section 2) TC1(n), TC2(n)(s)	136	Cable Section 2	34
AC160	Not required	-	Cable Section 2	-	Not required	-	Cable Section 2	-
AC162	Not required	-	Cable Section 2	34	MA1b (Cable Section 1) TC1(s)	112	Cable Section 2	34
AC163, AC164	Not required	-	Cable Section 2	34	Crossing only	-	Cable Section 2	34
AC165	Not required	-	Cable Section 2	34	Not required	-	Cable Section 2	34
AC166	Not required	-	Cable Section 1	34	Not required	-	Cable Section 1	34
AC178	National Grid Substation	34	Not required	-	National Grid Substation	68	Not required	-

Construction Access ID	Scenario 1				Scenario 2			
	Stage 1		Stage 2		Stage 2		Stage 3	
	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements	Access function	Peak daily two-way HGV movements
	Extension				Extension			
AC179	Not required	-	Not required	-	National Grid Overhead Line Modifications	20	Not required	-
AC180	Onshore project substation	46	Cable Section 1	34	MA1a (Cable Section 0 & 1) Onshore project substation	134	Cable Section 1	34

77. The appointed contractor will be encouraged to validate the access figures based on a greater certainty on supply chain and programming during the preconstruction phase. The number of movements per access may be subject to variance but at all times remaining within the total assessed levels defined on highways links (as set out in Chapter 24 Traffic and Transport of the ES) unless otherwise agreed by the relevant local authority in consultation with NCC and HE.

78. Any potential changes would be submitted to and approved by the relevant local authority, NCC and HE as part of the process of discharging Requirement 21.

3.2.1 Cumulative HGV restrictions

79. A number of highway links have been identified as being shared with Hornsea Project Three. Five shared links have been identified as requiring the cumulative peak traffic demand to be managed to ensure that significant impacts are not realised. The preferred method for managing cumulative traffic is to work with Hornsea Project Three to ensure that respective project peak HGV demand does not overlap (see Section 1.6.1). If that is not possible, a cap will be applied to Norfolk Vanguard HGV demand (achieved through a minor programme extension) to ensure that cumulative traffic with Hornsea Project Three remains below the threshold that would constitute a significant impact.

80. Table 3.3 details the routes with capped maximum daily construction HGVs when considered cumulatively with Hornsea Project Three.

Table 3.3 Capped HGV Routes Norfolk Boreas Cumulatively with Hornsea Project Three

		Cumulative			Stipulations
Link ID	Route	Max. Daily NB HGV movements	Max. Daily HP3 HGV movements	Total Max. Daily Cumulative HGV movements	
13b	A148	379	156	535	-
32	B1149	136	153	289	-
34	B1145: High Street	112	127	239	
36	B1149	0	n/a	n/a	NCC requested the use of an alternative route (Shorthorn Road) to avoid the village of Horsford along Link 36 (B1149). As this proposed diversion would take traffic off the B1149 and onto a lower classification road the Applicant has proposed an alternative diversion.

Link ID	Route	Cumulative			Stipulations
		Max. Daily NB HGV movements	Max. Daily HP3 HGV movements	Total Max. Daily Cumulative HGV movements	
					The alternative diversion route would use Link 39 (A140) and Link 37 (B115) and ensure that traffic remains on a road of similar or greater standard, in terms of the road hierarchy, compared to the B1149.
41	B1436 – Felbrigg Road	287	149	436	A further cap (down to 128 daily HGV movements for Norfolk Boreas) will apply during the six week school summer holidays

3.3 Control of HGV Numbers

81. To ensure compliance with the assessed HGV movements, a booking system for deliveries will be established by the contractor.

82. The booking system will enable a daily profile of deliveries to be maintained within the assessment thresholds (Table 3.2) and allow the contractor to ensure that the required deliveries are regularly forecast and planned. This in turn, allows the hourly profile of HGVs to be controlled by allocating timeslots. This is an important measure for the accesses served by routes whereby two-way HGV flow is constrained. By controlling hourly arrival and departure time the potential for the Project's HGVs to add to delays at 'pinch-points' is substantially reduced. Hourly delivery profiles would be applied to all 'Pilot Vehicle' routes (Section 4.1 refers) as well as B1145 Cawston High Street and The Street, Oulton.

83. HGVs will be refused access and turned away if they arrive outside of their allocated time slot; a small number of daily slots will be reserved to accommodate any unplanned deliveries.

84. To ensure that compliance with the assessed HGV movements does not impact upon progress, the contractor will where possible plan for maintaining stockpiles of critical path items such as aggregate. These stockpiles will facilitate advanced planning of deliveries, maximise payloads, and enable a smooth import profile to be maintained.

85. The contractor will be required to keep an up to date record of deliveries and exports from the project, this will take the form of delivery receipts. This information will be retained to be provided to the relevant local authority, NCC and HE upon request.

3.4 Delivery Route Compliance

86. Figure 4 details the HGV delivery routes for Scenario 1: Stage 2 and Scenario 2: Stage 3 and Figure 5 details the HGV delivery routes for Scenario 1: Stage 1 and Scenario 2: Stage 2. To ensure compliance with the agreed delivery routes, the following measures are proposed:

- An information pack will be distributed to all individuals involved in the transport of materials and will include key information on delivery routes. The pack will be provided in a convenient format and size so it can be stored in a truck cab;
- Appropriate traffic signage would be installed to direct suppliers and contractor's vehicles along appropriate delivery routes;
- Information signs will also be erected which will include a telephone number for the public to report concerns; and
- Supply chain vehicles will display a unique identifier in the cab of the vehicle to assist the public in reporting potential non-compliance.

3.5 Delivery Periods

87. The delivery of materials and plant would typically occur between 7am to 7pm Monday to Friday and Saturday 7am to 1pm, however, further restrictions to HGV movements have been identified for a number of links.

88. Table 3.4 sets out a summary of links which will require a delivery restriction.

Table 3.4 Delivery Period Restrictions Summary (Norfolk Boreas in isolation and cumulatively)

Link Id	Route	Delivery Period Restrictions
32	B1149 Edgefield	7:30am to 9am
34	B1145 Cawston	~~6pm to 9am and 3pm to 4pm (Monday to Friday)~~No deliveries between 6pm and 9am; and no deliveries between 3pm and 4pm during school term times.
47c	North Walsham Road - Edingthorpe Green	8am to 9am 3pm to 4pm (during school term times)
49	B1159	8am to 9am 3pm to 4pm (during school term times)
53	A149	8am to 9am 5pm to 6pm
68	The Street – Oulton.	7:30am to 9am

89. The final TMP will include advice to drivers of locations of approved lorry parks, motorway services or other designated parking areas between the source of the delivery and the site compound. This will assist drivers when they may be running early / late in relation to set delivery timeslots to avoid instances where drivers arrive outside of their timeslot and attempt to wait nearby.

90. Table 3.5 sets out further measures to coordinate the timing of HGV deliveries to ensure highway network 'resilience' is maintained.

Table 3.5 Summary of delivery management measures

Potential Event	Mitigation Measures
Managing traffic demand during major events on the highway (e.g. bike races, parades, etc.) and around public holidays	The Contractor will ensure that a stockpile of materials is maintained to allow HGV movements to be reduced during planned major events whilst not impacting upon the construction programme. The Contractor will also work closely with the local liaisons groups to identify the dates of local planned events, (e.g. harvests) that could impact upon the project and seek to effectively manage deliveries during these events. Special provisions will be made in the Communications Plan for events relating to the Blickling Estate (Link 75).
Co-ordinating HGV delivery demand with local business.	The contractor will engage with local businesses and the agricultural industry to identify periods when there is potential for high background demand on the highway network and will be encouraged to plan their works accordingly to avoid clashes with their peak construction HGV demand. Special provisions will be made in the Communications Plan for co-ordination with deliveries relating to the Winery operations affecting the B1145, Cawston High Street and for the agricultural businesses affecting the Street, Oulton.
Managing traffic demand during major incidents such as accidents on the highway.	The Contractor will monitor traffic conditions. Should the Contractor be notified of an incident then the Contractor will liaise directly with suppliers to suspend HGV deliveries along affected routes. If the obstruction is likely to be longer term, in the first instance the programme would be reviewed to ascertain if resource could be diverted to an alternative onshore cable route section. Failing that, the Contractor would liaise with NCC and other relevant authorities to identify and assess alternative temporary access arrangements.
Incidents involving HGV traffic blocking the highway, such as, breakdowns, accidents, etc.	The Contractor and their suppliers' fleets will have arrangements with recovery companies to allow breakdowns and accidents to be cleared as quickly as possible.
A47 Corridor improvement programme	The current programme of construction works for the A47 Corridor improvement is programmed for commencement of construction in 2020 and completion by 2022. The works are likely to finish before the main construction works of the project commence, however this does not allow for slippage in the programme. It is therefore proposed that, should the two projects overlap, Norfolk Boreas Limited and its Contractors would engage with HE to establish opportunities to co-ordinate activities and avoid peak traffic impacts.

3.6 Abnormal Loads

91. The importing of large Abnormal Indivisible Loads (AILs) may lead to delays on the highway network. The construction of the onshore project substation is likely to require the delivery of up to eight supergrid Transformers to the onshore project substation near Necton. Appendix 3 contains an AIL report which sets out the type

of management measures which could be employed to minimise disruption to traffic during AIL delivery.

92. The movement of Abnormal Loads is outside of the restrictions (routes, times) contained within this OTMP and will be subject to separate agreement with the relevant highway authorities and police through the Electronic Service Delivery for Abnormal Loads (ESDAL) system.

93. The Contractor will notify stakeholders through ESDAL (to be completed 10 weeks before the scheduled date of move) and agree appropriate timings and AIL routes (with the relevant highway authorities and police) appropriate to the type of load.

3.7 Road Safety

94. The EIA identified three cluster locations (Cluster Sites 11, 13 and 17) with a pattern of collisions. The locations and the proposed mitigation measures are identified within Table 3.6 and will be implemented prior to the commencement of construction.

Table 3.6 Specific mitigation measures related to road safety

Location	Identified Pattern	Mitigation
Four-arm roundabout of the A47 and Cucumber Lane north of Brundall.	Collisions involving rear end shunts and poor positioning for vehicles approaching the roundabout from the west.	Introduce high friction surfacing on the A47 eastern approach arm. Advanced line delineators to be provided on all approaches to the roundabout.
Four-arm roundabout of the A47 and A1064 to the east of Acle.	Collisions involving rear end shunts approaching the roundabout from the east. A review of forward visibility to the give-way line identified that existing vegetation is overgrown. Drivers approaching from the east could therefore fail to see a vehicle stopped at the give-way line, potentially contributing to the pattern of rear end shunts.	It is strongly recommended that the local highway authority increase the frequency of vegetation clearance in this location. Notwithstanding, Norfolk Boreas Limited would also ensure that the appointed contractor is made aware of this risk and require them to trim and maintain the vegetation in this location throughout construction.
A12 Yare Bridge	Collisions involving rear end shunts.	Proposed to introduce 'Queues Likely' signage making drivers aware of the potential for queuing traffic.
Four arm roundabout of the A47 and A1064 leading to Acle Straight (A47)	Excessive queuing on Acle Straight.	Request by Highways England for variable message signs in response to the sensitive junction assessment provided in the Norfolk Boreas ES. The variable messaging signs would be provided on Link 6, with the objective of alerting

Location	Identified Pattern	Mitigation
		westbound drivers on the A47 of the risk of excessive queues at the junction.

95. To further address road safety, it is proposed that a series of 'enhanced' mitigation measures are provided within the finalised TMP (as outlined in Table 3.7). The measures detailed are additional to those contained in a 'typical' TMP and are included to minimise impacts and enable construction vehicle drivers to understand the policies, procedures and regulations proposed for the safe and efficient movement of plant, materials and employees.

Table 3.7 Enhanced TMP measures

Enhanced TMP Measures
Driver training and toolbox talks
Driver information packs to include: • Delivery timing constraints (e.g. school arrival/departure times); • HGV delivery routes; • Diversion routes; and • Identify safe areas to pull over to reduce the effect of slow moving platoons of vehicles.
Safety Awareness – Educate drivers to report 'near misses'
Day time parking controls and stewardship (where a need is identified)
Engagement structure – to provide clear governance and reporting (stakeholders) structure
Monitoring and Reporting – To monitor traffic flows at mobilisation areas, jointing pit locations and the onshore project substation
Contact information at all roadwork sites and robust complaint response standards (as soon as practicable)

96. The measures are designed to familiarise drivers with the identified sensitivities within the traffic and transport study area delivery routes. The 'enhanced' measures will help to mitigate the effects of pedestrian severance and amenity (and associated fear and intimidation factors) and are expected to reduce the potential for significant road safety impacts associated with the increase of HGV movements within the area.

97. An induction for contractor HGV drivers will also help to establish a clear set of responsibilities that drivers will be required to follow including:

- Timings, pre-booked slots;
- Clarification of approved HGV routes;
- Awareness of highway safety concerns;
- Adherence to speed limits;
- Instructions on when to pull over safely to alleviate platoons;
- Safe driving techniques for over-taking manoeuvres; and
- Details of reporting accidents and 'near misses'.

3.8 Other Measures

98. To prevent dust and dirt being tracked on to the highway the following measures will be adopted:

- Accesses will be metalled surface within the adopted highway boundary;
- Road sweepers will be used to regularly sweep the highway as required; and
- Wheel washing facilities will be provided as required and dependant on weather conditions.

99. To avoid the need for parking or waiting on the highway, appropriate loading/unloading and parking areas for construction vehicles will be designated. The pre-booking of deliveries will assist the Contractor to allocate sufficient space to accommodate the planned number of deliveries.

3.9 Highway Asset Management

100. A highway condition survey would be undertaken by the contractor before the commencement of construction and after the substantial completion of construction works. Any damage to the existing road network or public highway as a consequence of the construction activities, will be made good to the reasonable satisfaction of NCC.

101. The survey would most likely comprise of a Coarse Visual Inspection survey (in accordance with the UK Pavement Management System standard) of all Minor Local Routes. The exact extent and specification of surveys required would be agreed within a Method Statement between the contractor and NCC prior to commencement.

4 TRAFFIC MANAGEMENT

102. This section sets out the processes for managing the interaction between construction traffic and existing highway users. Figure 6 and Figure 7 detail the highway links referred to in this section.

4.1 General Principles - Managing HGV Demand

103. To ensure that the identified road links are suitable to accommodate the forecast HGV demand, a detailed review of the highway geometry has been undertaken. This review has provided an initial assessment to identify those routes that allow two-way HGV traffic.

104. The routes that do not allow two-way HGV traffic require mitigation to ensure that the project's traffic demand would not have an adverse impact upon the free flow of traffic.

105. The guiding principle in developing the route mitigation strategy is to minimise impact on the surrounding environment. Recognising the temporary nature of the onshore project construction period, opportunities will be sought to pursue management measures in preference to 'hard engineering' solutions only, such as road widening.

106. To reduce the requirement for hard engineering, mobile traffic management is proposed to control low HGV demand on lightly trafficked narrow roads. The use of mobile traffic management would avoid the need for temporary road closures or road widening which could introduce delays and in many areas would require a full road closure to implement.

107. It is envisaged that mobile traffic management would comprise of a suitably marked pilot vehicle (with flashing ambers) with two-way radio communication with the HGV driver. The pilot vehicle would exit the access and travel to a designated layby/passing place. The pilot vehicle would then temporarily stop oncoming traffic and radio to the HGV driver to exit the site and traverse to the designated passing place. Appendix 4 visually depicts this traffic measure.

108. The desirable distance a HGV would be allowed to travel under pilot vehicle control would be 1km, this is based on a HGV travelling at 20km per hour for a period of three minutes (deemed an acceptable duration for other road users to be held up). To keep the pilot vehicle control distance to a minimum it may be necessary to construct temporary passing bays in the highway verge to 'hold' HGVs prior to being called.

109. Table 4.1 details the locations where pilot vehicle traffic management would be employed noting that the maximum peak HGV demand would be <14 two-way HGV

movements per hour, i.e. 7 arrivals and 7 departures. Where possible HGVs would be escorted in platoons to minimise delays to the travelling public.

110. During Scenario 2 Stage 2, links would typically experience hourly flows of 7 movements. Links would typically experience 4 movements or less during Scenario 1 – Stage 2 and Scenario 2 – Stage 3.

111. The pilot vehicle routes would be appropriately signed to indicate to motorists the presence of mobile construction traffic and potential delays.

112. Suitable scale plans of pilot control routes with any proposed widening would be submitted with the final TMP pursuant to the discharge of Requirement 21 of the DCO.

Table 4.1 Proposed mobile traffic management routes

Link ID	Route	AADT Base Flows	Scenario 1				Scenario 2			
			Stage 1 HGV movements (two-way)		Stage 2 HGV movements (two-way)		Stage 2 HGV movements (two-way)		Stage 3 HGV movements (two-way)	
			Max. Daily	Hourly peak*	Max. Daily	Hourly peak*	Max. Daily	Hourly peak*	Max. Daily	Hourly peak*
42	B1145: Reepham Road	2,265	n/a	n/a	40	4	72**	8	40	4
67	Happisburgh Road	1,000	n/a	n/a	33	~ 4	80	8	33	~ 4
68	Heydon Lane	1,000	n/a	n/a	37	~ 4	80	8	37	~ 4
69	Little London Road	500	n/a	n/a	30	~ 4	48**	5	30	~ 4
70	Plantation Road (230m south of North Walsham Road junction)	1,000	n/a	n/a	31	~ 4	72**	8	31	~ 4
71	Vicarage Road / Whimpwell Street	2,000	34	~ 4	31	~ 4	30	~ 4	31	~ 4
72	Dereham Road / Longham Road - Dillington	1,000	n/a	n/a	34	~ 4	136	14	34	~ 4
73	Hoe Road South	800	n/a	n/a	29	~ 3	96	10	29	~ 3
74	Mill Street, Elsing Road – Swanton Morley	800	n/a	n/a	30	~ 4	72	7	30	~ 4
75	B1354 - Blickling	2,000	n/a	n/a	37	~ 4	72	7	37	~ 4
76	High Noon Road / Church Road	500	n/a	n/a	31	~ 4	72	7	31	~ 4
77	Hall Lane – North Walsham	500	n/a	n/a	30	~ 4	72**	7	30	~ 4
78	Bylaugh	500	n/a	n/a	30	~ 4	72	7	30	~ 4
79	B1145 / Suffield Road***	2,000	n/a	n/a	31	~ 4	72	7	31	~ 4
A to V	Local Access routes	Varies	n/a	n/a	29 - 37	~ 4	n/a	n/a	29 - 37	~ 4
Notes										
*	Daily HGV flows divided by 10									
**	Proposed mitigation flows identified in the ES									
***	Localised widening may be required at the junction between the A140/B1145 to accommodate the largest HGVs.									

4.2 General Principles – Roadworks

113. Where the onshore cable route crosses roads, tracks and Public Rights of Way (PRoW), via 'open cut' methods, traffic management would be employed to allow construction activities to continue safely within the road. Where appropriate, single lane operation of roads would be utilised during installation, typically with signal controls to allow movements to continue. Where the normal width of the road is less than 7.2m kerb to kerb (typical width for two way traffic) then it may not be possible to undertake works in the road and maintain a single lane open for traffic. In these cases, alternative methods such as temporary road closure or diversion could be required.

114. Temporary closures or diversions would be in place for the period of time required for the duct installation (e.g. approximately one week with a maximum worst case of two weeks). To minimise the impact of closures or diversions, night working could be employed. The detailed installation method for each crossing utilising traffic management would be set out in the TMP and agreed with the relevant local authority and the NCC/HE pursuant to the discharge of Requirement 21.

115. Under Scenario 2, it should be noted that trenchless crossing methods have been agreed for the following roads where standard traffic management techniques are not deemed to be suitable:

- A47;
- A1067;
- A140; and
- A149.

4.3 Highways Mitigation Schemes

4.3.1 Link 33 – B1149

116. NCC has specific concerns relating to the cumulative interaction of Norfolk Boreas (Scenario 2 only) and Hornsea Project Three's traffic. With regard to one-way working the specific concerns are:

- Accommodating the large volume of abnormal loads delivering cable drums to the Hornsea Project Three Main compound at Oulton; and
- Ensuring the roadworks do not lead to 'blocking back' of the B1149/The Street, Oulton junction; or vehicles do not approach the back of the queue unsighted from the B1149 south, hump back bridge.

117. Appendix 5 sets out the proposed one-way traffic management concept design for the B1149. The roadworks design incorporates a wide one way lane (5m) to accommodate the Hornsea Project Three abnormal loads within the current Order

Limits for Norfolk Boreas. It can also be observed from Appendix 5 that the road works terminate some 210m southeast of the B1149/The Street, Oulton junction ensuring that the risk of traffic blocking back to the B1149/The Street junction would be minimised. Furthermore, the roadworks terminate some 430m northwest of the hump back bridge ensuring the risk of queue length collision is minimised.

118. It is therefore concluded that the specific cumulative traffic concerns have been designed out at the B1149 crossing.

4.3.2 Link 34 – Cawston Highway Intervention Scheme

119. The Highway Intervention Scheme (HIS) was initially developed by Hornsea Project Three to mitigate construction traffic impacts through Cawston and was subsequently adopted by Norfolk Vanguard. It has been agreed with Norfolk Vanguard and Hornsea Project Three that the Applicant would take forward the scheme design to address the recommendations of the first Road Safety Audit and concerns raised by Norfolk County Council.

120. The proposed scheme has developed to mitigate impacts for Hornsea Project Three alone, Norfolk Boreas alone or both projects in combination.

121. The HIS design has been informed by extensive consultation with NCC, Cawston Parish Council and Broadland District Council and the findings of two Stage 1 Road Safety Audits.

122. Plans for the HIS are detailed in Appendix 6 and the full package of mitigation measures for link 34 would consist of:

- Driver induction and awareness of specific traffic management requirements relating to the High Street;
- Prohibition of HGV deliveries during term time school pick up and drop off times (7:30am – 9:00am and 3:00pm – 4:00pm, Monday to Friday);
- Prohibition of HGV deliveries from 6pm to 9am (in line with parking restrictions);
- A 20mph speed restriction;
- Hazard warning signage to inform of ‘pinch points’ and ‘pedestrians in the road’;
- Controlled kerbside parking denoted by broken line box road markings;
- Parking controls to include a ‘Limited Waiting’ order (9:00am – 6:00pm) and associated single yellow line road markings and supplementary traffic signs;
- High Street carriageway re-alignment adjacent to Chapel Street;
- Resurfacing of the High Street, reinstatement of surface depressions (e.g. old utility trenches) repair and raising to level carriageway ‘ironwork’;
- Ongoing vegetation maintenance programme to protect roadspace and visibility;

- Development and support for an improved Cawston C of E Primary School 'School Travel Plan';
- Improvements to the Cawston C of E Primary School pedestrian crossing;
- A Norfolk Boreas Scenario 2 HGV cap of 112 daily HGV movements with managed hourly arrivals and departures; and
- Managed cumulative traffic demand to no greater than 239 daily HGV deliveries.

123. As part of the Highway Intervention Scheme existing vegetation is to be cut back within the highway boundary to protect roadspace and visibility. The vegetation cutback regime would comply with Norfolk County Council policy for the grass cutting visibility splays. The policy sets out a maintenance regime of five cuts between May and September in urban areas (defined as roads subject to a speed limit of less than 40mph).The clearance in the very eastern extent of the Cawston Conservation Area, affects a tree noted as a 'significant tree' (though not subject to a tree preservation order), numbered CA6 – Common Walnut within Appendix D of the Cawston Conservation Area Character Appraisal (2009). Any proposed lopping of branches of this tree would need to be discussed and agreed with the appropriate Broadland District Council Officer in advance of the works.

124. Norfolk Boreas Limited is committed to ongoing engagement with Norfolk Vanguard Limited, Hornsea Project Three, Broadland District Council, Cawston Parish Council and NCC to implement the Cawston HIS design post-consent. Cawston High Street would be subject to a speed monitoring regime post HIS implementation (see Section 5.6) to evaluate the effectiveness of the measures and intervene further if required.

125. Norfolk Boreas Limited is committed to adopting the scheme under both Scenario 1 and Scenario 2 and the principle that the first project (either Hornsea Project Three or Norfolk Boreas or Norfolk Vanguard) to proceed to construction would deliver the full scheme of mitigation and the final project would be responsible for removing the measures once all project's construction phases are complete.

~~125.~~126. Norfolk Boreas Limited have addressed all the recommendations made in the latest RSA. Norfolk County Council have indicated that no further amendments are required to the HIS and there are no remaining technical objections. Accordingly, NCC also indicated that they will be completing the RSA log to finalise the scheme.

4.3.3 Link 68 – The Street, Oulton

~~126.~~127. Link 68 serves Hornsea Project Three's main construction compound at Oulton Airfield and is predicted to generate 118 HGV daily movements over a three year 'Maximum Design Scenario' period.

~~127.~~128. Link 68 serves Norfolk Boreas Scenario 2 Mobilisation Area 7 (west and east) during the duct installation period and access points AC84, AC85 and AC88 during the Scenario 1 and Scenario 2 cable pull works.

~~128.~~129. There has been extensive consultation between Hornsea Project Three and NCC with regards to a highways mitigation scheme to address the cumulative impacts. NCC has confirmed a preferred scheme option, which is summarised in Table 4.2 (Plans are detailed in Appendix 7).

~~129.~~130. Norfolk Boreas Limited is committed to adopting the preferred mitigation scheme option for Norfolk Boreas under both scenarios, to ameliorate the potential traffic impacts. In effect this scheme of mitigation, on the shared part of Link 68, would be sufficient to mitigate impacts for Norfolk Boreas alone, Hornsea Project Three alone or for both projects together.

~~130.~~131. The first project (either Hornsea Project Three or Norfolk Boreas or Norfolk Vanguard) to proceed to construction would deliver the full scheme of mitigation and the final project would be responsible for removing the measures once all project's construction phases are complete.

Table 4.2 The Street, Oulton Proposed Highway Mitigation Scheme

Components
Improvement of existing bellmouth junction between The Street and the B1149 (Holt Road).
Up to 8 passing places along The Street for HGV opposing traffic (using Grasscrete paving) resulting in an overall carriageway width of 6.0m.
Widening of The Street near Dorking farm access (using full carriageway construction).
Trimming, but no removal, of vegetation and trees along The Street.
A means of priority work for southbound vehicles in the vicinity of The Old Railway Gatehouse with a view to minimising the potential for two opposing HGVs to pass by this property simultaneously while also serving as a means of speed attenuation and mitigation to improve noise and vibration risk.
Temporary lowering of the existing 60mph speed limit to 30mph from the B1149 junction to the Hornsea Three main construction compound access.
Temporary signage along the B1145 and The Street as agreed with the Highway Authority to provide driver awareness and enforcement.
Regrading of existing road hump on The Street in the vicinity of the Old Railway Gatehouse to minimise noise and vibration impacts on the Old Railway Gatehouse.
Filter trench drainage of The Street along the regrading of the existing road hump.

Components
Optional Measure – Provision of acoustic glazing along the eastern façade (i.e. closest to The Street) and acoustic glazing on the bedroom window along the south-eastern façade of the Old Railway Gatehouse (subject to the landowner agreement).
Optional Measure – Provision of acoustic glazing to the existing skylight at the Old Railway Gatehouse (subject to the landowner agreement).
Optional Measure – Installation of a 2m high acoustic barrier (wall) along the south-eastern boundary of the property (along the boundary to the garden) at the Old Railway Gatehouse, together with a 90 degree turn at the garden end for a minimum of 10m along the southern property boundary (to be located within the highway boundary or on the landowner's property) (subject to the landowner agreement).

~~131.~~132. In addition to the above, Norfolk Boreas Limited has committed to not routing HGV construction traffic along Oulton Street north of the junction between the Street and Heydon Road.

~~132.~~133. Any deliveries outside normal working hours (7am to 7pm Monday to Friday, 7.00am and 1pm on Saturdays) will be subject to notification and approval by Broadland District Council under DCO Requirement 26 and the Applicant will consult with residents regarding any proposed out of hours movements to or from the Cable Logistics Area.

4.3.4 Mitigation Summary

~~133.~~134. Table 4.3 details the link specific traffic management measures require for Norfolk Boreas under Scenario 1 and Scenario 2. Cumulative management measures are also presented for Norfolk Boreas Scenario 2 and Hornsea Project Three.

Table 4.3 Specific Traffic Management Measures Summary

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
5	A47 (roundabout junction with A47 / Cucumber Lane)	High friction surfacing on eastern approach and advanced lane markings provided on all approaches and lane delineation markings on the circulatory area (undertaken by Norfolk Boreas)	High friction surfacing on eastern approach and advanced lane markings provided on all approaches and lane delineation markings on the circulatory area (undertaken by Norfolk Boreas)	High friction surfacing on eastern approach and advanced lane markings provided on all approaches and lane delineation markings on the circulatory area (undertaken by Norfolk Boreas)
6	A47 (roundabout junction with A47 / A1064)	Advanced warning signs (Acle Straight) (undertaken by Norfolk Boreas)	Requirement to trim vegetation when approaching the roundabout from the east throughout construction. Advanced warning signs (Acle Straight) (undertaken by Norfolk Boreas)	n/a
9	A12 – Yare Bridge	n/a	'Queues likely' advanced warning sign (undertaken by Norfolk Boreas)	n/a
13b	A148	n/a	Managed Traffic Demand (Table 3.1)	Managed Traffic Demand (Table 3.3) Enhanced TMP measures.
17	B1145 - Billingford Road	n/a	Enhanced TMP measures.	n/a
21	B1147 – Etling Green	n/a	Enhanced TMP measures.	n/a
22	B1147 – Dereham Road	n/a	Enhanced TMP measures.	n/a

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
32	B1149 - Edgefield	HGV Delivery Restrictions (7:30am to 9am).	Managed Traffic Demand (Table 3.1) HGV Delivery Restrictions (7:30am to 9am).	Managed Traffic Demand (Table 3.3) Enhanced TMP measures HGV Delivery Restrictions (7:30am to 9am)
34	B1145 – west of Cawston	Enhanced TMP measures. Improved School Travel Plan Prohibition of HGV deliveries between 6pm and 9am; and no deliveries between 3pm and 4pm during school term times. ~~HGV Delivery Restrictions (7:30am to 9am and 3pm to 4pm)~~. Cawston Highway Intervention Scheme (undertaken by Norfolk Vanguard).	Managed Traffic Demand (Table 3.1) Enhanced TMP measures. Improved School Travel Plan Prohibition of HGV deliveries between 6pm and 9am; and no deliveries between 3pm and 4pm during school term times. ~~HGV Delivery Restrictions (7:30am to 9am and 3pm to 4pm).~~ Cawston Highway Intervention Scheme (undertaken by Norfolk Boreas).	Managed Traffic Demand (Table 3.3) Enhanced TMP measures. Improved School Travel Plan Prohibition of HGV deliveries between 6pm and 9am; and no deliveries between 3pm and 4pm during school term times. ~~HGV Delivery Restrictions (7:30am to 9am and 3pm to 4pm).~~ Cawston Highway Intervention Scheme (undertaken by Norfolk Boreas ~~/~~ or Hornsea P3).
35a	B1159	n/a	Enhanced TMP measures.	n/a
35b	B1159	n/a	Enhanced TMP measures.	n/a
36	B1149 – Holt Road	Alternative diversion route identified via Link 37 (B1145) and Link 39 (A140)	Managed Traffic Demand (Table 3.1) Alternative diversion route identified via Link 37 (B1145) and Link 39 (A140)	Managed Traffic Demand (Table 3.3). Alternative diversion route identified via Link 37 (B1145) and Link 39 (A140)

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
41	B1436 - Felbrigg	n/a	Managed Traffic Demand (Table 3.1). Enhanced TMP measures.	Managed Traffic Demand (Table 3.3). Managed Traffic Demand. Enhanced TMP measures.
42	B1145: Reepham Road	Mobile Traffic Management.	Mobile Traffic Management. Enhanced TMP measures. Managed Traffic Demand as identified in ES Chapter 24 and to include: - No concurrent Infrastructure components construction. - Extend TC 6 peak construction period.	n/a
47c	North Walsham Road - Edingthorpe Green	Enhanced TMP measures. HGV Delivery Restrictions (8am to 9am and 3pm to 4pm).	Enhanced TMP measures. HGV Delivery Restrictions (8am to 9am and 3pm to 4pm). Managed Traffic Demand as identified in ES Chapter 24 and to include: - No concurrent Infrastructure components construction. - Extend TC 16 peak construction period.	n/a
49	B1159	HGV Delivery Restrictions (8am to 9am and 3pm to 4pm).	HGV Delivery Restrictions (8am to 9am and 3pm to 4pm). Managed Traffic Demand as identified in ES Chapter 24 and to include: - No concurrent Infrastructure components construction. - Extend TC 16 peak construction period.	n/a

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
53	A149	HGV Delivery Restrictions (8am to 9am and 5pm to 6pm)	HGV Delivery Restrictions (8am to 9am and 5pm to 6pm)	n/a
67	North Walsham Road / Happisburgh Road	Mobile Traffic Management.	Mobile Traffic Management.	n/a
68	The Street / Heydon Road	Oulton Highway Mitigation Scheme (undertaken by Norfolk Vanguard). HGV Delivery Restrictions (7:30am to 9am) Mobile Traffic Management (Heydon Road)	Oulton Highway Mitigation Scheme (undertaken by Norfolk Boreas). HGV Delivery Restrictions (7:30am to 9am) Mobile Traffic Management (Heydon Road)	Managed Traffic Demand. Oulton Highway Mitigation Scheme (Undertaken by Norfolk Boreas/ Hornsea P3). HGV Delivery Restrictions (7:30am to 9am)
69	Little London Road	Mobile Traffic Management. Enhanced TMP measures. Managed Traffic Demand as identified in ES Chapter 24 and to include: - Splitting HGV payloads into smaller 10t vehicles.	Mobile Traffic Management. Enhanced TMP measures. Managed Traffic Demand as identified in ES Chapter 24 and to include: - No concurrent Infrastructure component construction. - Increase construction programme for Route Section 16a of duct installation. - Locate reception sides of TCs to area served by Link 69. - Splitting HGV payloads into smaller 10t vehicles.	n/a

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
70	Plantation Road (230m south of North Walsham Road junction)	Mobile Traffic Management.	Mobile Traffic Management.	n/a
71	Vicarage Road / Whimpwell Street	Mobile Traffic Management.	Mobile Traffic Management.	n/a
72	Dereham Road / Longham Road - Dillington	Mobile Traffic Management.	Mobile Traffic Management. Enhanced TMP measures.	n/a
73	Hoe Road South	Mobile Traffic Management.	Mobile Traffic Management.	n/a
74	Mill Street, Elsing Road – Swanton Morley	Mobile Traffic Management.	Mobile Traffic Management.	n/a
75	B1354 - Blickling	Mobile Traffic Management.	Mobile Traffic Management.	n/a
76	High Noon Road / Church Road	Mobile Traffic Management.	Mobile Traffic Management.	n/a
77	Hall Lane – North Walsham	Mobile Traffic Management.	Mobile Traffic Management. Managed Traffic Demand.	n/a
78	Bylaugh	Mobile Traffic Management.	Mobile Traffic Management.	n/a

Link	Link description	Scenario 1 Mitigation measures In isolation	Scenario 2 Mitigation measures In isolation	Scenario 2 Mitigation measures Cumulatively
79	B1145 / Suffield Road	Mobile Traffic Management. Potential localised highway widening.	Mobile Traffic Management. Potential localised highway widening.	n/a
A	Dale Road	Not to be used.	Not to be used.	n/a
B	Bradenham Lane	Enhanced TMP measures. Mobile Traffic Management.	Enhanced TMP measures. Mobile Traffic Management.	n/a
C to F	Local routes	Mobile Traffic Management.	Mobile Traffic Management.	n/a
G	B1145 - Cawston road	Enhanced TMP measures. Mobile Traffic Management.	Enhanced TMP measures. Mobile Traffic Management.	n/a
H	Wood Dalling Road	Enhanced TMP measures. Mobile Traffic Management.	Enhanced TMP measures. Mobile Traffic Management.	n/a
I to L	Local routes	Mobile Traffic Management.	Mobile Traffic Management.	n/a
M	North Walsham Road / Happisburgh Road	Enhanced TMP measures. Mobile Traffic Management.	Enhanced TMP measures. Mobile Traffic Management.	n/a
N to V	Local Access routes	Mobile Traffic Management.	Mobile Traffic Management.	n/a

4.4 A47 Access and Associated Traffic Management Measures

~~134.~~135. A traffic management strategy has been developed for each of the accesses required off the A47 to the onshore project area. The final details of which are being discussed with HE and will be included into the final TMP. Details and the locations of all accesses are set out within the OAMP (document reference 8.10).

4.4.1 Access AC159

~~135.~~136. Access AC159 will be required for the following Norfolk Boreas scenarios:

- Scenario 1 Stage 2 / Scenario 2 Stage 3 for any potential jointing bay locations; and
- Scenario 2 Stage 2 to access MA2-E, TC1 (north) and TC2.

~~136.~~137. Access AC159 will be upgraded to a DMRB compliant rural simple junction with a 'no right turn' traffic management plan.

~~137.~~138. The 'no right turn' traffic management plan for AC159 at the A47/Bushy Common Road, will utilise a left turn in / left turn out only. This will require any potential right turning construction vehicles either entering or exiting the junction to divert and perform the following 'u-turn' manoeuvres:

1. Westbound traffic to utilise the 'McDonalds Roundabout' located on the A47 / Norwich Road roundabout junction approximately 7.1 miles west of AC159 near Swaffham. Figure 8 shows the construction vehicle diversion route; and
2. Eastbound traffic to utilise the eastbound offramp off the A47 (approximately 2.9 miles west of AC159) and turning right onto Tavern Lane. At the traffic signal-controlled junction with the A1075 (Yaxham Road) at Dereham, construction vehicles would turn right and proceed south east under the A47 taking the westbound onramp back onto the A47. Figure 9 shows the construction vehicle diversion route.

4.4.2 Access AC162 (TC1 (south))

~~138.~~139. Access AC162 will be required for the following Norfolk Boreas scenarios:

- Scenario 1 Stage 2 / Scenario 2 Stage 3 for any potential jointing bay locations.
- Scenario 2 Stage 2 to access MA1b and TC1 (south).

~~139.~~140. Vehicle demand associated with the TC1 southern compound off the A47 / Dale Road / Bushy Common Road staggered junction is to be diverted to the MA1b compound (AC162) access on Dereham Road (Link 66). Once construction vehicles

have arrived at MA1b, they would travel 450m north along the running track to the TC1 southern compound.

~~140.~~141. Access AC160 off Dale Road is not to be used to access TC1 southern compound.

~~141.~~142. The proposed diversion route is shown in Figure 10.

4.4.3 Access AC178 and AC179 (National Grid works)

~~142.~~143. Access AC178 will be required for the following Norfolk Boreas scenarios:

- Scenario 1 Stage 1 for construction of the National Grid substation extension; and
- Scenario 2 Stage 2 for construction of the National Grid substation extension.

~~143.~~144. Access AC179 will be required for the following Norfolk Boreas scenario:

- Scenario 2 Stage 2 for construction of the overhead line modification works (see Section 4.5 for details).

~~144.~~145. Both Accesses AC 178 and AC179 will be DMRB compliant rural simple junctions with a 'no right turn' temporary traffic management strategy. The temporary traffic management strategy proposed for Access AC178 and Access AC179 will be to utilise a left turn in / left turn out only. This will require any potential right turning construction vehicles to divert and perform the following 'u-turn' manoeuvres:

1. Westbound traffic to utilise the 'McDonalds Roundabout' located on the A47 / Norwich Road roundabout junction approximately 2.8 miles west of Access AC178 near Swaffham. Figure 11 graphically depicts the construction vehicle diversion route; and
2. Eastbound traffic to utilise the eastbound offramp off the A47 (approximately 7.4 miles east of AC178) and turning right onto Tavern Lane. At the traffic signal-controlled junction with the A1075 (Yaxham Road) at Dereham, construction vehicles would turn right and proceed south east under the A47 taking the westbound onramp back onto the A47. Figure 12 graphically depicts the construction vehicle diversion route.

~~145.~~146. It is not possible to provide two-way HGV entry/exit at Access AC179 due to land constraints and therefore further traffic management measures are required to ensure two HGVs do not meet in the 'bell mouth' and obstruct the flow of traffic on the A47. All site bound HGVs destined for Access AC179 will temporarily park at a segregated layby approximately two miles west of the site. From here, the drivers

will communicate with a designated contact at the site to ascertain that no HGVs are leaving the site. Once, confirmed the driver will continue their journey and enter access AC179 unopposed. The location of the layby is detailed in Figure 11.

~~146.~~147. AC179 will not be required for Scenario 1 as all works would have been undertaken within the Norfolk Vanguard project.

4.4.4 Access AC180 (Onshore project substation, MA1a-West and MA1a-East)

~~147.~~148. A DMRB compliant right turn ghost island junction will be constructed allowing all movements. No temporary traffic management (including diversion manoeuvres) is required to support the access strategy for this location.

~~148.~~149. Full details of each of the required A47 access designs are detailed in the OAMP (document reference 8.10) in accordance with DCO Requirement 21.

4.5 National Grid overhead line modifications

~~149.~~150. Necton National Grid substation would need to accommodate circuit breakers and associated busbar (metal bar that conducts electricity within a substation) structures which allow connection onto the existing 400kV overhead line for generation to be transmitted onto the wider National Grid system. In addition to the Necton National Grid substation itself, modifications to the existing overhead line structures adjacent to the substation would be required.

~~150.~~151. Under Scenario 1 the overhead line modification works will have been completed by Norfolk Vanguard to accommodate both projects. Under Scenario 2 these works will be undertaken by Norfolk Boreas.

~~151.~~152. Two new overhead line towers will be required to accommodate Norfolk Boreas in close proximity to the existing corner tower (to the north east of the existing Necton National Grid substation) with a maximum height of 55m. The existing corner tower will be demolished such that the net new number of towers is one.

~~152.~~153. Under Scenario 2 it will be necessary to oversail the A47 to facilitate the connection to the wider national grid system. To undertake this operation safely, it will be necessary to construct two scaffold towers adjacent to the carriageway and erect netting. Whilst the scaffold towers can be constructed with limited disturbance to the free flow of traffic, the netting must be installed during a temporary full road closure (for a matter of hours).

~~153.~~154. Norfolk Boreas Limited and National Grid are committed to work with the HE to agree appropriate timings, diversions and consultation strategy to implement the road closure with the least disruption to the traveling public and local communities.

5 MONITORING AND ENFORCEMENT

5.1 Introduction

~~154.~~155. The HGV movements associated with the works will be continuously monitored through the use of the booking system. As part of this monitoring process, the contractor would be required to keep an up to date record of deliveries and exports associated with the construction works.

~~155.~~156. The information will be made available upon request to the relevant Local Authority, in the form of a report validating the project HGV demand.

5.2 Local Community Liaison

~~156.~~157. Norfolk Boreas Limited will ensure effective and open communication with local residents and businesses that may be affected by noise or other amenity aspects caused by the construction works. Communications will be co-ordinated on site by a designated member of the construction management team. A proactive public relations campaign will be maintained, keeping local residents informed of the type and timing of works involved, the transport routes associated with the works, the hours of likely construction traffic movements and key traffic management measures that would be provided. A combination of communication mechanisms such as posters and parish meetings will be employed to keep local residents informed.

~~157.~~158. A designated Norfolk Boreas Limited local community liaison officer will respond to any public concerns, queries or complaints in a professional and diligent manner as set out in a project community and public relations procedure which will be submitted for comment to the Local Authorities.

~~158.~~159. Parish Councils in the relevant area will be contacted (in writing) in advance of the proposed works and ahead of key milestones. This information will include, as far as possible, an outline timetable of works, a schedule of working hours, the extent of the works, and a contact name, address and telephone number in case of complaint or query. Enquiries will be dealt with in an expedient and courteous manner. Any complaints will be logged, investigated and, where appropriate, rectifying action will be taken.

~~159.~~160. The above will be captured in a communications plan as part of the final CoCP (DCO Requirement 20).

5.3 Co-ordination

~~160.~~161. The contractor will establish the role of a Traffic Management Plan Coordinator (TMPCo). Their key responsibilities include:

- Managing the implementation of the plan;
- Reporting monitoring to Norfolk Boreas Limited and relevant stakeholders (i.e. local authorities, NCC and HE);
- Inputting into and attending community liaison as required by Norfolk Boreas Limited;
- Providing details of any complaint investigations to Norfolk Boreas community liaison;
- First point of contact for construction workers and sub-contractors.

5.4 Potential Plan Breaches

~~161.~~162. To ensure that the OTMP can be effectively enforced, it is important to define what would constitute a breach. The following non- compliances of the OTMP would constitute a breach whereby corrective measures would be required:

1) Failure to implement or use the agreed traffic management measure;
2) Failure to follow the agreed delivery routes;
3) Failure of the HGV to display its unique identifier;
5) Dangerous driving; and
7) Failure to record deliveries and departures for plant and materials within the booking system.

5.5 Corrective Process

~~162.~~163. On receipt of a report of a potential breach, Norfolk Boreas Limited would investigate the circumstances and compile a report to the relevant authorities as soon as practicable. The report would outline the outcome of the investigation and what corrective action (if necessary) had been implemented.

~~163.~~164. If the breach is found to be material, Norfolk Boreas Limited would take appropriate action within the jurisdiction of the contract and report back to the relevant local authority and the highway authority.

~~164.~~165. Individual employee breaches would be addressed through UK employment law whereby the process outlined above would form the basis for disciplinary proceedings.

5.6 Specific Cawston Village ~~Speed~~ Monitoring and Intervention Regime

166. A key recommendation of the ~~As a result of the~~ Road Safety Audit (Report Ref: BN/RH/20-101, February 2020) was:

"Review the compliance of drivers following the introduction of the reduced speed limits and introduce further measures if necessary" ~~undertaken February 2020, a requirement to undertake regular speed surveys on Cawston High Street was agreed.~~

~~165.~~ To accord with the Road Safety Audit recommendation, a tailored monitoring regime has been developed for the Cawston HIS to ensure early intervention should driver compliance become an issue.

167. Initially, continuous monitoring cameras would be installed along the B1145 High Street and daily capture would be shared with NCC. These cameras would provide 'real-time' information and monitor continuously during the delivery times (as specified in Table 3.4) for a minimum period of three months from the commencement of the Project and three months from the commencement of a cumulative traffic overlap between Norfolk Boreas and Hornsea Project Three.

168. After a period of three months, the monitoring regime would be reduced to a frequency to be agreed with NCC (utilising the data from the continuous monitoring to identify peak traffic periods).

169. Should at any time a valid driver compliance issue be identified, and subsequent intervention measures introduced, the continuous monitoring period will be extended or reinstated for a one month period.

170. Norfolk Boreas Limited will consult with NCC to pre-define (as far as is possible) a driver compliance issue that warrants further intervention and agree potential measures. It is important that intervention is limited to issues that have occurred during typical traffic conditions and is demonstrably attributable to the Projects' construction traffic (noting the commitment to Project HGV identifiers in Section 3.4.).

171. Further intervention measures will be agreed with NCC, to be implemented on validation of a driver compliance issue. These measures could include (but are not limited to):

- Applying the OTMP 'breach' corrective process identified in Section 5.4 and 5.5 to the supply chain;
- Further hazard signing;
- Introduce mandatory priority 'give-way';
- Increased parking enforcement; and
- A reduction in the cumulative HGV cap (239 HGV movements) by ensuring Norfolk Boreas and Hornsea Project Three traffic demand does not overlap.

~~166. The speed survey monitoring frequency will occur one month into the start of construction and then at three months, six months then repeating every six months until the end of the construction phase.~~

~~167. If it is found that additional mitigation measures are necessary to reduce speeds through Cawston, these will be proposed and agreed with the relevant stakeholders.~~

~~Upon the implementation of the agreed additional measures, the speed survey monitoring frequency cycle would restart.~~

6 REFERENCES

Norfolk Boreas Limited (2018). Norfolk Boreas Offshore Wind Farm Preliminary Environmental Information Report. Available online at https://corporate.vattenfall.co.uk/projects/wind-energy-projects/vattenfall-in-norfolk/norfolkboreas/documents/preliminary-environmental-information-report/. Accessed 16/01/2019.
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