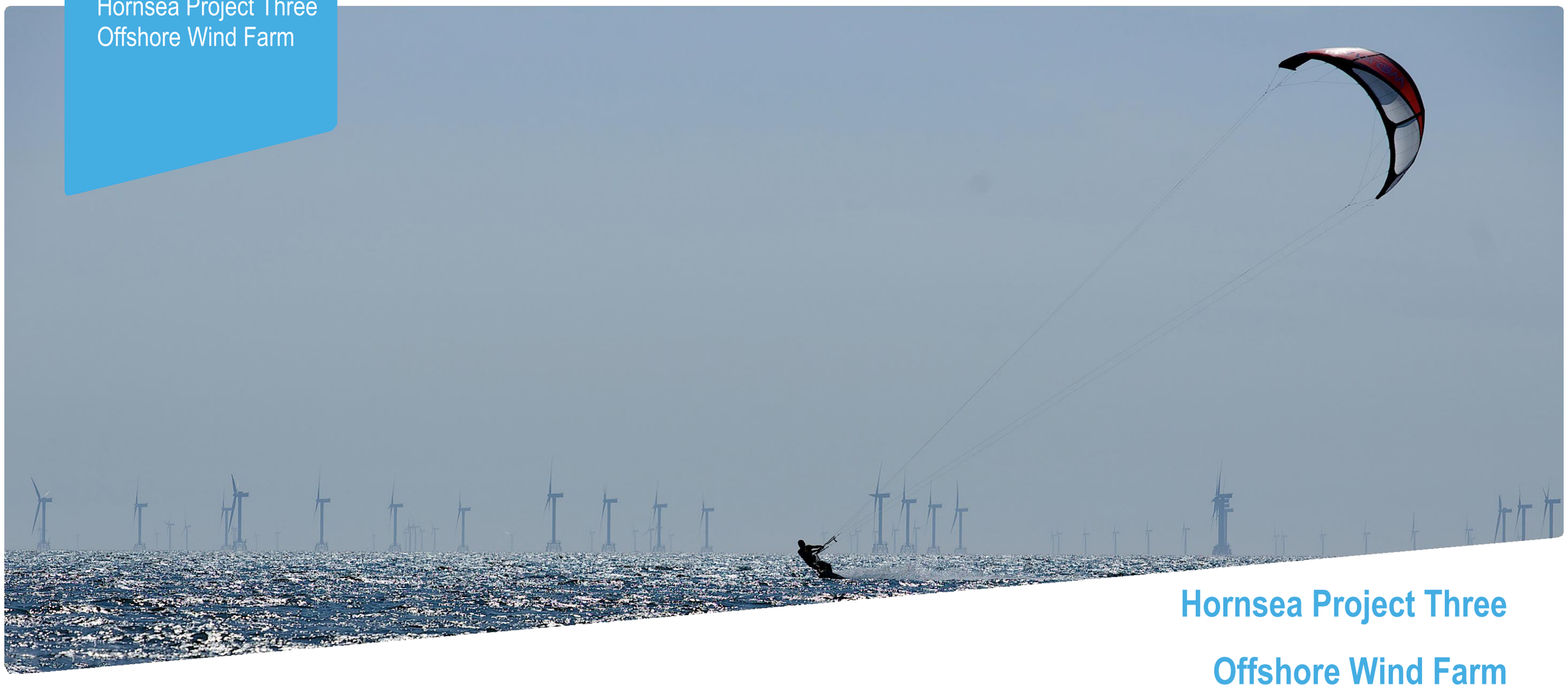
Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Environmental Statement:
Volume 3, Chapter 7 – Traffic and Transport

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APFP Regulation 5(2)(a)

Date: May 2018

Hornsea 3
Offshore Wind Farm

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Environmental Impact Assessment

Environmental Statement

Volume 3

Chapter 7 – Traffic and Transport

Liability

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Glossary

Term	Definition
Abnormal Indivisible Loads	Loads or vehicles that exceed maximum vehicle weight, axle weight or dimensions as set out in the Road Vehicles (Construction and Use) Regulations 1986 as amended.
Construction Traffic Management Plan(s)	A plan(s) managing construction traffic, including protocols for delivery of Abnormal Indivisible Loads to site, personnel travel, measures for road cleaning and sustainable site travel measures relevant to those works.
Driver Delay	Delays incurred to the driver of vehicles as they move along the highway network.
Geotextile	Textile matting laid under aggregate to provide coherence and stability to a temporary road surface.
Growthed	The application of traffic growth rates to traffic flows.
Highway Link	Length of highway.
NATA/WebTAG Methodology	A standard national approach to undertaking assessments of major transport infrastructure projects.
Onshore elements of Hornsea Three	Hornsea Three landfall, onshore cable corridor, construction compounds (including main construction compound), the onshore HVAC booster station, the onshore HVDC converter/HVAC substation and the interconnection with the Norwich Main National Grid substation.
Pedestrian Amenity	The convenience or comfort of movement on foot.
Pedestrian Delay	Delay incurred to pedestrians moving from one side of a road to another.
Project Description	A summary of the engineering design elements of Hornsea Project Three.
Ratio of flow to capacity	A measure of the operational performance of one arm of a junction calculated as the number of vehicles using an arm of a junction divided by the theoretical maximum number of vehicles that are able to use the arm during a specified period.
Serious personal injury accident	An accident leading to serious injuries requiring hospital treatment.
Severance	Real or perceived difficulties moving between one part of a community to another.
Shuttle working	The use of either manual control or traffic signals to allow alternate traffic streams to pass through a length of highway where the width is reduced and insufficient to allow two vehicles to pass each other.
Slight accident	An accident leading to slight injuries which are defined as cuts, bruises or sprains requiring roadside attention but not normally requiring admission to hospital.
TRACK Analysis	Computer modelling of area taken up by a moving vehicle.
Traffic growth rate	An estimate of the rate of change in traffic flows from one year to another year.
Transport Assessment	A transport assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport impacts of the scheme and to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling and public transport.
Trip Generation	The number of vehicle movements into and out of a development.
Trip Assignment	The routes that vehicles take between a site and other areas.
Trip Distribution	The proportion of vehicle trips between a site and other areas.
Trunk Road	A trunk road is a road maintained by a national government body, as distinct from the great majority of roads, which are maintained by local Highway Authorities.

Acronyms

Acronyms	Description
AADT	Annual Average Daily Traffic
AoS	Appraisal of Sustainability
ATC	Automatic Traffic Counter
CoCP	Code of Construction Practice
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
HDD	Horizontal Directional Drilling
HE	Highways England
HGV	Heavy Goods Vehicle
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
IHT	Institution of Highways and Transportation
MCCs	Manual Classified Count
MD	Main Distributor
MHWS	Mean High Water Spring
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
PINS	Planning Inspectorate
PEIR	Preliminary Environmental Information Report

Acronyms	Description
PIA	Personal Injury Accident
SRN	Strategic Road Network
TEMPRO	Trip End Model Presentation Programme
TA	Traffic Assessment
WebTAG	Web Transport Analysis Guidance

Units

Unit	Description
“	Inches (distance)
ft	Feet (distance)
GW	Gigawatt (power)
km	Kilometre (distance)
kW	Kilowatt (power)
m	Metre (distance)
m^2	Metres squared (area)
mph	Miles per hour (speed)
t	Tonne (weight)

7. Traffic and Transport

7.1 Introduction

7.1.1.1 This chapter of the Environmental Statement presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the Hornsea Project Three offshore wind farm (hereafter referred to as Hornsea Three) on traffic and transport. Specifically, this chapter considers the potential impacts of Hornsea Three landward of Mean High Water Spring (MHWS) during its construction, operation and maintenance, and decommissioning phases.

7.1.1.2 Those impacts of Hornsea Three on noise and vibration and air quality relating to traffic are assessed in volume 3, chapter 8: Noise and Vibration and chapter 9: Air Quality respectively.

7.1.1.3 This chapter summarises information contained within technical reports, which are included at volume 6, annex 7.1: Transport Assessment; annex 7.2: Description of Network Links and Sensitivity; annex 7.3: Baseline Traffic Flows; annex 7.4: Personal Injury Accident Locations; annex 7.5: Public Transport Networks; annex 7.6: Construction Vehicle Trip Generation Assumptions; annex 7.7: Traffic Flows with Construction Traffic; and annex 7.8: Traffic and Transport Figures.

7.2 Purpose of this chapter

7.2.1.1 The primary purpose of the Environmental Statement is to support the Development Consent Order (DCO) application for Hornsea Three under the Planning Act 2008 (the 2008 Act) and accompanies the application to the Secretary of State for Development Consent.

7.2.1.2 It is intended that the Environmental Statement will provide statutory and non-statutory consultees with sufficient information to complete the examination of Hornsea Three and will form the basis of agreement on the content of the DCO.

7.2.1.3 In particular, this Environmental Statement chapter:

- Presents the existing environmental baseline established from studies, and consultation;
- Presents the potential environmental effects on traffic and transport arising from Hornsea Three, based on the information gathered and the analysis and assessments undertaken;
- Identifies any residual effects;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

7.3 Study area

7.3.1.1 The Hornsea Three traffic and transport study area includes the onshore elements of Hornsea Three (i.e. the Hornsea Three landfall area, the onshore cable corridor, HVAC booster station, HVDC converter/HVAC substation and the interconnection with the Norwich Main National Grid substation), together with the compounds (including main construction compound), storage areas, construction accesses and all highways, Public Rights of Way (PRoW), private accesses and railways in the vicinity that are anticipated to be used by, or affected by, the construction, operational and decommissioning traffic. The Hornsea Three traffic and transport study area also includes parts of the wider transport network that provide links between the onshore cable corridor and onshore HVDC converter/HVAC substation site and HVAC booster station and the local and strategic transport networks.

7.3.1.2 The study area has been defined for the purposes of undertaking the EIA. The movement of Abnormal Indivisible Loads are low in number (less than 20), will be spread over a period of time and expected to result in no more than one movement in any one day, potentially during the night. The port of entry and the routes the Abnormal Indivisible Loads will take will be influenced from Highways England (HE) and Norfolk County Council and will be based upon each port's capabilities to accommodate the large loads and the available routes from these in terms of their geometries and layout being able to accommodate the large vehicles. HE and Norfolk County Council can only agree the port of entry and the route once the detailed dimensions and weight of the load, the heavy haulage contractor and the resultant transport vehicle has been defined and the requisite permission is sought to enable such movement. In terms of the number of movements, these will not result in any significant effects and so is scoped out of this assessment.

7.3.1.3 In summary, the Hornsea Three traffic and transport study area therefore extends from the A148 at Fakenham to the A149 at Cromer, following the A1067 and A140 to the south to the Norwich ring road (as shown in Figure 7.1). This study area has been discussed and agreed with the Local Highway Authority.

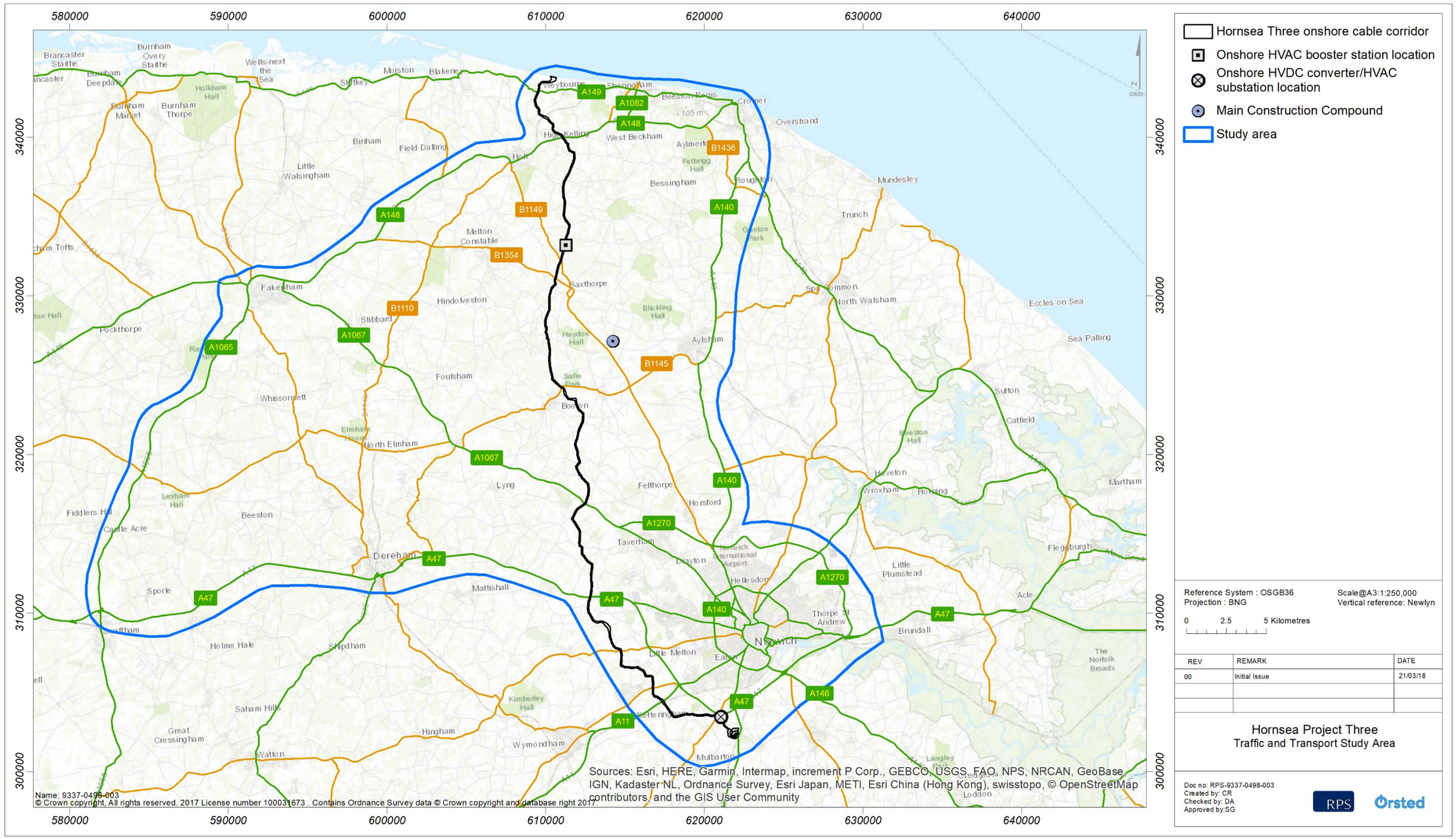

Figure 7.1: Hornsea Project Three traffic and transport study area.

7.4 Planning policy context

7.4.1 National Policy Statement

7.4.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to traffic and transport is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3) (DECC, 2011b).

7.4.1.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 7.1.

Table 7.1: Summary of NPS EN-1 provisions relevant to traffic and transport.

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
Introduction	
The transport of materials, goods and personnel to and from a development during all project phases can have a variety of impacts on the surrounding transport infrastructure and potentially on connecting transport networks, for example through increased congestion. Impacts may include economic, social and environmental effects. Environmental impacts may result particularly from increases in noise and emissions from road transport. Disturbance caused by traffic and abnormal indivisible loads generated during the construction phase will depend on the scale and type of the proposal (paragraph 5.13.1).	This chapter of the Environmental Statement considers all relevant potential transport impacts during the construction, operation and maintenance, and decommissioning phases of development. The Hornsea Three traffic and transport study area has been established through discussions with the relevant Highway Authorities. Noise is considered in volume 3, chapter 8: Noise and Vibration, air impacts are considered in volume 3, chapter 9: Air Quality and environmental impacts acting in combination on receptors are considered in volume 3, chapter 11: Inter-Related Effects.
The consideration and mitigation of transport impacts is an essential part of Government's wider policy objectives for sustainable development as set out in section 2.2 of NPS EN-1 (paragraph 5.13.2).	This chapter of the Environmental Statement identifies possible transport impacts and ways to mitigate them in section 7.11. The mitigation of these impacts is incorporated into the development proposals.
Applicant's assessment	
If a project is likely to have significant transport implications, the applicant's Environmental Statement should include a Transport Assessment (TA) using the NATA/WebTAG methodology stipulated in Department for Transport (DfT) guidance (DfT, 2007), or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation (paragraph 5.13.3).	A Traffic Assessment (TA) is submitted with the DCO Application in accordance with the NATA/WebTAG methodology stipulated in DfT guidance (DfT, 2007) and its replacement Planning Practice Guidance, with its scope discussed and agreed with the relevant Highway Authorities including HE. The TA is presented at volume 6, annex 7.1: Transport Assessment.
Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts (paragraph 5.13.4).	Where appropriate it is expected that movement by sustainable means will be facilitated and encouraged. However, it is recognised that the linear nature of the works, the absence of a fixed permanent work site along the Hornsea Three onshore cable corridor and the rural nature of much of the onshore cable corridor may make it difficult to implement a standard travel plan for onshore cable corridor working.
If additional transport infrastructure is proposed, applicants should discuss with network providers the possibility of co-funding by Government for any third-party benefits. Guidance has been issued in England which explains the circumstances where this may be possible, although the Government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time (paragraph 5.13.5).	Additional transport infrastructure is limited to the provision of a number of mostly temporary construction accesses along the Hornsea Three onshore cable corridor. Accesses will be removed where appropriate and where agreed with landowners and the land reinstated when the Hornsea Three onshore cable corridor construction is finished. Where accesses are not removed, they will remain in-situ, for example, the access to the onshore HVDC converter/HVAC substation.
Decision making	
A new energy NSIP may give rise to substantial impacts on the surrounding transport infrastructure and the Secretary of State should therefore ensure that the applicant has sought to mitigate these impacts, including during the construction phase of the development. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the Secretary of State should consider requirements to mitigate adverse impacts on transport networks arising from the development, as set out below. Applicants may also be willing to enter into planning obligations for funding infrastructure and otherwise mitigating adverse impacts (paragraph 5.13.6).	Section 7.11 identifies possible transport impacts resulting from all phases of development and ensure mitigation measures (where relevant/necessary) incorporated into the scheme.
Provided that the applicant is willing to enter into planning obligations or requirements can be imposed to mitigate transport impacts identified in the NATA/WebTAG TA, with attribution of costs calculated in accordance with the DfT's guidance, then development consent should not be withheld, and appropriately limited weight should be applied to residual effects on the surrounding transport infrastructure (paragraph 5.13.7).	Section 7.11 identifies possible transport impacts resulting from all phases of development and any commitments made to implementing appropriate mitigation measures.
Mitigation	
Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts (paragraph 5.13.8).	The proposed mitigation measures (see section 7.11) relate to the routeing and timing of heavy goods vehicle (HGV) movements and management of construction staff movement and do not require the provision of any new inland transport infrastructure apart from temporary improvements to the Hornsea Three onshore cable corridor accesses.

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
The Secretary of State should have regard to the cost-effectiveness of demand management measures compared to new transport infrastructure, as well as the aim to secure more sustainable patterns of transport development when considering mitigation measures (paragraph 5.13.9).	As stated above, no new provision of inland transport infrastructure apart from mostly temporary (with some remaining in-situ where appropriate) improvements to the Hornsea Three onshore cable corridor accesses, is proposed (see section 7.11).
The Secretary of State may attach requirements to a consent where there is likely to be substantial HGV traffic that: • Control numbers of HGV movements to and from the site in a specified period during its construction and possibly on the routing of such movements; • Make sufficient provision for HGV parking, either on the site or at dedicated facilities elsewhere, to avoid 'overspill' parking on public roads, prolonged queuing on approach roads and uncontrolled on-street HGV parking in normal operating conditions; and • Ensure satisfactory arrangements for reasonably foreseeable abnormal disruption, in consultation with network providers and the responsible police force (paragraph 5.13.11).	Proposed HGV routes are identified and restrictions on HGV timing are proposed to avoid adverse impact on sensitive receptors, particularly schools. The design of the construction works will avoid the risk of HGV parking on surrounding highway. The transport of abnormal indivisible loads has been subject to necessary studies and is expected to cause minimal disruption.
If an applicant suggests that the costs of meeting any obligations or requirements would make the proposal economically unviable this should not in itself justify the relaxation by the Secretary of State of any obligations or requirements needed to secure the mitigation (paragraph 5.13.12).	The costs of transport mitigation currently envisaged by the applicant will not make Hornsea Three economically unviable.

7.4.1.3 NPS EN-3 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 7.2.

Table 7.2: Summary of NPS EN-3 policy on decision making relevant to this chapter.

Summary of NPS EN-3 policy on decision making (and mitigation)	How and where considered in the Environmental Statement
Appraisal of Sustainability (AoS)	
Significant negative effects were identified for all three technologies covered by EN-3 for traffic and transport. (1.7.2 bullet point 4). The AoS relates to the NPS policy though and that for the majority of AoS objectives, the strategic effects of offshore wind are considered to be neutral (1.7.2 bullet point 1) and that positive effects are likely on the climate change objective in the medium and long term by supporting the transition to a low carbon economy (paragraph 1.7.2 bullet point 2).	Section 7.11 assesses the significance of effects of the Hornsea Three on traffic and transport receptors.
Offshore wind	
The extent to which generic impacts set out in EN-1 are relevant may depend upon the phase of the proposed development being considered. For example, land-based traffic and transport and noise issues may be relevant during the construction and decommissioning periods only, depending upon the specific proposal (paragraph 2.6.4).	This has been described and considered within the assessment of Hornsea Three. The impacts which have been scoped out of the assessment are outlined in section 7.8.2, along with the justification for scoping out.

7.4.1.4 NPS EN-5, to be read in conjunction with NPS EN-1 deals with electricity network infrastructure including onshore cable corridors and grid connections. No specific policy is set out in relation to transport and traffic.

7.4.1.5 Further advice in relation specifically to the Hornsea Three development has been sought through consultation with the statutory authorities (see section 7.5) and from the scoping opinion (see volume 4, annex 5.5: Scoping Report and PINS Scoping Opinion).

7.4.2 Other relevant policies

7.4.2.1 A number of other policies are relevant to traffic and transport including:

- National Planning Policy Framework (Department for Communities and Local Government (DCLG), 2012);
- North Norfolk Core Strategy (North Norfolk District Council, 2008);
- Joint Core Strategy for Broadland, Norwich and South Norfolk (Greater Norwich Growth Board, 2014);
- Development Management Development Plan Document (DPD) (Broadland District Council, 2015); and
- Development Management Policies Document (South Norfolk Council, 2015).

7.4.2.2 Key provisions of these policies are set out in Table 7.3 along with details as to how these have been addressed within the assessment.

Table 7.3: Summary of local policy relevant to this chapter.

Summary of provision	How and where considered in the Environmental Statement
National Planning Policy Framework	
With regard to traffic and transport, the NPPF states that "*All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:* • *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;* • *safe and suitable access to the site can be achieved for all people; and* • *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.*" (paragraph 32).	A TA, provided at volume 6, annex 7.1: Transport Assessment, assesses these criteria, the opportunities for sustainable transport, access and road safety, and the need for any transport improvements. It concludes that no severe impact would not arise.
Circular 02/2013: The Strategic Road Network and the Delivery of Sustainable Development	
The Circular sets out the way in which the Highways Agency (now Highways England) will engage with communities and the development industry to deliver sustainable development and economic growth whilst safeguarding the primary function and purpose of the strategic road network. Circular 02/2013 states that *"the Highways Agency supports the economy through the provision of a safe and reliable strategic road network, which allows for the efficient movement of people and goods."* Similarly to the NPPF, Circular 02/2013 states that *"development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*	A TA is provided at volume 6, annex 7.1: Transport Assessment and assesses the impact of Hornsea Three, concluding that no severe impact would not arise.
Planning Practice Guidance: Travel Plans, TAs and Statements	
The guidance provides a concise report on the use and importance of TAs / Statements and Travel Plans. It considers that TAs / Statements and Travel Plans should be proportionate to the size and scope of the proposed development, be tailored to particular local circumstances and be established at the earliest practicable possible stage of a development proposal. It sets out that: "*the scope and level of detail in a Transport Assessment or Statement will vary from site to site and then lists a host of elements that should be considered."*	A TA is provided at volume 6, annex 7.1: Transport Assessment, has been tailored to the local circumstances, and is proportionate to the size and scope of Hornsea Three.
Local Planning Policy	
North Norfolk District – the Adopted Core Strategy and Development Management Policies Development Plan Documents (DPDs) Development will be designed to reduce the need to travel and to maximise the use of sustainable forms of transport appropriate to its particular location. Development proposals will be considered against the following criteria: • the proposal provides for safe and convenient access on foot, cycle, public and private transport addressing the needs of all, including those with a disability; • the proposal is capable of being served by safe access to the highway network without detriment to the amenity or character of the locality; • outside designated settlement boundaries the proposal does not involve direct access on to a Principal Route, unless the type of development requires a Principal Route location; • the expected nature and volume of traffic generated by the proposal could be accommodated by the existing road network without detriment to the amenity or character of the surrounding area or highway safety; and • if the proposal would have significant transport implications, it is accompanied by a TA, the coverage and detail of which reflects the scale of development and the extent of the transport implications, and also, for non-residential schemes, a travel plan (Policy C5, North Norfolk Core Strategy).	This Environmental Statement chapter and the TA (volume 6, annex 7.1: Transport Assessment) outline the proposed accesses and locations in section 7.7 and 1.6 respectively and assesses these along with the transport implications against these criteria in section 7.11 and 1.6 respectively. Safe and convenient access is demonstrated; HGVs generated by Hornsea Three benefit from direct access onto the Principal Route network, and so this is proposed where possible; and the nature and volume of traffic generated by the proposal on the road network is assessed to conclude there would be no impact on highway congestion or highway safety.
Former railway trackbeds, and other railway land will be protected from development that would be prejudicial to the re-use of railway, or sustainable transport links and facilities in the following locations: Sheringham; Fakenham to the District Council boundary (to the south of Great Ryburgh); and sites currently in use as, or with potential for, rail freight terminal facilities in the following settlements: Cromer Fakenham Great Ryburgh and North Walsham (Policy CT 7, North Norfolk Core Strategy).	It is proposed that the Hornsea Three onshore cable corridor would use Horizontal Directional Drilling (HDD) to enable the construction of the onshore cable corridor around railway infrastructure. The construction of the onshore cable corridor is temporary and would have no long-term implications on the function of former railway trackbeds. The Hornsea Three onshore cable corridor does not impact upon any of those listed in the policy, but does cross Marriott's Way, which follows two disused railway lines, where HDD will be used.
Joint Core Strategy for Broadland, Norwich and South Norfolk Local Plan The transportation system will be enhanced to develop the role of Norwich as a Regional Transport Node, particularly through the implementation of the Norwich Area Transportation Strategy, and will improve access to rural areas. (Policy 6: Access and Transportation, Joint Core Strategy for Broadland, Norwich and South Norfolk).	It is proposed that traffic management measures will be used on rural roads, with passing places improved or built only where necessary, as set out in section 7.11. In addition, accesses for the Hornsea Three onshore cable corridor may require improvements to the highway network and farm accesses for HGV access, thus improving access to rural areas on a temporary basis during the construction phase and longer term where any improvements are retained.

Summary of provision	How and where considered in the Environmental Statement
"*Improved strategic links to the rest of the region and beyond and access to jobs, services and facilities across the area are also key to the success of this Joint Core Strategy. Good strategic access reduces the perceived isolation of Norfolk. Improvements help stimulate and enhance the local economy and make the area more attractive for inward investment. In some instances, the Joint Core Strategy may be able to deliver improvements, but it is often the case that improvements to infrastructure providing longer distance strategic links have to be delivered by outside agencies such as Network Rail and the Highways Agency. The Joint Core Strategy will ensure that it promotes these improvements by providing a context for them to occur and ensuring their importance is recognised. Any significant negative impacts of transport improvements will need to be addressed by appropriate mitigation measures.*" (paragraph 5.46, Improvements help stimulate)	Section 7.11 assesses the impact on the strategic road network and proposes mitigation measures where significant negative impacts are predicted.
Broadland District Council Development Management DPD (2015) "*It is important that new development is undertaken in such a way that highway safety, or the operation of the network, is not adversely affected. Proposals for new development will be expected to demonstrate a safe access to the highway and that the local highway network will continue to function for the future.*" (paragraph 8.14, Development Management DPD).	This Environmental Statement chapter proposes accesses, locations and management measures (see section 7.11) and the TA at volume 6, annex 7.1: Transport Assessment (section 1.6) such that safe access is achieved and that the local highway network would continue to function.
"*The County Council has defined a route hierarchy identifying principal routes that can carry significant amounts of through traffic and these routes are defined on the policies map. The function of these routes must not be impaired by inappropriately located development. New development should be treated such that traffic from the site has a good access to an appropriate route as defined by the County Councils route hierarchy. For example HGV generating development should have good access to a HGV Access Route or higher designation of route within the route hierarchy.*" (paragraph 8.15, Development Management DPD).	The Norfolk County Council route hierarchy has been considered within the assessment of Hornsea Three. The route options available utilise trunk, principal and main distributor roads where practicable. Lower classification roads are only used on access options to reach individual accesses where there are no other options available.
"*In general, new accesses onto or off other principal routes and main distributor routes are only acceptable where they support integrated and sustainable development objectives. Development served by side roads connecting to other defined principal routes must demonstrate that no significant adverse effects will result. With the exception of sites inside defined development areas, accesses will generally only be permitted where it can be demonstrated that the routes ability to perform its function as designated in the route hierarchy would not be impaired.*" (paragraph 8.17, Development Management DPD).	Access taken from main distributor roads will be required; however, HDD will be used at these points to allow the road to be utilised without compromising on the routes ability to perform its function. Access to HDD compounds and haul road will be short term and continuous. This Environmental Statement chapter and the TA at volume 6, annex 7.1: Transport Assessment assesses each access in section 7.11 and 1.6 respectively and seek to demonstrate that routes' ability to perform its function as designated in the route hierarchy would not be impaired.

Summary of provision	How and where considered in the Environmental Statement
South Norfolk District Management Policies Document (2015) *'Proposals for development that create new access / egress points (or intensify the use of existing access / egress points) onto the local highways network should ensure the safe and satisfactory functioning of the highway network'.*	This Environmental Statement chapter proposes accesses and management measures (see section 7.11) and the TA at volume 6, annex 7.1: Transport Assessment (section 1.6) such that safe access is achieved and that the local highway network would continue to function.
"The function of the principal routes and some main distributor routes is particularly important to the strategy for sustainable transport to serve the current and future needs and new development in the towns and villages of South Norfolk, and their function should be protected".	This Environmental Statement chapter proposes accesses, locations and management measures (see section 7.11) and the TA at volume 6, annex 7.1: Transport Assessment (section 1.6) such that safe access is achieved and that the local highway network would continue to function.
"Policy DM 3.11 Road Safety and the free flow of traffic: *Planning permission will be granted for development involving the formation or intensified use of a direct access onto a Corridor of Movement providing it would not:* *Prejudice the safe and free flow of traffic or planned proposals for sustainable transport initiatives along the Corridor of Movement".*	This Environmental Statement chapter proposes accesses, locations and management measures (see section 7.11) and the TA at volume 6, annex 7.1: Transport Assessment (section 1.6) such that safe access is achieved and that the local highway network would continue to function.

7.5 Consultation

7.5.1.1 Table 7.4 below summarises the issues raised relevant to traffic and transport, which have been identified during consultation activities to date. Table 7.4 also indicates either how these issues have been addressed within this Environmental Statement or how the Applicant has had regard to them. Further information on the consultation activities undertaken for Hornsea Three can be found in the Consultation Report (document reference number A5.1) that accompanies the application for Development Consent.

7.5.1.2 The general scope of assessment and methodologies contained within this chapter and the TA (volume 6, annex 7.1: Transport Assessment) have been agreed in advance with Norfolk County Council and HE. Due to their nature, some of the detailed elements (for example the configuration of trenches to result in a maximum design scenario) have not been discussed with Norfolk County Council or HE in advance. However, for those detailed elements that have not been discussed in advance, industry standard practices have been adopted to ensure a maximum design scenario is created and relevant guidance documents have been followed such that a reasonable maximum impact is assessed appropriately and in accordance with those documents.

Table 7.4: Summary of key consultation issues raised during consultation activities undertaken for Hornsea Three relevant to traffic and transport.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
December 2016	Norfolk County Council – Scoping Response	Access to compounds and corridor needs to be appropriate with adequate visibility splays.	All accesses have been considered with regard to current design standards. The DCO application proposes temporary 30 mph speed restrictions at all temporary accesses and visibility splays will be provided in accordance with such vehicle speeds.
December 2016	Norfolk County Council – Scoping Response	Some of the roads are traffic sensitive and are tourist routes and/or main roads, for which road opening notices are unlikely to be granted or be allowed to be affected during holiday seasons.	The access strategy seeks to avoid the use of tourist routes, wherever practicable, however, some use of all parts of the network is required for local access to the cable corridor.
December 2016	Norfolk County Council – Scoping Response	Need to ensure that Abnormal Indivisible Loads are capable of travelling along the accesses.	Considerations for Abnormal Indivisible Loads are set out in volume 6 annex 7.1: Transport Assessment.
February 2017	Norfolk County Council - Meeting	Traffic management measures should be adopted.	An Outline Construction Traffic Management Plan (CTMP (document reference A8.2)) and an Outline CoCP (document reference A8.5) which establish the principles that any subsequent CTMPs and CoCPs will follow are submitted with the application. The CTMPs form part of the CoCPs. The draft DCO submitted with the application requires that no phase of any works landward of MLWS may commence until, for that phase, a CoCP (which must accord with the outline CoCP) has been submitted to, and approved by, the relevant planning authority, in consultation with the relevant highway authority. Post consent / prior to the commencement of works (when there is greater certainty about parameters of Hornsea Three) CTMPs will be developed in consultation with Norfolk County Council as the Local Highway Authority and HE, prior to submission to the Local Planning Authorities for approval.
February 2017	Norfolk County Council - Meeting	Appointed contractor should be ETON6 (electronic transfer of notifications) compliant to enable permits to be issued by Norfolk County Council.	This will be contained within the Outline CTMP (document reference A8.2). An Outline CTMP accompanies the DCO Application (document reference A8.2).
February 2017	Norfolk County Council - Meeting	The Environmental Statement assessment scope would include identification of potential access and haul roads for the Hornsea Three cable corridor construction and not specific finally chosen access and haul roads, which will allow consultees to feed into the process. The Environmental Statement will set out principles for traffic management measures to control construction vehicles and traffic surveys will be carried out to allow a full EIA to be undertaken leading up to the final DCO application.	The published PEIR set out a range of accesses to the onshore cable corridor. The comments received pertaining to the PEIR have been reviewed and have informed the accesses that are presented within this chapter of the Environmental Statement.
May 2017	Norfolk County Council - Meeting	Agreement of traffic survey locations and timings/durations etc.	The traffic survey results have been used to inform the TA (see volume 6, annex 7.3: Baseline Traffic Flows). The traffic survey locations were agreed with Norfolk County Council.
September 2017	AECOM, on behalf of HE – Section 42 Response	Highway links where the increase in total flow or HGV flows are predicted to be less than 10% will be screened out of the assessment. AECOM acknowledge that this is the 'industry standard' approach for the sort of impacts considered in an EIA. However, it should be noted that Circular 02/2013 can require detailed scrutiny of traffic capacity and road safety impacts at significantly lower thresholds	This approach has only been applied to this Environmental Statement chapter. The TA (volume 6, annex 7.1: Transport Assessment) adopts an approach aligned to Circular 02/2013.
September 2017	AECOM, on behalf of HE – Section 42 Response	Construction vehicle movements at each access and compounds should be presented.	Volume 6 annex 7.1: Transport Assessment sets these movements out.
September 2017	AECOM, on behalf of HE – Section 42 Response	The management of interactions with the A47 improvements needs to be considered.	Orsted has engaged with HE and at the point of cross over between the onshore cable works and the proposed alignment of the dualled A47 (just west of Easton roundabout) the onshore cable can be installed by way of a HDD if required. The management of these interactions will be discussed and agreed with HE at a later date when the A47 dualling scheme is further developed.
September 2017	AECOM, on behalf of HE – Section 42 Response	A47 / B1535 priority junction should be assessed because it serves as the access to the main compound C1.	Compound option C1 is no longer proposed as part of Hornsea Three, this is as a result of the project refinement process. Further details are set out in volume 1, chapter 4: Site Selection and Consideration of Alternatives.
September 2017	AECOM, on behalf of HE – Section 42 Response	A47 access should be resisted.	Direct access from the A47 is not proposed.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
September 2017	AECOM, on behalf of HE – Section 42 Response	If traffic flows warrant it, an assessment of junctions on the trunk road should be undertaken.	A threshold of 30 vehicle movements during the network peak hour has been utilised as a threshold to warrant assessment.
September 2017	Norfolk County Council – Section 42 Response	The Local Highway Authority would like a TA.	A TA has been completed and is presented in volume 6 annex 7.1: Transport Assessment.
November 2017	Highways England - Meeting	Assessment methodology	It was agreed with HE that if the construction traffic flows through a junction on their network exceeded 30 vehicle movements during the network peak hours, then an assessment of the impact upon highway capacity of that junction would be undertaken. For the movement of construction staff, it was agreed that if the construction staff peak hour subsequently exceed the network peak hour, then an assessment of the impact upon highway capacity of that junction would be undertaken. These calculations are set out in volume 6 annex 7.1: Transport Assessment.
November 2017	Norfolk County Council - Meeting	Norfolk County Council will want to review details of proposed works to permanent accesses to the HVAC Booster Station and HVDC Converter station/HVAC substation.	Proposed access layouts to the onshore HVDC converter station/HVAC substation and HVAC booster station will be designed to current design standards to accommodate construction HGVs and Abnormal Indivisible Loads. Detailed layouts will be prepared prior to the commencement of any construction. Where traffic management measures are to be adopted the extent of these will be agreed with Norfolk County Council at the time of preparing the subsequent CTMPs secured prior to the commencement of works and activities at the substation sites.
December 2017	Strutt and Parker on behalf of landowners	Suitability of accesses and the potential to improve accesses to minimise impacts upon landowners.	The comments on the accesses were all reviewed and actioned accordingly. In one instance, there was a misunderstanding on the access strategy but in all other instances, the accesses were updated in accordance with the comments received.
March 2018	Broadland District Council - (Meeting	Local concern about management of traffic using the proposed main construction compound at Oulton Airfield.	The main compound at Oulton Street will be accessed from The Street, east of the B1149. Traffic management will be designed post submission as part of the subsequent CTMPs secured prior to the commencement of works and activities at the main compound, which might involve diversion route.

7.6 Methodology to inform the baseline

7.6.1 Desktop study

7.6.1.1 Information in Hornsea Three traffic and transport study area, along the accesses and adjacent roads, was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 7.5.

Table 7.5: Summary of key desktop sources.

Title	Source	Year	Author
Identification of sensitive receptors	Search along accesses	2017	N/A
Road geometries and layouts	Analysis of accesses	2017	N/A
Identification of facilities for sustainable travel	Desktop analysis	2017	N/A
Identification of potential route options	Norfolk County Council Route Hierarchy Map	2017	Norfolk County Council
Analysis of Personal Injury Accident data	Norfolk County Council	2013 to 2017	Norfolk County Council

7.6.2 Site specific surveys

7.6.2.1 In order to inform the EIA, site-specific surveys were undertaken in June 2017, the scope of which have been agreed with Norfolk County Council's Highway Authority. A summary of the surveys undertaken is outlined in Table 7.6.

Table 7.6: Summary of site-specific survey data.

Title	Extent of survey	Overview of survey	Survey contractor	Year	Reference to further information
Traffic Surveys	Along accesses where EIA was required and where capacity assessments were undertaken.	Daily traffic flows on key road links was measured by placing Automatic Traffic Counters (ATCs) for two-week periods and daily traffic flows through junctions was measured by undertaking Manual Classified Counts (MCCs).	Countsequential.	2017	Volume 6, annex 7.3: Baseline Traffic Flows.

7.7 Baseline environment

7.7.1.1 Details of the highway network are set out in volume 6, annex 7.2: Description of Network Links and Sensitivity. The following paragraphs provide an overview of the strategic highway network and the highway network providing access to the onshore elements of Hornsea Three.

7.7.1.2 The Norfolk County Council Route Hierarchy map, produced by Norfolk County Council Highway Network Management sets out a hierarchy of road types with higher classifications of road being at the top and illustrates trunk roads and principal roads in addition to Main Distributor (MD), HGV, tourist and accesses throughout Norfolk. The classification of links which comprise the roads shown on the Norfolk County Council Route Hierarchy map is shown in volume 6, annex 7.8: Traffic and Transport Figures, Figure 1.2.

7.7.2 Strategic/Principal Road Network

7.7.2.1 The main routes into the Hornsea Three traffic and transport study area from the wider Strategic Road Network (SRN) are via the A47 that runs east-west between Kings Lynn and Great Yarmouth, and the A11 which routes from junction 9A of the M11 to Norwich City Centre. The A47 is primarily a wide single carriageway road, becoming a dual carriageway from its junction with the Dereham Road/Church Lane roundabout to Blofield, east of Norwich, where it returns to a wide single carriageway. The A11 is a dual carriageway road from its junction with the A47 to its junction with the M11, and is accessed from the A47 via a grade-separated junction.

7.7.2.2 The A1270 Northern Distributor Road is a dual carriageway strategic distributor road which routes from the A47 east of Norwich via a grade-separated junction, routeing to the north of Norwich where it joins the A1067 via junctions for the A140 and B1149. The A140 and A1067 are key commuter roads between Norwich and North Norfolk within a highway network that has few trunk roads and A roads.

7.7.2.3 The A1270 Northern Distributor Road objectives are to reduce traffic levels and congestion on the existing road network, both within the urban area and beyond to the north. The A1270 opened in late 2017 / early 2018 and allows traffic to route north of Norwich, bypassing the A1042 and A140 which route towards and around the Norwich city centre.

Access to Hornsea Three onshore cable corridor

7.7.2.4 The Hornsea Three onshore cable corridor will be accessed using roads listed on the Route Hierarchy map wherever possible, although some use of narrow single carriageway and single track roads will be necessary to reach some accesses.

7.7.2.5 Up to two temporary haul roads will be constructed (typically one per phase – see Table 1.4 and volume 1, chapter 3: Project Description) along the majority of the Hornsea Three onshore cable corridor. The haul roads would provide HGV access to undertake trenching works and install the cables, with gaps only at some HDD locations and road crossings. The haul road will enable vehicles to move along the Hornsea Three onshore cable corridor and relieve the need for construction traffic to rely on longer sections of the local road network during construction.

7.7.2.6 Access from the highway network will be necessary for the transportation of materials for the construction of the haul road. Construction accesses from the road network to the Hornsea Three onshore cable corridor have sought to utilise existing field accesses or where the onshore cable corridor crosses the public highway and are shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures.

7.7.2.7 The Hornsea Three onshore cable corridor crosses a number of roads, disused railway lines and active railways. Major transport infrastructure including railways, and all public roads would be crossed using HDD. HDD will also be used to cross features such as main rivers and ordinary watercourses, major drains and ecologically designated sites as shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures. At HDD locations, temporary construction site accesses are located to ensure that access can continue to be provided to the whole route where an obstacle might prevent the installation of a haul road.

7.7.2.8 Access to the Hornsea Three onshore cable corridor and key transport links are described in 21 individual cable sections, each generally defined by a primary access from the road network of A and/or B road classification to the onshore cable corridor. In most cases a cable section will have multiple accesses. These 21 cable sections are specific to this chapter and have only been defined to assist with access routeing and traffic generation.

7.7.2.9 The Hornsea Three onshore cable corridor with HDD and access locations, along with cable sections are shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures.

7.7.2.10 The key roads are identified in the following paragraphs in order to provide an overview of some of the larger roads which will provide access to multiple sections of the Hornsea Three onshore cable corridor.

7.7.2.11 Sensitive receptors such as schools, care homes, hospitals and residential areas with poor footway provision have been identified within the vicinity of the Hornsea Three onshore cable corridor, shown on Figure 1.3 in volume 6, annex 7.8: Traffic and Transport Figures and highlighted in the paragraphs below.

A149

7.7.2.12 The A149 runs parallel to the coastline, routing from Kings Lynn to Cromer via Hunstanton, then south east to Caister-on-Sea, and is a key commuter road between the coastal towns. It is identified on the Norfolk Route Hierarchy Map as a '3B3 – Special Access' road between Cromer and Hunstanton. The A149 provides a potential access through Sheringham via the A1082, with good forward visibility and few sensitive receptors with the exception of Weybourne, which has some residential frontages and sensitive receptors with no footways. The A149 Sheringham Road runs underneath the former North Norfolk Railway Line; therefore, a railway bridge crossing over the A149 prevents vehicles over 4.3 m in height from accessing Weybourne from Sheringham via this route.

7.7.2.13 While the A149 is a principal road with good forward visibility and a wide carriageway, it routes through Cromer, an urban centre with a residential area, town centre, shops and schools. Residential frontages and a church access are located directly onto the main road, and a one-way system operates in the centre of Cromer. Eastbound vehicles route along the A149 Church Street, and westbound vehicles route along Louden Road. There are several signal controlled crossing points on both of these routes enabling pedestrians to safely cross from residential areas to shops and schools. Car parking bays are present along the route; the carriageway which is unsuitable for parking due to width or activities, is controlled by double yellow lines.

7.7.2.14 The remainder of the A149 has few sensitive receptors and is subject to variable speed limits (40 mph, 50 mph and national speed limit).

A148

7.7.2.15 The A148 routes north east from Kings Lynn to Cromer via Fakenham. The A148 is one of the primary routes through North Norfolk and is a key commuter road for the rural communities and coastal towns.

7.7.2.16 The A148 will provide HGV access to narrow single carriageway and single track roads adjacent to the Hornsea Three onshore cable corridor between the A148 and Baconsthorpe. South of Baconsthorpe, HGVs can access the Hornsea Three onshore cable corridor via the B1149.

A140

7.7.2.17 The A140 routes between the A149 junction located approximately 3.5 km south of Cromer to the B1145 junction south of Aylsham; from Aylsham the A140 routes south to Norwich. As a principal road with wide carriageways and good forward visibility, the A140 is a key commuter road into Norwich from North Norfolk. The speed limit of the A140 between Cromer and Norwich varies between 30 mph, 40 mph and the national speed limit.

7.7.2.18 The A140 routes through Roughton, a small village centre with shops and crossings, pub and church. The speed limit is reduced to 30 mph through this section, increasing to the national speed limit to the south of Roughton. Road width and forward visibility are retained through Roughton.

B1436

7.7.2.19 The B1436 routes from the A148 via a three-arm roundabout, routeing south to the A140 at Roughton via a three-arm mini roundabout. The B1436 routes through Felbrigg and is primarily a national speed limit carriageway road; however, the speed limit reduces to 30 mph near Roughton within the vicinity of some sensitive receptors such as residential frontages and primary school.

7.7.2.20 The B1436 allows construction vehicles to route onto the A148 from the A140, bypassing Cromer which has many sensitive receptors and may be sensitive to changes in vehicle movements during peak tourist season.

A1067

7.7.2.21 The A1067 routes from the A148 east of Fakenham, south east to the A140 and A1402 junctions in Norwich. The A1067 between Fakenham and Bawdeswell is a principal road with good forward visibility. The A1067 from Bawdeswell to the A140 is suitable for HGVs; it has good forward visibility, a suitable carriageway width and is used as an existing bus route. The speed limit varies between 30 mph, 40 mph, 50 mph and the national speed limit.

7.7.2.22 There are some sensitive receptors on this route as it routes into Norwich; however, the footways are wide within the vicinity of these sensitive receptors. The A1270 Northern Distributor Road is accessed from the A1067 via a three-arm roundabout; therefore, construction vehicles can route via the A148 and A1067 south and onto the lower section of the B1149 for some sections of the Hornsea Three onshore cable corridor.

B1149

7.7.2.23 The A148 provides access to the B1149 via four-arm roundabout in Holt. The B1149 routes between Holt and the A1270 Northern Distributor Road; however, it previously joined the A140 via a large three-arm roundabout west of Norwich International Airport. The construction of the A1270 Northern Distributor Road has resulted in the previous junction of the B1149 and A140 being blocked off, instead having the B1149 route onto the A1270 Northern Distributor Road and a separate grade-separated junction between the A1270 Northern Distributor Road and the A140 has been constructed.

7.7.2.24 The B1149 is a '3A2 - Main Distributor' road and runs broadly parallel to the Hornsea Three onshore cable corridor as it routes from landfall to the A1067. There are some sensitive receptors on the B1149 as it passes through villages such as Edgefield, Saxthorpe and Horsford. The speed limit varies between 30 mph, 40 mph, 50 mph, and the national speed limit.

A47

7.7.2.25 The A47 is one of the few trunk roads within Norfolk, and routes from Kings Lynn to Great Yarmouth. The A47, routes to the south of Norwich within the vicinity of the Hornsea Three onshore cable corridor.

7.7.2.26 The A47 has typical characteristics of a trunk road, namely national speed limit with a wide carriageway and few sensitive receptors. The A47 proves a key route for HGVs routing north and south along the cable access as HGVs can route around Norwich via the A47 without travelling through the city centre or on minor roads.

7.7.2.27 The B1108, B1172, A11 and A140 have junctions with the A47 to the south west of Norwich and are included within the Hornsea Three traffic and transport study area.

A11

7.7.2.28 To the south west of Norwich, the A11 routes south west from the A147 junction and forms bypasses around Hethersett and Wymondham.

7.7.2.29 The B1172 routes from the A11 junction with the A47 along the south of Hethersett with a foot and cycle path north of the carriageway.

7.7.2.30 In general, the A11 has wide carriageways and few sensitive receptors, though some residential frontages are present. A good footway provision is present in the vicinity of dwellings.

B1145 from Aylsham to Bawdeswell

7.7.2.31 The B1145 is classified by Norfolk County Council as a '3A2 – Main Distributor' road and is a key link to the A140 from Bawdeswell, Reepham and Cawston. A four-arm roundabout connects the B1145 to the A140 and Norwich Road. Routing west from Aylsham, the B1145 has a crossroad junction with the B1149 and a priority junction where it meets the A1067. The B1145 has generally good visibility with the exception of some bends on which visibility is reduced by high hedgerows and buildings. The speed limit varies between 20 mph, 30 mph, 40 mph, 50 mph and the national speed limit.

7.7.2.32 The B1145 provides an access for HGVs between the Hornsea Three onshore cable corridor and the A140, with wide carriageways and street lighting within the vicinity of Aylsham.

7.7.2.33 The B1145 routes through the village of Cawston and Reepham town centre which have a number of sensitive receptors including shops, narrow footways and residential frontages. The speed limit is reduced to 20 mph as it routes through Reepham.

B1108 Earlham Road/Watton Road

7.7.2.34 The B1108 Earlham Road/Watton Road routes from the A47, west of Norwich, to Barford approximately 11.5 km from Norwich. The B1108 continues to route through Barford and to the south west where it joins the A1065 at Bodney. Between the A47 and Barford, the B1108 has good forward visibility and width, with suitable footways either side of the carriageway in residential areas. The B1108 is a key commuter road from the west of Norwich into the city centre and its junction with the A147 via a four-arm roundabout enables access from the B1108 to the city centre.

7.7.2.35 The B1108 is classified as a '3A2 – Main Distributor' road within the Norfolk County Council Route Hierarchy. On this section of road there is on-street parking, with footways and lighting, and numerous sensitive receptors including a hospital, church and direct access to residential dwellings.

7.7.3 Traffic flows

7.7.3.1 In order to establish baseline traffic flow models, traffic surveys were undertaken at various points across the transport study area. 12 Manual Classified Counts were undertaken between 07:00 and 19:00 on Tuesday 13 June 2017 to establish a baseline scenario from which the impact of construction traffic on highway capacity could be assessed.

7.7.3.2 Daily traffic flows for 22 sites were obtained through the use of Automatic Traffic Counters as various points across the transport study area, primarily on principal and MD roads to the north of Norwich. Daily traffic flows at 4 sites have been obtained from the DfT website. Daily traffic flows at four sites were obtained by HE and the remaining data was extracted from the Norfolk County Council Northern Distributor Road TA.

7.7.3.3 These traffic surveys have been agreed with Norfolk County Council and volume 6, annex 7.3: Baseline Traffic Flows summarises the traffic flow information collected.

7.7.3.4 Norfolk County Council have advised that there are seasonal variations in traffic flows on the A149 and A148. The A140 runs north to south between the coastal town of Cromer and Norwich. The A148 runs from Cromer roughly on a south west route to Kings Lynn, whilst the A149 again runs from Cromer, due west following the coastline, before turning to Kings Lynn. All three routes pass through the Norfolk Coast Area of Outstanding Natural beauty and converge on the popular seaside town of Cromer.

7.7.3.5 Norfolk County Council do not hold any traffic data along the A149 or A148 on which to determine the extent of any seasonal variation along the key coastal areas.

7.7.3.6 There are some DfT permanent traffic counters on each of the above roads, but these only provide year on year Annual Average Daily Flow figures rather than information relating to seasonal flow variation. HE provide network journey time and traffic flow data via their web site WebTRIS. However, on interrogating the WebTRIS database (March 2018) at the time of writing there are no count sites on any of the above routes.

7.7.3.7 An analysis of the traffic survey data shows that annual average traffic flows are very low in the areas to the north of Norwich and they do not identify any distinct AM or PM peak hours. Although there are peaks, they are not as defined as on other parts of the network. Observations indicate that there are no existing highway capacity problems in this area under annual average conditions.

7.7.3.8 It is understood from Norfolk County Council that traffic flows are higher during the peak summer season, (mid-July to September) however, there is no data available on which to quantify the full extent of this. On the basis that traffic surveys have been undertaken outside of the peak summer season, the change in traffic flows as a result of the Hornsea Three construction vehicles relative to the baseline traffic flows are at a maximum and therefore represent the biggest impact in comparison to comparable traffic flows during the tourist season. As set out in the methodology (section 7.9), this will therefore be a robust assessment in terms of the rule 1 and rule 2 (see section 7.9.1.7) thresholds and thus identify the key road links for detailed assessment robustly. The peak tourist season increases the number of cars along these sections and although this results in higher total vehicle flows, the number of HGV movements remain similar since there is no such increase in freight movement. Because the majority of traffic generated by Hornsea Three are HGVs, the conclusions drawn from the detailed assessments undertaken in sections 7.11 and 7.13 are subsequently weighted towards HGV movements and thus the conclusions do not change as a result of peak seasonal traffic flows.

7.7.3.9 From a highway capacity perspective, the requirement for detailed assessment considers the change in traffic flow as a result of the construction traffic flows and thus is dependent upon these volumes. The construction traffic flow volumes do not alter due to the peak seasonal traffic flows and thus the conclusions drawn in this regard similarly do not change.

7.7.4 Tourist routes

7.7.4.1 The Norfolk County Council Route Hierarchy map outlines several roads which are listed as tourist routes. These sections of the highway network will differ greatly in volumes and profiles of traffic between a typical working day, and during the summer season, particularly the peak summer holiday period between mid-July and September. It is considered that the seasonal variation will be greater on the highway network closer to the coast due to the limited number of alternative routes and specific tourist attractions.

7.7.5 Access to onshore cable corridor

7.7.5.1 To assist with the calculation of construction vehicle movements and the movement of these to the Hornsea Three onshore cable corridor, the onshore cable corridor has been separated into several sections, as shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures.

7.7.5.2 The accesses into the Hornsea Three traffic and transport study area are the A148 west, A1065, A11, A140, A146 and A47 west. An additional access into the Hornsea Three traffic and transport study area is the A140 / B1145 four-arm roundabout at Aylsham, which enables construction staff travelling from the A140 corridor between Norwich and Cromer to be incorporated into the traffic flow model. It is assumed that all construction traffic will route to the Hornsea Three onshore cable corridor via these external points on the network. This maximises the number of links within the study area that have HGV movements generated along them. This is because it forces all HGVs to arrive from outside the study area which maximises the number of road links they travel on within the study area. If HGVs were to originate from within the study area then those HGVs would not travel on road links between their origin and the outer edge of the study area.

7.7.5.3 The accesses in each section are summarised in the following paragraphs to clarify the extent of the local highway network being utilised. Access from the wider network will be taken via the strategic roads listed above.

7.7.5.4 Access to the Hornsea Three onshore cable corridor and key transport links are described in 21 cable sections, with the Hornsea Three landfall area, the onshore HVAC booster station and HVDC converter/HVAC substation also discussed.

Landfall

7.7.5.5 The onshore cable corridor makes landfall at Weybourne, with access from the highway network taken via The Muckleburgh Museum, west of Weybourne. The museum has an existing 5 m wide access, and an additional road will be constructed parallel to the existing road to allow for two-way HGV movements with minimal impact on the Museum. The military museum access is taken from the A148.

7.7.5.6 The primary route option for HGVs routeing from the A148 to the A149 is via the A1082 at Sheringham, where a four-arm roundabout enables construction vehicles to route onto the A149 and route west to Weybourne. The remainder of the local highway network consists of single track and narrow single carriageway roads which are less suitable for significant HGV movements: The Church Street T-junction with the A149 at Weybourne has limited visibility to the left due to residential dwellings adjacent to the carriageway. Church Street routes to Holt Road and Holgate Hill which has residential frontages with a lack of pedestrian facilities. The remainder of Holt Road and Holgate Hill are narrow single carriageways with no frontage access or sensitive receptors. Therefore, to access the lower half of Cable Section 1 HDD locations, a haul road above will be utilised, or a construction access which is not within the Hornsea Three onshore cable corridor will route around HDD points.

7.7.5.7 The A149 routes from the Foxhills camping access through the centre of Weybourne to the point at which the A149 becomes subject to the national speed limit. There are no pedestrian facilities between the camping site and Weybourne, and high hedgerows limit forward visibility on bends. There are many sensitive receptors and a lack of footways to village facilities such as shops, pubs and a church. There is on-street parking and houses which front straight onto the road in the village, with poor visibility for several houses with driveways; the speed limit varies between 20 mph and 30 mph.

Landfall to Holgate Hill (Cable Section 1)

7.7.5.8 From landfall to Holgate Hill, the local highway network utilised for the construction of this section of the onshore cable corridor will utilise the A148 from the wider highway network. Access is taken from the A149 and from Holgate Hill.

7.7.5.9 The primary route option for HGVs from the A148 to the A149 will be taken via the four-arm roundabout at Sheringham; however, a railway bridge which crosses the A148 prevents vehicles over 4.3 m in height from accessing landfall and Cable Section 1. This will not be an issue for daily construction vehicles; however, the cable drums will have to be transported such that their transport height is less than 4.3 m.

Holgate Hill to woodland north east of High Kelling (Cable Section 2)

7.7.5.10 Access to Section 2 of the onshore cable corridor will be taken via an existing agricultural access corridor from Bridge Street, north east of Holt and west of High Kelling. The existing access, north of Holt Rugby Club, routes to Warren Road which provides access to residential dwellings, Warren Close and agricultural land. Warren Road routes from Bridge Street; however, utilising the farm track north of Holt rugby club results in HGVs avoiding residential dwellings, minimising the risk of conflict.

Woodland north east of High Kelling to woodland south of Church Road (Cable Section 3)

7.7.5.11 Access to Section 3 of the Hornsea Three onshore cable corridor will be taken from the A148 and from Manor House Road. The A148 is a principal road with wide carriageways, good forward visibility and few sensitive receptors within the vicinity of the onshore cable corridor. As the A148 routes south of Holt, some frontage access is taken directly from the principal road. The section of road necessary to access the Hornsea Three onshore cable corridor is subject to the national speed limit, with good visibility and few sensitive receptors.

Woodland South of Church Road to Woodland south and east of School Lane (Cable Section 4)

7.7.5.12 Access to Cable Section 4 will be taken via Hempstead Road, accessed from the A148 at Holt. Hempstead Road is a '3B2 – Local Access' road as identified on the Norfolk County Council Route Hierarchy map between the A148 and the Hornsea Three onshore cable corridor.

7.7.5.13 The north section of Hempstead Road routes from the A148 to the Hempstead Industrial Estate and has a 30 mph speed limit. To the south and east of the industrial estate, Hempstead Road is subject to the national speed limit.

Woodland (east of School Lane) to Plumstead Road (Cable Section 5)

7.7.5.14 There are few points at which the highway network crosses the Hornsea Three onshore cable corridor on Cable Section 5; the roads which do are primarily narrow single carriageway or single track roads. The landscape becomes increasingly rural and commuter or distributor roads are infrequent on sections of the cable corridor where there are few towns or villages.

7.7.5.15 Hempstead Road / Hole Farm Road and Plumstead Road route from the B1149 eastwards and provide access to the Hornsea Three onshore cable corridor.

Plumstead Road to the B1149 (Cable Section 6)

7.7.5.16 Cable section 6 routes from Plumstead Road to the B1149, and access to this section of the onshore cable corridor will be obtained from the existing access to the Organic Waste Processing Site, taken from the B1149 north of Saxthorpe and Corpusty. The B1149 is classified as a '3A2 – Main Distributor' road and is subject to the national speed limit in the vicinity of the site entrance.

7.7.5.17 Sweetbriar Lane routes from the B1149 eastwards towards the onshore cable corridor; however, it is single track with few passing places. Accesses are located on Sweetbriar Lane and background traffic flows are not likely to be significant. Access is also taken from the B1149 and from the Organic Waste Processing Site access.

7.7.5.18 Cable Section 6 has a temporary secondary compound associated with the onshore HVAC booster station. The vehicle movements associated with the temporary secondary compound have been included within the Cable Section 6 calculations and will be discussed further in Section 5.

HVAC booster station

7.7.5.19 The HVAC booster station is located north of the B1149 at Saxthorpe, situated within Cable Section 6. The access corridor from the B1149 to the booster station utilises part of an existing access for an Organic Waste Processing Plant which has daily HGV movements associated with its operation.

B1149 to land south of Town Close Lane (HDD) (Cable Section 7)

7.7.5.20 Access to Cable Section 7 will be taken primarily from the B1149 and B1354, both classified as '3A2 - Main Distributor' roads and subject to the national speed within the vicinity of the onshore cable corridor. The B1149 and B1354 reduce to 30 mph at Saxthorpe.

7.7.5.21 The B1149 allows for two-way vehicle movements, but has no footways. The B1149 will provide access to several accesses of the Hornsea Three onshore cable corridor via single track and narrow single carriageway roads. Access A25 on the B1149 is the only access for this section of the route as shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures.

7.7.5.22 In general, the B1354 has wide carriageways and few sensitive receptors in the Hornsea Three traffic and transport study area and is subject to the national speed limit. There are some sensitive receptors as the road routes through Melton Constable and Briston in the form of a school with narrow footways adjacent to the carriageway, and on-street parking which narrows the carriageway width; however, conditions in the vicinity of the onshore cable corridor are reasonable, with some frontage access, good visibility and negligible sensitivity receptors.

Land south of Town Close Lane to woodland north of Reepham Road (Cable Section 8)

7.7.5.23 Much of the road network located on Cable Section 8 varies between narrow single carriageway and single track roads; therefore, the use of the haul road as the primary means of access to the remainder of the onshore cable corridor, rather than the use of the local highway network, is likely to be of increased importance on this section of the onshore cable corridor.

7.7.5.24 Heydon Road is the primary access to Cable Section 8, with single track roads routeing from Heydon Road also crossing the cable corridor. Heydon Road is classified as a '3B2- Local Access' road between the B1149 and onshore cable corridor.

Land north of Reepham Road to woodland north of Reepham (Cable Section 9)

7.7.5.25 Cable Section 9 will be accessed from Wood Dalling Road which routes from the B1145 via a priority junction, and has a small industrial estate approximately 100 m north of the B1145 junction. There are a small number of dwellings which take access from Wood Dalling Road. To the south, within 200 m of the B1145 junction, there are a small number of dwellings with frontage access taken from Wood Dalling Road; however, north of this the road is primarily for agricultural access.

Woodland north of Reepham to woodland at Booton Common (Cable Section 10)

7.7.5.26 The B1145 crosses the cable corridor and provides access to Section 10 of the onshore cable corridor. The B1145 is classified by Norfolk County Council as a '3A2 – Main Distributor' road and routes from the B1149 via Cawston, with some sensitive receptors between the onshore cable corridor and B1149. Cawston has some sensitive receptors including frontage access and a small village centre with narrow footways. The B1145 is a signed HGV route between the B1149 and a small industrial estate to the north of Cawston, accessed via Chapel Street.

7.7.5.27 All accesses for Cable Section 10 will be taken from the B1145 Cawston Road. Two accesses where the onshore cable corridor crosses the B1145 allow construction vehicles to access the cable section north of Marriott's Way. An additional access utilises an existing farm track taken from the B1145, north east of Reepham, which routes south east to Marriott's Way. The access is located adjacent to where the B1145 becomes the national speed limit from a 30 mph zone to the west at Reepham. The access avoids any sensitive receptors in Reepham, and is located on the outskirts of the town where there are few dwellings.

Woodland east of Reepham to The Grove (Cable Section 11)

7.7.5.28 Cable Section 11 is located to the south east of Reepham. Access will be taken from the B1149 via Buxton Road, which turns to Church Road.

7.7.5.29 To the east, Buxton Road is identified as a '3B2 – Access' road as identified on the Norfolk County Council Route Hierarchy map. The speed reduces from the national speed limit to 30 mph at Eastgate, within the vicinity of dwellings with frontage access and no footways.

The Grove to woodland south of Church Farm Lane (Cable Section 12)

7.7.5.30 Cable Section 12 can be accessed from Reepham Road, north of Lenwade and Alderford. Reepham Road routes from the A1067 via Station Road, which has some residential accesses and footway provision within the vicinity of dwellings, on the eastern side of the carriageway.

7.7.5.31 Section 12 of the onshore cable corridor is relatively rural in nature; there are no principal, main distributor or HGV routes across this section; therefore, Reepham Road is the only access available from the A1067 to Cable Section 12.

Woodland south of Church Farm Lane to River Wensum (Cable Section 13)

7.7.5.32 Cable Section 13 can be accessed from the A1067 via Porter's Lane from the west, and Old Fakenham Road leading to Station Road and Reepham Road from the east. Old Fakenham Road and Porter's Lane both route from the A1067, and are typical rural roads with no lane markings and hedgerows either side of the carriageway.

7.7.5.33 Station Road passes through the small village of Attlebridge, which features dwellings that are accessed directly from the road via driveways. The Marriott's Way cycle route, National Cycle Route 1, crosses Station Road north of Attlebridge and south of Alderford.

River Wensum to woodland south west of Ringland (Cable Section 14)

7.7.5.34 The A1067 crosses the onshore cable corridor and provides access to Section 14 of the onshore cable corridor. It forms a junction with The Street at Attlebridge and construction vehicles can route onto The Street via its western junction with the A1067, which will avoid the residential area at the eastern junction between The Street and the A1067.

7.7.5.35 Marl Hill Road forms a junction with the A1067 west of Attlebridge. Marl Hill Road is a rural road with no road markings; little vegetation on the verges provides good forward visibility. Morton Lane and Ringland Lane are narrow rural roads with passing places. It gives access via Morton Lane and Ringland Lane.

Woodland south west of Ringland to A47 (Cable Section 15)

7.7.5.36 The A47 is a trunk road and gives access to Cable Section 15 north west of Easton, via Church Lane and Ringland Road. Church Lane is subject to the national speed limit and features two-way traffic with centre lines and leads to Ringland Road which gives access to Weston Road and Accesses A80 and A81. There are a small number of dwellings on this section of narrow rural road, with no footway provision.

7.7.5.37 Intwood Lane routes between the B1113 and a stream to the west. The cable will route through farmland from the stream to the B1113, with Intwood Lane being the only road which crosses the onshore cable corridor on this section.

A47 to Bawburgh Road (Cable Section 16)

7.7.5.38 Cable Section 16 is accessed from the A47 via Dereham Road, Church Lane and Marlingford Road. Church Lane is an unmarked rural road which is subject to the national speed limit, with some street lighting and a footway between Dereham Road and Saint Peter's church.

Bawburgh Road to woodland west of Little Melton (Cable Section 17)

7.7.5.39 Bawburgh Road forms a priority junction with a private track which travels southbound towards the B1108. The B1108 is a two-way rural road with centre lines, and is subject to the national speed limit. It is accessed via the A47, and with the exception of a small number of sparsely distributed dwellings, the B1108 does not pass through any sensitive receptors between the A47 junction and the onshore cable corridor. Access to Cable Section 17 will be taken directly from the B1108, or via Bawburgh Road which routes north from the B1108, crossing the onshore cable corridor.

Woodland west of Little Melton to A11 (Cable Section 18)

7.7.5.40 Cable Section 18 of the onshore cable corridor runs nearby to the western residential areas of Little Melton, and so to lessen the impacts on sensitive receptors, the majority of this section's construction vehicle movements will occur on the haul road.

7.7.5.41 The B1172 is accessible from the A47 and A11 at the Thickthorn Interchange, and gives direct access to the onshore cable corridor. The road is subject to the national speed limit, features two-way traffic with centre lines, and a footway on its northern side. The B1172 contains a small number of dwellings from the Thickthorn Interchange to Station Lane, which are all set back from the carriageway.

7.7.5.42 As the B1172 routes into Hethersett it becomes subject to a 40 mph speed limit, and forms a junction with Station Lane. Station Lane leads to the cable corridor, and is a narrow rural road with high hedgerows. Access is achieved via an existing track, which passes a small number of dwellings.

A11 to woodland north west of Swardeston (Cable Section 19)

7.7.5.43 Cable Section 19 is accessed from Station Lane, which itself is accessed from the southern side of the A11 with deceleration and acceleration lanes. The A11 is a trunk road, and the section that passes through Section 19 is dual carriageway and subject to the national speed limit.

7.7.5.44 Station Lane routes broadly north-south and features two-way traffic with a centre line from its junction with the A11 and its junction with the Ketteringham Recycling Centre access road. From this junction, Station Lane continues as a wide rural road, with good forward visibility. The onshore cable corridor is accessed from Cantley Lane which forms a bifurcated junction with Station Lane. Cantley Lane is a rural road with no markings and good forward visibility.

Woodland north west of Swardeston to B1113 (Cable Section 20)

7.7.5.45 Cable Section 20 is accessed from the B1113. Construction vehicles will route from the A47 via the northbound exit to the A140. This section of the A47 is dual carriageway and is subject to the national speed limit. The A47 forms a priority roundabout with the A140 following a deceleration lane, and then routes northbound to from a signalised junction with the B1113. The routes to the onshore cable corridor and features a two-way carriageway with centre lines.

7.7.5.46 Approximately 150 m north of the onshore cable corridor, there is a bridge where the A47 passes over the B1113. This bridge will not impact on the HGV movements towards the onshore cable corridor. Access will be achieved form the B1113 via Short Lane, The Common and Intwood Lane. All three roads are typical narrow rural roads with high vegetation on the verges.

B1113 to end of onshore cable corridor (Cable Section 21)

7.7.5.47 Access will be taken from the previously discussed B1113, a national speed limit '3A2 – Main Distributor' road with good visibility. The access for the onshore HVDC converter/HVAC substation will be the access for Cable Section 21. Accesses located on Mangreen Lane are not suitable for large HGV movements, therefore these accesses will not be used by HGVs.

7.7.5.48 The A140 will be utilised to route to the onshore cable corridor, and is subject to the national speed limit. It forms a junction with Mangreen Lane, which after approximately 60 m from the A140 forms an access. This utilises the existing Norwich Main National Grid substation access.

Onshore HVDC converter/HVAC substation

7.7.5.49 Access to the permanent onshore HVDC converter/HVAC substation (Access A118), will be taken from the previously discussed B1113, a national speed limit '3A2 – Main Distributor' road with good visibility. A permanent access will be designed as vehicle movements associated with the operation of the onshore HVDC converter/HVAC substation will occur daily. The designed access will incorporate a temporary wide access which will allow abnormal indivisible loads such as the transformers to enter the site, and the operational access will be instated once construction of the onshore HVDC converter/HVAC substation has been completed.

Main Compound at Oulton Street

7.7.5.50 The main compound at Oulton Street is currently accessed from The Street and Oulton Street, which routes broadly north to south between Blickling Road and the B1149. Traffic management measures will be developed as part of the subsequent CTMPs secured prior to the commencement of works and activities at the main compound, when the scope of the use of the main construction compound by the principal contractor is known. These traffic management measures may involve diversion routes.

7.7.6 Existing vehicle restrictions

7.7.6.1 Volume 6, annex 7.8: Traffic and Transport Figures, Figure 1.2, shows the Hornsea Three onshore cable corridor and proposed accesses, with links on potential routes within the Hornsea Three traffic and transport study area. There are restrictions on the passage of HGVs over 7.5 t at the following locations on the proposed accesses.

- Link 105: Hall Road to Reepham Road junction;
- Link 119: Marl Hill Road and Ringland Lane from A1067 to the onshore cable corridor;
- Link 165: Bawburgh Road from the Hornsea Three onshore cable corridor to B1108;
- Link 166: Stocks Hill from link 163/164 to B1108;
- Link 172: Cantley Lane from Station Lane to A47/A11; and
- Link 181: Gowthorpe Lane.

7.7.6.2 In addition, there are signs on the road network stating that the following routes are not suitable for HGVs:

- Links 6 to 9: Sandy Hill Lane;
- Link 87: B1145 in Reepham; and
- Link 100: Ketts Lane.

7.7.6.3 The above links pass through or lead up to urban areas with residential properties, other sensitive areas or are too narrow for accommodating two-way HGV movements and it appears to be for these reasons that there are 7.5 t weight restrictions in place or they are marked as being unsuitable for HGVs. These restrictions will be temporarily suspended for construction HGVs over the temporary period for which access is required.

7.7.6.4 Abnormal indivisible loads require prior permission to travel along the road network and so the above relates to HGVs that are permitted to travel along the road without any such prior permission.

7.7.7 Compound areas

7.7.7.1 A main construction compound will be sited at Oulton Airfield, near Oulton Street and up to five secondary compounds (smaller in scale) will also be required along the onshore cable corridor to facilitate construction works in those areas. The main compound will house the central offices, welfare facilities, and stores. It will act as a staging post and secure storage for equipment and component deliveries. Further details of the construction compounds and their proposed uses are provided in volume 1, chapter 3: Project Description.

7.7.7.2 Volume 6, annex 7.8: Traffic and Transport Figures, Figure 7.2, shows the onshore cable corridor, main construction compound, secondary compound areas and proposed accesses.

7.7.8 Sustainable transport modes

Public transport services

7.7.8.1 800 m is a distance adopted based upon a mix of guidance and professional judgement. 400 m is a target walking distance (Institution of Highways and Transportation (IHT), 1999. *Guidelines for Planning for Public Transport in Developments*) to achieve for new developments and that is generally accepted as a reasonable walking distance in urban areas. Some people will walk longer than this distance and especially in rural areas, walking distances can be expected to be slightly longer for such areas. A distance of 800 m is therefore considered reasonable for the purposes of accessibility in this location.

7.7.8.2 Details of bus services within 800 m of the Hornsea Three onshore cable corridor are summarised in Table 7.7 with routes shown at volume 6, annex 7.5: Public Transport Networks. There are no other bus services within 800 m of the Hornsea Three onshore cable corridor that are not listed in Table 7.7.

Table 7.7: Local Bus Services.

Stop (if within 800m of cable corridor)	Service	Route	Frequency (Monday to Friday)	Frequency (Saturday)	First service	Last service
Church, Weybourne	Coasthopper	Kings Lynn - Hunstanton - Wells-next-to-Sea - Weybourne - Sheringham - Cromer	Hourly	Hourly	09:42	18:42
		Cromer - Sheringham - Weybourne - Wells-next-to-Sea - Hunstanton - Kings Lynn	Hourly	Hourly	09:26	17:26

Stop (if within 800m of cable corridor)	Service	Route	Frequency (Monday to Friday)	Frequency (Saturday)	First service	Last service
High, Kelling, A148	5	North Walsham - Mundesley - Cromer - Holt	30 minutes	30 minutes	08:20	18:56
		Holt - Cromer - Mundesley - North Walsham	30 minutes	30 minutes	06:55	17:49
	19	Cromer - Weybourne - Holt	10:44 Monday, Wednesday and 10:27 Friday (Return 12:25 Monday, Wednesday and 12:43 Friday)			
	44	Holt - High Kelling - Sheringham	30 minutes	30 minutes	05:42	17:25
		Sheringham - High Kelling - Holt	30 minutes	30 minutes	10:18	00:03
The Street, Hempstead	16	Cromer - Baconsthorpe - Holt	Tuesday 10:38 (Return 12:25)			
	17	Holt - Baconsthorpe - Sheringham - West Runton	Tuesday 10:43 (Return 12:30)			
Green, Edgefield	43	Norwich - Reepham - Edgefield - Holt	Mon - Fri 06:48 (Return 18:38 and 19:05)			
Croft Lane, Saxthorpe	43	Norwich - Reepham - Edgefield - Holt	Mon - Fri 06:52 (Return 18:32 and 18:59)			
	45	Holt - Corpusty - Norwich	2 per day	2 per day	07:07	10:02
		Norwich - Corpusty - Holt	2 per day	2 per day	13:49	18:09
	45A	Norwich - Felthorpe - Reepham - Holt	Monday to Friday 17:26			
	45B	Norwich - Feltthorpe -Corpusty - Holt	Saturday 13:49 and 18:19			
Heydon Road	24	Fakenham - Reepham - Norwich	Tuesday 09:49 (Return 14:00)			
	43	Reepham - Aylsham - Norwich	6 per day	5 per day	10:12	18:36
		Norwich - Aylsham - Reepham	6 per day	6 per day	07:21	15:51
	45A	Norwich - Felthorpe - Holt	Monday to Friday 17:14			
	80	Aylsham - Reepham - Dereham	Friday 09:47 (Return 14:17)			
	98	Cawston - Reepham - Fulmodeston - Fakenham	Thursday 09:17 (Return 13:48)			
Hall Road, Alderford	24	Fakenham - Reepham - Norwich	Tuesday 10:04 (Return 13:46)			
	X29	Norwich - Foulsham - Fakenham	Hourly	Hourly	08:06	19:27

Stop (if within 800m of cable corridor)	Service	Route	Frequency (Monday to Friday)	Frequency (Saturday)	First service	Last service
Fakenham Road, Morton on the Hill		Fakenham - Foulsham - Norwich	Hourly	Hourly	06:56	17:12
Des Amis, Easton	4	Swanton Morley - Dereham - Easton - Norwich	Hourly	Hourly	06:39	17:38
		Norwich - Easton - Dereham - Swanton Morley	Hourly	Hourly	07:44	18:46
Kings Head, Bawburgh	15	Shipdham - Hardingham - Norwich	Wednesday 09:10 (Return 13:05)			
	806	Bawburgh - Wymondham	Friday 09:20 (Return 12:10)			
Colney Lane, Hethersett	6	Norwich - Hethersett - Wymondham - Watton	Hourly	Hourly	08:29	19:22
		Watton - Wymondham - Hethersett - Norwich	Hourly	Hourly	07:12	17:49
	6A	Attleborough - Hethersett - Norwich	One Service (07:12)	-		
		Norwich - Hethersett - Attleborough	Two Services Daily (16:57 and 19:22)			
	9A	Norwich - Cringleford - Hethersett	Monday to Friday 08:05 (Return 15:00 / 16:00)			
	14 / 15 / 15A	Thorpe St Andrew - Norwich - Hethersett - Wymondham	Every 15 minutes	Every 15 minutes	07:10	19:08
		Wymondham - Hethersett - Norwich - Thorpe St Andrew	Every 15 minutes	Every 15 minutes	06:34	19:14
	13A / 13B / 13C	Norwich - Hethersett - Attleborough	One morning and 4 evening services daily (07:41, 19:55, 20:55, 22:20, 23:08)			
		Attleborough - Hethersett - Norwich	6 services daily	5 services daily	16:42	22:46
Short Lane, Main Road	10A	East Harling - Swardeston - Norwich	2 services Monday to Friday 07:53 and 10:20			
		Norwich - Swardeston - East Harling	3 services Monday to Friday 13:31, 16:23 and 17:58			
	37 / 38	Long Stratton - Mulbarton - Norwich	Half Hourly	Half Hourly	07:41	18:11
		Norwich - Mulbarton - Long Stratton	Half Hourly	Half Hourly	07:33	18:21

Stop (if within 800m of cable corridor)	Service	Route	Frequency (Monday to Friday)	Frequency (Saturday)	First service	Last service
Hall, Dunston	1	Diss - Aslacton - Norwich	4 services per day (08:07, 10:01, 12:57 and 14:26)			
		Norwich - Aslacton - Diss	4 services per day (08:06, 10:01, 12:59 and 17:56)			
	2	Long Stratton - Norwich	Hourly	5 per day	07:28	21:10
		Norwich - Long Stratton	Hourly	6 per day	10:13	22:44
	38	Norwich - Long Stratton	Half Hourly	Half Hourly	06:59	18:44
		Long Stratton - Norwich	Half Hourly	Half Hourly	06:56	19:19
	40	Diss - Harleston - Norwich	Saturday 08:30 (Return 15:05)			
	83	Norwich - Pulham - Harleston	4 per day		10:51	18:01
		Harleston - Pulham - Norwich	5 per day	4 per day	07:40	17:44

Pedestrian infrastructure

7.7.8.3 It is generally accepted that a reasonable distance that people would be prepared to walk to work is 2 km (IHT, Guidelines for Providing for Journeys on Foot, 2000). There are residential areas within 2 km of the Hornsea Three onshore cable corridor from which, if footpath provision is available, there is potential for construction workers to undertake their journey on foot.

Cycle infrastructure

7.7.8.4 Designated cycle routes that cross or are in the vicinity of the onshore elements of Hornsea Three are:

- Holt Explorer Loop: Routes from Regional Route 30 north east crossing the onshore cable corridor on the edge of Kelling Heath to Weybourne where it then routes south east through Bodham and West Becham and continues south and then west through Baconsthorpe. It then crosses the onshore cable corridor as it routes west to Hempstead where it continues south west to Edgefield;
- Regional Route 30, located approximately 1 km west of the onshore cable corridor parallel to the onshore cable corridor from just south of Kelling Hall, through High Kelling and crosses the cable corridor in the vicinity of the property 'Quietways' from where it routes east and connects with the Holt Explorer Loop; and
- National Cycle Route 1 which is a long-distance cycle route connecting Dover and the Shetland Islands - via the east coast of England and Scotland routes to the west of the onshore cable corridor. It routes through Reepham, approximately 1 km west of the onshore cable corridor, through Whitwell and Lenwade, after which it crosses the onshore cable corridor to the north of Attlebridge and continues south east to Drayton.

7.7.8.5 It is generally accepted that a reasonable distance that people are willing to cycle to work is 5 km. There are a number of residential areas within 5 km of the onshore cable corridor which have access to these cycle routes, enabling construction workers to cycle to work.

7.7.9 Personal injury accident data

7.7.9.1 Personal Injury Accident (PIA) data obtained from Norfolk County Council has been used to consider the road safety record of the study area.

7.7.9.2 The area of analysis is over a significantly large area and therefore a two-stage process is undertaken as follows. After breaking the network into links, the injury accident rate was calculated and compared to the national average injury accident rate set out in Table RAS1002 of the DfT document 'Reported Road Casualties Great Britain 2016'.

7.7.9.3 This initial analysis was undertaken using PIA's from the Crashmap website for 2013, 2014 and 2015 and the injury accident rates are contained in Table 7.8.

Table 7.8: Summary of injury accident rates.

Link	AADT (1)	Link Length (Kilometres)	Personal Injury Accidents (PIAs) over 3 years (2)	PIAs per million vehicle-km (observed)	PIAs per million vehicle km (national average)
A148, west of The Street and east of Green Lane	12797	2.3	3	93	152
A148 west of Holt and east of Letheringsett	10550	10.2	11	94	152
A148, east of the B1149 roundabout and west of Station Road	11264	0.35	0	0	152
B1354 between the Swanton Road junction and B1110 junctions	3714	2.4	3	308	274
B1354 east of Melton Constable and west of Briston	5151	0.6	1	296	274
B1149 at Edgefield, north of the village hall and south of Hempstead Road	4174	0.5	2	878*	274
A148 at High Kelling, south of Kelling Hospital	12783	0.6	1	119	152

Link	AADT (1)	Link Length (Kilometres)	Personal Injury Accidents (PIAs) over 3 years (2)	PIAs per million vehicle-km (observed)	PIAs per million vehicle km (national average)
A148, east of Bodham and west of the Woodlands Leisure centre	12179	0.5	1	150	152
A148, west of the B1436 junction and east of the Lion's Mouth junction	13200	1.1	2	126	152
B1436, east of Felbrigg	8893	2.2	1	47	274
A140, south of Roughton and north of the Topshill Road junction	11079	2.7	3	92	152
A149 west of Weybourne and east of The Pheasant hotel	3282	1.1	0	0	152
A149 east of Weybourne, west of the North Norfolk Railway line	4390	3.5	3	179	152
A1067, north of Bridge Road and east of Little Ryburgh	8696	2	2	105	152
B1145 at Bawdeswell, between The Street junction and Hall Road junction	3119	0.45	0	0	274
B1145, west of Reepham and east of the Old Lane junction	2742	2.7	2	247	274
B1145 east of Cawston, west of the B1149 crossroads	3199	1.5	3	573*	274
B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	4448	4	7	360*	274
A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	14475	1.4	2	90	152
A1067, between Attlebridge and the Fir Covert Road junction	8276	2.9	3	114	152
A140 between the A47 and B1113 junctions	22881	0.6	0	0	473
B1113, south of the A47 near Norwich Sports ground	8141	1.8	2	125	448
A47 at Honingham	27245	1.6	5	105	473
A47 at Bawburgh	43804	2.2	2	19	473
A47 at Intwood	52775	3.4	17	87	473
A11 at Hethersett	48817	1.9	5	49	473
A1065 south of A148 and north of Pond Road	7854	1.3	0	0	473
A140 north of Hevingham	12500	1.5	4	195	473
A1067 at Lenwade	11778	2.5	5	156	473
A1065 at Weasenham, between B1145 and Massingham Road	5050	3.5	4	207	473

(1) Annual average daily traffic (AADT) derived from traffic surveys / DfT flows

(2) Information obtained from Crashmap website

* Links with accident rates more than 25% above the national average

7.7.9.4 Where observed accident rates are in excess of national averages this does not necessarily indicate a poor safety record. Indeed, because they are an average, this means than 50% of all roads will have an injury accident rate that exceeds the average.

7.7.9.5 For robustness, injury accident rates that were 25% higher than the national average rates have been assessed further as a second stage of the analysis.

7.7.9.6 Therefore, four links have been identified as having an injury accident rate of 25% higher than the national average and these links have been analysed in further detail, along with injury accidents occurring on the A47 trunk road.

7.7.9.7 To undertake this analysis, PIA data for these locations has been obtained from Norfolk County Council for the five-year period between 01 December 2012 and 30 November 2017 and analysed in terms of their location, severity and vehicles involved at volume 6, annex 7.4: Personal Injury Accident Locations and as described below. The roundabout, junctions or roads discussed below have a corresponding figure in volume 6, annex 7.8: Traffic and Transport Figures. The numbered PIA below (e.g. PIA 28) correspond to the PIA shown on these figures.

A11 / A47 Roundabout

7.7.9.8 PIA data has been obtained from Norfolk County Council for the five-year period 01 December 2012 and 30 November 2017, and covers the entirety of the A11 / A47 Thickthorn Interchange. This includes Thickthorn Interchange junctions with; Newmarket Road, the A11, the A47, Cantley Lane South, and the B1172. This data also covers the B1172 roundabout with Thickthorn Park and Ride, Thickthorn Bus Station, Travelodge Norwich Cringleford, and the service station.

7.7.9.9 There were 31 PIAs in the search over the 5-year period. Of these PIAs, two were serious and there were no fatalities.

7.7.9.10 The first serious accident, shown as PIA 28, occurred on the Thickthorn Interchange exit to the A47 southbound, and was the result of a motorcycle heading for the A11 westbound failing to give way to a car heading towards the A47 southbound. The other serious accident, PIA 11, was the result of a car failing to stop and shunting the rear of a stationary car on the A11 junction to the Thickthorn Interchange. The shunt pushed the stationary vehicle into the path of oncoming vehicles on the roundabout, causing a collision with a third car. Both these serious accidents were the result of driver error.

7.7.9.11 Of the 29 slight accidents, four involved goods vehicles. Two of these accidents were the result of drivers failing to give way, and two were due to drivers failing to judge speed. These accidents were the result of driver error.

7.7.9.12 At the B1172 roundabout with Thickthorn Park and Ride, there were two slight accidents which were the result of drivers not driving to suit the road conditions, and another failing to give way or judge another person's speed. There is one slight accident that occurred at the Park and Ride / Thickthorn Services roundabout, which was the result of a motorcyclist losing control.

7.7.9.13 The analysis shows a cluster of accidents at the western slip-road from the A11 to the Thickthorn Interchange. Four of these accidents are attributed to rear end shunts, and two are the result of drivers failing to give way.

7.7.9.14 Four slight accidents occurred on the A47 flyover. One accident was the result of a driver not driving to suit the road conditions, two were the result of drivers failing to judge other persons speed or give way, and one was due to an electrical fault reducing visibility of a stationary car.

7.7.9.15 From the analysis undertaken at this junction, it appears that driver error is the common factor in the PIA data obtained. There is nothing in relation to the existing highway layout or geometries that causes a road safety concern.

A47 between Sandy Lane and the B1535 junctions (inclusive of junctions)

7.7.9.16 PIA data has been obtained from Norfolk County Council for the five-year period between 01/12/2012 and 30/11/2017, and covers the A47 between Sandy Lane and the B1535, inclusive of the junctions.

7.7.9.17 There were 21 PIAs in the search over the 5-year period. Of these PIAs, one was fatal and four were serious.

7.7.9.18 The fatal incident occurred on the A47 junction with Wood Lane, and is shown as PIA 18. This was the result of a car turning right into Wood Lane from the A47 colliding with a motorcycle travelling southbound on the A47.

7.7.9.19 Over the period, there were four serious accidents. Two serious accidents occurred near the A47 / Sandy Lane junction, PIA 2 and 3. These were the result of careless driving and failure to judge speed. Serious accidents PIA 6 and 10 occurred on the A47 between the Sandy Lane and the B1535 junctions. One was due to loss of control of control, and the other was the result of a driver failing to judge another vehicles speed.

7.7.9.20 There were nine accidents involving goods vehicles. Two of these accidents involved good vehicles over 7.5 t and were both the result of driver failure to judge speed. Three involved goods vehicles of unknown weight and were also due to driver failure to look and judge speed.

7.7.9.21 There is a cluster of accidents near the A47 / Church Lane junction, which all occurred on the A47 carriageway, and were all the result of driver failure to look and/or judge speed.

7.7.9.22 Two slight accidents occurred at the A47 / Berry's Lane junction, and both contributing factors were drivers failing to judge speed.

7.7.9.23 Four slight accidents are recorded at the A47 / Wood Lane junction in which the contributing factors were driver's failure to look or judge speed of other vehicles.

7.7.9.24 From the analysis undertaken at this section of the road network, it appears that driver error is the common factor in the PIA data obtained. There is nothing in relation to the existing highway layout or geometries that causes a road safety concern.

A47 / A146 Junction

7.7.9.25 PIA data has been obtained from Norfolk County Council for the five-year period between 01 December 2012 and 30 November 2017, and covers the junction between the A146 / Loddon Road and the A47 / Norwich Southern Bypass.

7.7.9.26 There were 24 PIAs in the search over the 5-year period. Of these PIAs, three were serious and there were no fatalities.

7.7.9.27 The serious PIA which occurred on the A47 approaching the flyover travelling south east to north east was the result of a bus or coach driver failing to slow in time, causing a collision with the back of a stationary car. Further east of this collision, another serious accident occurred after a driver lost control over a flooded section of road that was the result of a blocked storm drain. The serious accident that occurred A47 eastbound slip road to the A146 was the result of a driver failing to give way at the signalised junction, and subsequently collided with a car travelling south east to north west on the A146.

7.7.9.28 There are four slight accidents involving goods vehicles, all of which were under 3.5 t. Accidents numbered 10 and 18 were the result of driver's failure to stop at a red light, and snowy conditions were a contributing factor in drivers failing to stop in accidents 13 and 23.

7.7.9.29 There are two distinct clusters within the area. The first cluster is the A47 northbound exit slip road signalised junction with the A146. These are the result of driver error, as all these accidents are attributed to drivers failing to stop at a red-light signal.

7.7.9.30 Another cluster is at the A47 southbound exit slip road signalised junction with the A146 / Loddon Road. These accidents are all shown to be the result of drivers failing to stop at a red light.

7.7.9.31 From the analysis undertaken at this section of the road network, it appears that driver error is the common factor in the PIA data obtained. There is nothing in relation to the existing highway layout or geometries that causes a road safety concern.

A148 / B1454 junction

7.7.9.32 PIA data has been obtained from Norfolk County Council for the 5-year period between 01 December 2012 and 30 November 2017, and covers the junctions between the A148 and the B1454, and the A148 and Elm Lane.

7.7.9.33 There were 6 PIAs in the search over the 5-year period. Of these PIAs, three were serious and there were no fatalities.

7.7.9.34 The serious PIA, shown as 2, was the result of a driver failing to give way to a car u-turning on the B1454, causing a collision. The serious PIA denoted as 3, was the consequence of a driver failing to give way turning right from the A148 to the B1454. PIA 6 was due to ice on the A148 causing the goods vehicle to jackknife in the path of an oncoming car.

7.7.9.35 The main contributing factor of the remaining slight PIAs is shown to be drivers failing to stop and/or judge another vehicle's speed.

7.7.9.36 From the analysis undertaken at this section of the road network, it appears that driver error is the common factor in the PIA data obtained. There is nothing in relation to the existing highway layout or geometries that causes a road safety concern.

B1145 – Reepham to B1149

7.7.9.37 PIA data has been obtained from Norfolk County Council for the 5-year period between 01 December 2012 and 30 November 2017, and covers; the B1149 between Aylsham Road and Buxton Road, and B1145 between the B1149 and Orchard Lane.

7.7.9.38 There were 15 PIAs in the search over the 5-year period. Of these PIAs, one was serious and there were no fatalities.

7.7.9.39 The only serious accident, denoted as PIA 6, occurred after a driver lost control on a wet road, and subsequently collided with an oncoming car.

7.7.9.40 The only PIA involving a goods vehicle under 3.5 t, denoted as PIA 4, was the result of the goods vehicle failing to judge a cars speed, resulting in a rear end shunt.

7.7.9.41 There were no clusters of injury accidents over the link.

Aylsham B1145 and A140

7.7.9.42 PIA data has been obtained from Norfolk County Council for the 5-year period between 01 December 2012 and 30 November 2017, and covers; the B1145 between Holt Road and the A140, and the A140 between the B1145 and Banningham Road.

7.7.9.43 There were 32 PIAs in the search over the 5-year period. Of these PIAs, eight were serious and there were no fatalities.

7.7.9.44 The first serious, denoted as 1 on the B1145, was the result of a driver losing control of their car after making contact with the verge. Further east of this accident, a serious accident, PIA 5, was the consequence of a motorcyclist losing control at the righthand bend travelling eastbound. The two remaining serious accidents on the B1145, PIA 9 and 11, were both due to a loss of traction pertaining to the road surface. PIA 9 involved a motorcyclist losing control after coming into contact with mud on the road, and PIA 11 occurred after a driver lost control on a bend in icy conditions. These serious accidents on the B1145 are all shown to be the result of drivers not driving to suit the conditions, or driving carelessly.

7.7.9.45 There are four serious accidents on the A140. Serious PIA 23 was the result of a car driver turning right from Buxton Road to the A140 across the path of a motorcyclist travelling southbound on the A140. PIA 25 occurred at the roundabout between the A140 and Burgh Road, and involved one car losing control at the roundabout.

7.7.9.46 The two further serious accidents on the A140, PIA 24 and 31, both occurred previous to the construction of the current roundabout at the junction between the A140 and Burgh Road. These accidents occurred at the previous crossroad design, and were both the result of careless driving. There was a cluster of slight accidents alongside these serious accidents. However, PIA 25 is the only accident to have occurred since the roundabout has been built and, except for PIA 28 which occurred during construction, the remaining accidents occurred at the previous crossroads.

7.7.9.47 There are four serious and nine slight accidents on the B1145 between the junction with the B1149 and the roundabout with Woodgate Way / Hobart Lane. With the exception of PIA 13, which involved a pedestrian, the accidents along this link mostly involved only one vehicle, and were due to drivers losing control by not driving to suit the conditions or speeding. The contributing factor the PIA which involved a pedestrian, was a driver not seeing the pedestrian walking in road in the dark, who was wearing no illumination/reflective clothing.

B1149 Holt to Oulton

7.7.9.48 PIA data has been obtained from Norfolk County Council for the 5-year period between 01/12/2012 and 30/11/2017, and covers the B1149 between the A148 / B110 roundabout and Heydon Road, inclusive of junctions. The search area also includes the B1354 between its junction with the B1149 and Tithe Barn Lane.

7.7.9.49 There were 27 PIAs in the search over the 5-year period. Of these PIAs, two were fatal and seven were serious.

7.7.9.50 A fatal accident occurred south of Saxthorpe on the B1149, shown as PIA 7. This was the result of a car losing control travelling southbound in wet conditions, and colliding head on with a car going northbound. A fatal accident occurred south of the B1149 junction with Hunworth Road, shown as PIA 25. This was the result of a driver losing control and colliding with a tree whilst exiting a right-hand bend travelling southbound.

7.7.9.51 There are three serious accidents within a cluster to the south of Saxthorpe, denoted as PIA 2,3 and 5. The contributing factor to these three accidents is shown as being a deer or an unspecified animal in the carriageway.

7.7.9.52 Serious PIA 13 was the result of a driver losing control by failing to drive to suit the wet conditions. Serious PIA 15 was also due to a driver not driving to suit the conditions, as the car lost control on the icy road surface. Serious PIA 16 was the result of a motorcycle travelling at excessive speeds for a bend in the road.

7.7.9.53 The serious PIA 27 close to the B1149 junction with Hunworth Road occurred after a driver travelling around the bend in excessive speed losing control, and colliding head on with an oncoming car.

7.7.9.54 There were 14 slight accidents on the B1149 section of the surveyed area. Ten of these incidents were due to drivers losing control, with three of these being in wet conditions and another occurring in snowy conditions. Three accidents were the result of drivers failing to look, and another was a HGV failing to give way to a tractor.

7.7.9.55 On the studied section of the B1354, there were three slight accidents. Two were a result of drivers failing to drive to suit the conditions (wet and snowy), and the other occurred after a driver failed to see a broken-down car in the road.

Summary

7.7.9.56 Whilst all accidents are regrettable, the data suggests that in the majority of instances human error is likely to have been the primary cause indicating that, in general, there are no specific road safety issues in the aforementioned areas.

7.7.10 Future baseline scenario

7.7.10.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that "*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*" is included within the Environmental Statement. The Environmental Statement is not required to comply with the 2017 Regulations as the Environmental Statement is prepared under the 2009 Regulations.

7.7.10.2 The future baseline traffic scenario for the year in which construction is expected to be at its peak (assumed to be 2022) was determined based on the traffic surveys undertaken growthed to forecast traffic conditions on the local highway network during this future year. The construction phase generates the most vehicle movements in comparison to the operation and maintenance, and decommissioning phases. Therefore, undertaking assessments with a future baseline for the construction phase equates to an assessment of the maximum design scenario, and as such it is not necessary to individually assess the other phases.

7.7.10.3 Specific traffic surveys were undertaken to inform the baseline position for this assessment. These involved the placement of ATCs and MCCs on areas of the highway network. Annual Average Daily Traffic Flows were obtained from the Department of Transport for the A1067, A140, A148 and A149. This enabled a future baseline scenario to be established from which construction traffic will be assessed. Traffic flows to inform the baseline are reported in volume 6, annex 7.3: Baseline Traffic Flows.

7.7.10.4 To assess road safety along the adjacent highway network, PIA data has been obtained from Norfolk County Council for the latest available 5-year period. Personal injury data is reported in volume 6, annex 7.4: Personal Injury Accident Locations.

7.7.10.5 Future baseline scenarios were created using these data sets. Traffic growth rates were applied to the traffic flows.

7.7.10.6 The construction of Hornsea Three will generate the largest volume of vehicle movements. Vehicle movements generated during the decommissioning phase will generally be lower than those during the construction phase. Therefore, the assessment of the decommissioning phase has been undertaken on precautionary basis. Vehicle movements associated with operation and maintenance phase will be negligible in relation to the construction phase, therefore it is not necessary to assess this as a maximum design scenario has already been undertaken.

7.7.11 Data limitations

7.7.11.1 The baseline data and survey data have been obtained from recognised sources and methodologies with locations and types of surveys agreed with Norfolk County Council in advance. In this sense, there are only limited limitations to their use. The traffic survey data is considered representative of current conditions.

7.7.11.2 At this stage, there are no procurements in place and the resultant origins of materials cannot be confirmed. The procurement of material affects the movement of construction HGVs and thus affects the number of construction HGVs along each road link. It is likely that the origin of materials will change as the construction phase progresses as there is only a finite amount of material from each source. For example, an amount of material is sourced from one location, but when this amount is reached, material is then sourced from another location. This will change the movement of HGVs as the construction phase progresses and result in day-to-day variances. Section 7.8.3 has therefore devised a methodology that accounts for this day-to-day variance by approximately doubling the number of vehicles travelling to / from any particular location and thus maximising this variance within the assessment.

7.7.11.3 The Cumulative Effect Assessment contained in section 7.13 incorporates the A47 improvement works being promoted by HE. The key element of these works in relation to Hornsea Three is the overlapping of the construction areas and the construction methodologies and management to allow both to progress depending upon their respective timescales (i.e. one before the other or simultaneously).

7.7.11.4 Another consideration is the cumulative effect of construction traffic generated by both sets of works. However, there are no construction traffic flow estimates for the A47 improvement works available. Due to the location of these works being on the A47 trunk road, all associated construction vehicle movements would arrive along the A47 trunk road, which represents the outer areas of the study area being considered within this chapter. With the exception of the A47 itself, the construction traffic flows generated are not expected to route within the study area being considered within this chapter. As set out in section 7.13, even some allowance for such construction traffic would not affect the conclusions of this chapter. Although it is a data limitation in that the construction traffic generated by the A47 improvement works are not available, this does not affect the conclusions of this chapter.

7.7.11.5 The Norfolk Vanguard project has a published PEIR from which its construction traffic flows can be estimated albeit it is recognised this is not a final submission. Discussions with Norfolk Vanguard have identified that any changes to construction traffic flows from its PEIR to final submitted DCO application are expected to be only minimal.

7.8 Key parameters for assessment

7.8.1 Maximum design scenario

7.8.1.1 The maximum design scenarios identified in Table 7.9 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in volume 1, chapter 3: Project Description. Effects of greater significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope, to that assessed here be taken forward in the final design scheme.

7.8.1.2 There is an inter-relationship with this chapter and the Noise and Vibration and Air Quality chapters (volume 3, chapter 8: Air Quality and chapter 9: Noise and Vibration) in so far as these two chapters consider traffic flows. The traffic flows will be used to inform the assessments of these two chapters and are therefore fully consistent with the above.

7.8.2 Impacts scoped out of the assessment

7.8.2.1 On the basis of the baseline environment and the project description outlined in volume 1, chapter 3: Project Description, a number of impacts are proposed to be scoped out of the assessment Traffic and Transport. These impacts are outlined, together with a justification for scoping them out, in Table 7.10.

7.8.2.2 The level of vehicle generation during the operation and maintenance, and decommissioning phases would be significantly lower than during the construction phase, thus, these impacts have been scoped out of the assessment.

7.8.2.3 During the operation and maintenance phase, the only vehicle movements generated will be maintenance visits, which will be typically one vehicle on an approximate weekly basis. These visits are likely to be made by light vehicles only and would use the existing road network and the permanent onshore HVAC booster station and HVDC converter/HVAC substation accesses constructed as part of Hornsea Three. One vehicle arrival per week is very low and infrequent and is significantly under thresholds (depending upon the sensitivity of receptors, increases of 10 % or 30 % in total traffic flows or 30 % in HGVs, as set out in section 7.9.1) on which assessment is required. Even if repair work was required for example to a section of cable, such vehicle movements would be low (a few vehicles per day) and would be under the thresholds on which assessment would be required. Therefore, there will be no significant effects resulting from the traffic generated during the operation and maintenance phase and an assessment of this is scoped out.

7.8.2.4 Vehicle movements generated during the decommissioning phase will be lower than those during the construction phase since the removal of materials does not need to be delicately transported and can be bulk loaded whilst some infrastructure will be retained in-situ. Given that some infrastructure will be left in-situ, this results in less transport requirement which results in fewer vehicle movements in comparison to the construction phase. Background traffic flows are generally increasing year on year, therefore, in comparison to the construction phase, the combination of lower Hornsea Three traffic flows against higher baseline traffic flows results in a lower impact. However, all mitigation measures that are identified for the construction phase will also be adopted during the decommissioning phase, thus, for a maximum design scenario, it can be determined that the identification of significant effects resulting from traffic generated during the construction phase, would also apply to the decommissioning phase. Therefore, as vehicle movements generated during the decommissioning phase will generally be lower than those during the construction phase, the assessment of the decommissioning phase has been undertaken on precautionary basis.

Table 7.9: Maximum design scenario considered for the assessment of potential impacts on traffic and transport.

Potential impact	Maximum design scenario	Justification
Construction phase		
The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect severance of routes (see glossary). The temporary impact of the construction work may affect pedestrian delay (see glossary). The temporary impact of the construction work may affect pedestrian amenity (see glossary). The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect accidents and road safety. The temporary impact of hazardous, dangerous and abnormal loads during construction works.	<u>Hornsea Three landfall area</u> The temporary construction compound of 42,000 m^2 at the Hornsea Three landfall area. Thrust bore crossing method at Hornsea Three landfall area with pits measuring 5 m x 25 m x 6 m. A reasonable assumption is that 75% of staff assumed to drive themselves to work and no access by public transport (Additional 25% of staff assumed to car share). The worst case would involve the import and export of all material. The shortest practical duration of works would maximise daily HGV movements. A reasonable duration of 32 months has been assumed.	A well-known occurrence at construction sites is staff organising travel amongst themselves to car share, especially in rural locations. Furthermore, contractors regularly provide transport for their staff via minibus. The actual mode share of construction staff is not reported for any similar site, however, a calculation that 75% of construction staff drive is considered a reasonable assumption for assessment purposes. The use of Thrust Bore, rather than an alternative trenchless technology, represents the highest number of vehicle movements due to the requirement to transport steel shuttering and additional craneage compared with other techniques such as HDD. Larger areas result in larger amounts of material and thus larger numbers of HGV movements. Fewer number of days to transport a given amount of material results in a larger number of daily HGV movements.
The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect severance of routes (see glossary). The temporary impact of the construction work may affect pedestrian delay (see glossary). The temporary impact of the construction work may affect pedestrian amenity (see glossary). The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect accidents and road safety. The temporary impact of hazardous, dangerous and abnormal loads during construction works	<u>Onshore cable corridor</u> The route length is approximately 55 km. Duration of construction programme for the secondary compounds is 30 months (2.5 years) (secondary compounds, nor the storage areas, will not be in use for the full 30 month period). A reasonable assumption is that 75% of staff assumed to drive themselves to work and no access by public transport (Additional 25% of staff assumed to car share). • Widest cable trench option - six cable trenches up to 5 m width at surface (1.5 m at base) and 2 m depth up to 1,650,000 m^2 (5 m x 55,000 m x 6) from installation of up to six cable trenches; • On average 0.6 m stabilised backfill in each 2 m deep trench; • Up to 99,000 m^2 from jointing bays (based on 440 jointing bays (each jointing bay is 9 m x 25 m)); • Up to 3,960 m^2 from link boxes (based on 440 link boxes (each link box: is 3 m x 3 m)). Link boxes are permanent sub surface structures; • Up to 396,000 m^2 from installation of temporary haul road/accesses (6 m x 66,000 m per phase); • Up to 120 HDD locations per phase (up to 105 minor HDDs and 15 major HDDs per phase), including 15 HDD compounds; • Up to five secondary compounds (maximum area of construction compounds is 33,000 m^2 (average area 17,000 m^2)); and • Up to 55 storage areas; • 50% of the area of each compound would be surfaced with crushed aggregate. The aggregate would be removed when construction is complete; and • The haul road would be surfaced with aggregate on geotextile and would be removed at the end of each construction phase.	A well-known occurrence at construction sites is staff organising travel amongst themselves to car share, especially in rural locations. Furthermore, contractors regularly provide transport for their staff via minibus. The actual mode share of construction staff is not reported for any similar site, however, a calculation that 75% of construction staff drive is considered a reasonable assumption for assessment purposes. Maximising the depth and width of stabilised backfill/trenches would maximise HGV movements. Maximising the number of parallel trenches (minimum number of circuits per trench) would maximise HGV movements. The maximum design scenario in terms of traffic would be based on the minimum estimate of construction length. Larger areas/volumes result in larger amounts of material and thus larger numbers of HGV movements. Fewer number of days to transport a given amount of material results in a larger number of daily HGV movements. The maximum intensity of construction for the Hornsea Three onshore cable corridor would occur if it was built in a single phase within a 30 month (approximately 2.5 years) duration.

Potential impact	Maximum design scenario	Justification
The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect severance of routes (see glossary). The temporary impact of the construction work may affect pedestrian delay (see glossary). The temporary impact of the construction work may affect pedestrian amenity (see glossary). The temporary impact of the construction work may driver delay (see glossary). The temporary impact of the construction work may affect accidents and road safety. The temporary impact of hazardous, dangerous and abnormal loads during construction works.	<u>Onshore HVDC converter/HVAC substation</u> Up to 149,302 m^2 for permanent area of site (including an area which may be used for landscaping) plus a temporary works area of 91,000 m^2. Maximum building dimensions: up to 220 m length, 75 m width and 25 m height. The maximum intensity of construction for the onshore HVDC converter/HVAC substation would occur if it was built in a single phase with a three-year duration.	A maximum area/volume of site cleared for works would maximise HGV movements. Larger areas/volumes result in larger amounts of material and thus larger numbers of HGV movements. The maximum design scenario in terms of traffic would be based on the minimum estimate of construction duration. Fewer number of days to transport a given amount of material results in a larger number of daily HGV movements.
The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect severance of routes (see glossary). The temporary impact of the construction work may affect pedestrian delay (see glossary). The temporary impact of the construction work may affect pedestrian amenity (see glossary). The temporary impact of the construction work may affect driver delay (see glossary). The temporary impact of the construction work may affect accidents and road safety. The temporary impact of hazardous, dangerous and abnormal loads during construction works.	<u>Onshore HVAC booster station</u> Up to 30,407 m^2 for permanent area of site plus a temporary works area up to 25,000 m^2. Maximum building footprint of 9,000 m^2 (based on single building scenario (120 m length and 75 m width) and height up to 12.5 m). Up to 30,000 m^3 excavated for basement (based on 5m deep and area of 6,000 m^2). The maximum intensity of construction for the onshore HVAC booster station would occur if it was built in a single phase with a two-year duration. All topsoil and subsoil generated from levelling and earthworks would be removed from the site.	A maximum area/volume of site cleared for works would maximise HGV movements. Larger areas/volumes result in larger amounts of material and thus larger numbers of HGV movements. The maximum design scenario in terms of traffic would be based on the minimum estimate of construction duration. Fewer number of days to transport a given amount of material results in a larger number of daily HGV movements.
Decommissioning phase		
The temporary impact of the decommissioning work may affect driver delay (see glossary). The temporary impact of the decommissioning work may affect severance of routes (see glossary). The temporary impact of the decommissioning work may affect pedestrian delay (see glossary). The temporary impact of the decommissioning work may affect pedestrian amenity (see glossary). The temporary impact of the decommissioning work may affect driver delay (see glossary). The temporary impact of the decommissioning work may affect accidents and road safety. The temporary impact of hazardous, dangerous and abnormal loads during decommissioning works.	<u>Onshore HVAC booster station</u> Up to 30,407 m^2 for permanent area of site. The maximum intensity of decommissioning for the onshore HVAC booster station would occur if it was demolished in a single phase with a two-year duration. <u>Onshore HVDC converter/HVAC substation</u> Up to 149,302 m^2 for permanent area of site The maximum intensity of decommissioning for the onshore HVDC converter/HVAC substation would occur if it was demolished in a single phase with a three-year duration.	A maximum area/volume of site cleared for decommissioning would maximise HGV movements. The maximum design scenario in terms of traffic would be based on the minimum estimate of decommissioning duration.

Table 7.10: Impacts scoped out of the assessment for traffic and transport.

Potential impact	Justification
Construction phase	
N/A	N/A
Operation and maintenance phase	
The impacts arising from the operation and maintenance of the onshore elements of Hornsea Three.	During the operation and maintenance phase, the only vehicle movements generated will be maintenance visits for the onshore HVDC converter/HVAC substation and HVAC booster station, which will be on an approximate weekly basis. These visits are likely to be made by light vehicles only and would use the existing road network and permanent onshore HVDC converter/HVAC substation access constructed as part of Hornsea Three. Such movement is very low and infrequent and will be significantly under thresholds on which assessment is required. No routine maintenance of the onshore cable corridor is required.
Decommissioning phase	
The impacts arising from the decommissioning of the Hornsea Three onshore cable corridor.	The export cables along the Hornsea Three onshore cable corridor will remain in situ after the decommissioning of Hornsea Three. Therefore, it is not anticipated that there will be any traffic and transport impacts associated with the decommissioning the onshore cable corridor.

7.8.3 Vehicle trip generation, distribution and assignment (construction)

7.8.3.1 Detailed assessments of vehicle generation have been carried out for the construction phase of development. The level of vehicle generation during the operation and maintenance, and decommissioning phases would be significantly lower than during the construction phase.

7.8.3.2 The level of vehicular trip generation associated with the construction phase of Hornsea Three is based on the assumptions set out in Table 7.9. Details of the technical parameters used for the construction stage trip generation calculations are presented in volume 6, annex 7.6: Construction Vehicle Trip Generation Assumptions.

7.8.3.3 For the purposes of estimating the construction traffic generation, the Hornsea Three onshore cable corridor is divided into 21 sections using professional judgement based upon groupings of accesses that share key sections of the highway network, as shown on Figure 1.2 in volume 6, annex 7.8: Traffic and Transport Figures. There will be up to five work fronts (i.e. up to five construction activities – see volume 1, chapter 3: Project Description) being undertaken at any one time. It is assumed that there would be one work front on each cable section. This means that up to five cable sections could be under construction at any one time.

7.8.3.4 A worst case scenario would be created when five adjacent cable sections (or near to one-another) are constructed at the same time because this would concentrate the construction vehicle movements onto the same road links, especially those near to the cable sections under construction. If five cable sections that were spread apart from each other were constructed at the same time, then this would spread the construction vehicles across all of the road links within the study area and thus result in fewer construction vehicle movements on each road link in comparison to the above.

7.8.3.5 Based on this, if five adjacent or nearby cable sections in the northern part of the Hornsea Three onshore cable corridor were assessed, then the construction traffic flows would be concentrated in the northern part of the study area. If five adjacent or nearby cable sections in the southern part of the Hornsea Three onshore cable corridor were assessed, then the construction traffic flows would be concentrated in the southern part of the study area.

7.8.3.6 Therefore, a range of scenarios have been created that concentrates the construction traffic flows at differing parts of the study area, as follows:

- Northern part of corridor: cable sections 1, 2, 3, 4 and 5 all under construction simultaneously;
- Middle (northern) part of corridor: cable sections 6, 8, 9, 10 and 11 all under construction simultaneously;
- Middle (southern) part of corridor: cable sections 12, 13, 14, 15 and 16 all under construction simultaneously; and
- Southern part of corridor: cable sections 17, 18, 19, 20 and 21 all under construction simultaneously.

7.8.3.7 The exact groupings of cable sections do not make any noticeable difference to the assessment. The important factor is that cable sections that are adjacent or near to one-another are grouped together.

7.8.3.8 Each of these four scenarios creates different traffic flows on each road link and junction within the study area. Therefore, to ensure a robust analysis, the maximum construction traffic flow for the four scenarios on each link and junction has been assumed as the peak construction traffic flows and has been assessed.

7.8.3.9 In terms of a network, this overestimates the total number of construction vehicles, however, in terms of individual links and junctions, it represents the peak construction traffic flow that could be generated along or through them and is thus a robust methodology.

7.8.3.10 The above has been devised using 20 of the 21 onshore cable corridor sections. The smallest cable section has been excluded from this process so as to include the largest generating sections and thus ensure a robust analysis.

7.8.3.11 Excluding onshore cable corridor section from the above does not result in a lower daily traffic generation on any link or junction. This is because the above has been devised to consider the traffic generation when five work fronts are ongoing at any one time. When five work fronts are ongoing at any one time, based on there being 21 onshore cable corridor sections, this means there will be 16 other onshore cable corridor sections that do not have any works ongoing.

7.8.3.12 The above considers five onshore cable corridor sections being grouped together (to replicate maximum provision of up to five active work fronts occurring along the onshore cable corridor at any one time), but in reality there any many different scenarios that could be created of five onshore cable corridor sections. What is important is grouping five adjacent cable sections to maximise the concentration of construction vehicle movements in that local area to generate peak estimations. Thus, it is evident that the above presents a robust methodology and that considering 20 of the 21 onshore cable corridor sections still allows for the peak construction vehicle movements on each link and junction to be identified.

7.8.3.13 Each of the 21 onshore cable corridor cable route sections has one or more construction accesses. The HGV routes to the accesses have been determined taking into account the suitability of the surrounding highway network including the existing accesses, the opportunities to provide access to sections of the onshore cable corridor along the haul road and the stated preferences of consultees, and in particular the Highway Authority.

7.8.3.14 Cable sections also relate to the physical features that act as barriers to movements of vehicles along the onshore cable corridor. In general, such barriers are defined by the HDD crossing locations although in some cases, where a HDD crossing is required it is still possible to achieve vehicle movement along the cable crossing. For example, where a HDD crossing is required to place cables below a gas pipeline it may be possible for HGVs to pass over the gas pipeline with suitable load spreading ground reinforcement.

7.8.3.15 Table 7.11 identifies the 21 onshore cable corridor sections, their lengths and the proposed HGV accesses.

Table 7.11: Onshore cable corridor sections, accesses and HGV routes.

Route Section	Description	Length / Kilometres	Accesses	Local Access Route
1	Landfall to Holgate Hill	2.96	47 (B)	A148 - A1082 - A149
			45 (B)	A148 - A1082 - A149
			44 (B)	A148 - A1082 - A149
			ACC_P_75	A148 - Bridge Road- Holgate Hill
2	Holgate Hill to woodland north east of High Kelling	1.61	42C - Monitoring Access Only	A148 - Bridge Road- Holgate Hill
			41 (B)	A148 - Bridge Road
3	Woodland northeast of High Kelling to woodland south of Church Road	2.53	ACC_P_74	A148
			ACC_P_73	A148
			ACC_P_72	A148 - Selbrigg Road
			ACC_P_71	A148 - Selbrigg Road
			ACC_P_70	A148 - Selbrigg Road
			ACC_P_69	A148 - Selbrigg Road
4	Woodland south of Church Road to woodland south and east of School Lane	2.47	ACC_P_68	A148 - Hempstead Road
			ACC_P_67	A148 - Hempstead Road
			39a(B)	B1149 - Hempstead Road - Hole Farm Road - School Lane
5	Woodland east of School Lane to Plumstead Road	1.92	ACC_P_66	B1149 - Hempstead Road - Hole Farm Road
			ACC_P_65	B1149 - Hempstead Road - Hole Farm Road
			ACC_P_64	B1149 - Plumstead Road
			ACC_P_63	B1149 - Plumstead Road
			ACC_P_62	B1149 - Sweetbriar Lane
			ACC_P_61	B1149 - Sweetbriar Lane
6	Plumstead Road to the B1149	2.3	37(E)	B1149 - Organic Waste Processing Site Access
			ACC_P_60	B1149
7	B1149 to land South of Town Close Lane	1.9	ACC_P_59	B1149
			ACC_P_58	B1149 - B1354
			ACC_P_57	B1149 - B1354
			36(C) - Monitoring Access Only	B1149 - B1354 - Croft Lane
			ACC_P_56	B1149 - B1354 - Town Close Lane
			35(C) - Monitoring Access Only	B1149 - B1354 - Town Close Lane
8	Land south of Town Close Lane to woodland north of Reepham Road	4.37	ACC_P_55	B1149 - Valley Road - Wood Dalling Road
			ACC_P_54	B1149 - Valley Road - Wood Dalling Road
			ACC_P_53	B1149 - Heydon Road - Heydon Road - Blackwater Lane
			ACC_P_52	B1149 - Heydon Road - Heydon Road - Blackwater Lane
			ACC_P_51	B1149 - Heydon Road - Heydon Road - Heydon Lane
			ACC_P_50	B1149 - Heydon Road - Heydon Road - Heydon Lane
			ACC_P_49	B1149 - Heydon Road
			ACC_P_48	B1149 - Heydon Road
9	Land north of Reepham Road to woodland north of Reepham	1.95	ACC_P_47	B1149 - B1145 - Wood Dalling Road - Reepham Road
			ACC_P_46	B1149 - B1145 - Wood Dalling Road - Reepham Road
			34(A)	B1149 - B1145 - Wood Dalling Road - Reepham Road
			33(A)	B1149 - B1145 - Wood Dalling Road - Reepham Road
			ACC_P_45	B1149 - B1145 - Wood Dalling Road - Reepham Road
			ACC_P_44	B1149 - B1145 - Wood Dalling Road
			ACC_P_43	B1149 - B1145 - Wood Dalling Road
10	Woodland north of Reepham to woodland at Booton Common	1.74	ACC_P_42	B1149 - B1145
			32 (B)	B1149 - B1145
			ACC_P_41	B1149 - B1145
11		2.19	ACC_P_40	B1149 - Buxton Road - Church Road

Route Section	Description	Length / Kilometres	Accesses	Local Access Route
	Woodland east of Reepham to The Grove		ACC_P_39	B1149 - Buxton Road - Church Road
			ACC_P_38	B1149 - Buxton Road - Church Road - Norwich Road - The Grove
			ACC_P_37	B1149 - Buxton Road - Church Road - Norwich Road - The Grove
12	The Grove to woodland south of Church Farm Lane	2.16	ACC_P_36	B1149 - Buxton Road - Church Road - Norwich Road
			ACC_P_35	B1149 - Buxton Road - Church Road - Norwich Road
			ACC_P_34	B1149 - Buxton Road - Church Road - Norwich Road - Church Road
			30(B)	B1149 - Buxton Road - Church Road - Norwich Road - Church Road
			29(B)	A1065 - A148 - B1149 - Buxton Road - Church Road - Norwich Road - Church Farm Lane
13	Woodland south of Church Farm Lane to River Wensum	2.34	ACC_P_33	A1067 - Station Road - Reepham Road - Church Farm Lane
			ACC_P_32	A1067 - Station Road - Reepham Road - Hall Road
			28(C) - Monitoring Access Only	A1067 - Station Road - Reepham Road - Hall Road
			27(C) - Monitoring Access Only	A1067 - Station Road - Reepham Road
			26(B)	A1067 - Station Road - Reepham Road
			25 (B)	A1067 - Station Road
			ACC_P_31	A1067 - Station Road
14	River Wensum to woodland south west of Ringland	5.24	ACC_P_30 - Monitoring Access Only	A1067 - The Street
			24(A)	A1067 - The Street
			ACC_P_29	A1067 - Marl Hill
			ACC_P_28	A1067 - Marl Hill - Morton Lane
			ACC_P_27	A1067 - Marl Hill - Morton Lane
			ACC_P_26	A1067 - Marl Hill - Morton Lane - Ringland Lane
			23(A)	A1067 - Marl Hill - Morton Lane - Ringland Lane
			ACC_P_25	A1067 - Marl Hill - Morton Lane - Ringland Lane
			ACC_P_24	A1067 - Marl Hill - Morton Lane - Ringland Lane
			22(B)	A1067 - Marl Hill - Morton Lane - Ringland Lane
			ACC_P_23	A1067 - Marl Hill - Morton Lane - Ringland Lane - Haul Road
			ACC_P_22	A1067 - Marl Hill - Morton Lane - Ringland Lane - Haul Road
			21(B)	A1067 - Marl Hill - Morton Lane - Ringland Lane - Haul Road
			20(B)	A1067 - Marl Hill - Morton Lane - Ringland Lane - Haul Road
			18(B)	A1067 - Marl Hill - Morton Lane - Ringland Lane - Haul Road
15	Woodland south west of Ringland to A47	2.1	17(B)	A47 - Taverham Road - Weston Road
			16(B)	A47 - Taverham Road - Weston Road
			ACC_P_21	A47 - Church Lane
16	A47 to Bawburgh Road	2.38	ACC_P_20	A47 - Dereham Road - Church Lane
			15(A)	A47 - Dereham Road - Church Lane
			ACC_P_19	A47 - Dereham Road - Church Lane - Broom Lane
			14(A)	A47 - Dereham Road - Marlingford Road
			ACC_P_18	A47 - Dereham Road - Marlingford Road
17	Bawburgh Road to woodland west of Little Melton	3.1	13(C)	A47 - B1108 - Stocks Hill - Marlingford Road - Bawburgh Road
			ACC_P_17	A47 - B1108 - Stocks Hill - Marlingford Road - Bawburgh Road
			ACC_P_16	A47 - B1108 - Stocks Hill - Marlingford Road - Bawburgh Road
			ACC_P_15	A47 - B1108 - Bawburgh Road
			ACC_P_14	A47 - B1108 - Bawburgh Road
			11(A)	A47 - B1108
			ACC_P_13	A47 - B1108

Route Section	Description	Length / Kilometres	Accesses	Local Access Route
18	Woodland west of Little Melton to A11	4.1	10(A)	B1172 - Colney Lane - Burnthouse Lane – Haul Road
			9(A)	B1172 - Colney Lane - Burnthouse Lane – Haul Road
			ACC_P_12	B1172 - Colney Lane - Burnthouse Lane – Haul Road
			ACC_P_11	B1172 - Colney Lane - Burnthouse Lane – Haul Road
			ACC_P_10	B1172 - Colney Lane - Burnthouse Lane - Little Melton Road
			ACC_P_9	B1172 - Colney Lane - Burnthouse Lane - Little Melton Road
			8(A)	B1172 - Colney Lane - Burnthouse Lane
			7(A)	B1172 - Colney Lane - Burnthouse Lane
			ACC_P_8	B1172 - Colney Lane - Burnthouse Lane
			6(B)	B1172 - Colney Lane - Burnthouse Lane
			50(B)	B1172 - Colney Lane
			5(A)	B1172
			4(C)	B1172
			4(B)	B1172 - Station Lane
			3(B)	B1172 - Station Lane
19	A11 to woodland north west of Swardeston	2.49	2(B)	A11 - Station Lane
			ACC_P_7	A11 - Station Lane - Cantley Lane
			ACC_P_6	A11 - Station Lane - Cantley Lane
			ACC_P_5	A11 - Station Lane - Cantley Lane – Haul Road
			ACC_P_4	A11 - Station Lane - Cantley Lane – Haul Road
20	Woodland north west of Swardeston to B1113	1.68	ACC_P_3	A47 - B1113 - Haul Road
			ACC_P_2	A47 - B1113 - Haul Road
			1(B)	A47 - B1113
21	B1113 to end of onshore cable corridor	1.89	ACC_P_1	A47 - B1113
			ACC_P_A	B1113 - Mangreen Lane
			ACC_P_B	B1113 - Mangreen Lane
			ACC_P_C	A140 - Mangreen
			ACC_P_D	A140 - Mangreen
			A(B)	A140 - Mangreen

7.8.3.16 In terms of the wider distribution of HGVs, this is wholly dependent upon the procurement of materials at the time of construction.

7.8.3.17 Therefore, assumptions have been made which seek to make reasonable estimates, but which also seek to incorporate a level of robustness.

7.8.3.18 From a high-level perspective, the A11 and the A47 (west) offer the key strategic routes to/from the largest catchment areas and it is likely that the majority of HGV movements would be via these two roads. Other key roads from outside the study area are the A148 (west), the A47 (east), the A146 and the A140.

7.8.3.19 An estimated distribution of HGVs has concentrated movement along the A11 and the A47 (west) as follows:

- A11 – 35%;
- A47 (west) – 35%;
- A148 (west) – 10%;
- A47 (east) – 5%;
- A146 – 5%; and
- A140 – 10%.

7.8.3.20 There is potential for materials to originate from very localised areas within the study area. The above assumes all material originates from outside the study area. Such an assumption means that all HGVs travel through the maximum number of links within the study area and thus represents a worst case scenario.

7.8.3.21 If local trips were assumed, then HGVs would not all be assigned onto the wider parts of the network and thus may underestimate the number of HGV movements on both the trunk road network and parts of the local road network within the study area.

7.8.3.22 If local trips were assumed then there may also be some different turning movements at some junctions, however, these would balance out against different turning movements at other junctions.

7.8.3.23 It is recognised that the above is estimated using professional judgement based upon a high-level review of the highway network and the study area in advance of any procurement of materials etc. It is also recognised that there will likely be day-to-day variances in the movement of material throughout the programme based on the procurements in place and the resultant origins of materials. For example, an amount of material is sourced from one location, but when this amount is reached, material is then sourced from another location. This will change the movement of HGVs as the construction phase progresses and result in day-to-day variances.

7.8.3.24 To ensure this assessment accounts for these day-to-day variances, a methodology has been adopted that increases the proportion of trips from each origin.

7.8.3.25 For assessment purposes only, it has been assumed that approximately double the proportion of HGVs would originate from the above six links and thus allows for day-to-day variances along them. This effectively doubles the total number of HGVs generated by the proposals when all road links are considered together as it effectively approximately doubles the number of HGVs on each link and through each junction. Although this would not happen in practice (because an increase from one origin would be offset by a decrease from another origin), it allows for a robust assessment that allows for day-to-day variances when individual links and junctions are considered.

7.8.3.26 The assessments do consider each road link and each junction separately and therefore the assessment methodology adopted allows for day-to-day variances to be considered and the upper of that variance to be assessed.

7.8.3.27 The assessment distribution of HGVs is therefore as follows:

- A11 – 50%;
- A47 (west) – 50%;
- A148 (west) – 25%;
- A47 (east) – 25%;
- A146 – 25%;
- A140 – 25%; and
- Total – 200%.

7.8.3.28 As above, a distribution of 200 % would not occur in practice, however, they allow for day-to-day variances and a robust assessment of the impact of construction vehicles and therefore form the basis of all assessments.

7.8.3.29 Data from the 2011 Census has been utilised to estimate the potential origin of construction staff using location of usual residence and place of work for the Broadland, North Norfolk and South Norfolk areas.

7.8.3.30 The onshore cable corridor extends through the Broadland, North Norfolk and South Norfolk datasets. Resident locations for the cumulative daytime populations of these datasets have been identified and aggregated to establish potential origins of construction staff.

7.8.3.31 In a similar manner to the HGV distribution, resident locations from within Norwich were excluded from this analysis. This distributes staff origins from outside of the study area and thus maximises the number of links within the study area that have staff movements generated along them. This is because it forces all staff to arrive from outside the study area which maximises the number of road links they travel on within the study area. If staff were to originate from within the study area then those staff would not travel on road links between their origin and the outer edge of the study area.

7.8.3.32 This has resulted in the following construction staff distribution:

- A148 (west) – 8%;
- A47 (east) – 28%;
- A146 – 11%;
- A47 (west) – 7%;
- A1065 – 6%;
- A11 – 16%;
- A140 – 13%; and
- A140 corridor between Comer and Norwich – 12%.

7.8.3.33 The above construction staff distribution results in a relatively equal spread of movement and appears to be representative of the local tourism accommodation in the surrounding areas and also the built-up areas in the surrounding areas, which provides confidence that the assumptions are suitable for assessment purposes. This view has been identified by identifying the surrounding built up areas and large tourist accommodation areas on maps and forming a judgement.

7.8.3.34 The above assumes that all material and construction staff travel directly to/from the cable accesses, which also form the same accesses to the secondary compounds and storage areas located along the onshore cable corridor.

7.8.3.35 However, this assumption does not incorporate an estimate for vehicle movements to / from the main compound at Oulton Street.

7.8.3.36 Following the experiences at Hornsea Project One and other projects, it has been identified that a main compound is needed as part of the construction process to manage the construction activities and to act as a central base for the construction operations to ensure they progress efficiently. The main compound will be used for storage of some materials, for example cable drums, and will be the key base for management to co-ordinate the operations, and supporting the efficient and safe construction of the onshore cable corridor as a whole. The location for a main compound at Oulton Street has been identified.

7.8.3.37 To estimate a number of construction vehicle movements, the results of the above trip generation, distribution and assignment exercise has been utilised. The above results in daily construction vehicle movements being assigned onto each link.

7.8.3.38 These were then reviewed and those on the B1149 near Oulton were disaggregated to remove all traffic associated with landfall, the onshore HVDC converter/HVAC substation and the onshore HVAC booster station, since these all have their own separate compounds. HGVs associated with concrete pouring at link boxes and aggregate for the haul road and secondary compounds will all deliver direct to their respective locations and so these were also removed. The remaining construction vehicle movements are those that could travel to and from the main compound at Oulton Street.

7.8.3.39 This is of course theoretical and it is recognised that not all staff and not all HGVs would travel to the main compound. However, this is considered a reasonable methodology to estimate the number of movements based on the peak movement at any one time.

7.8.3.40 Full details of the construction programme are set out in volume 1, chapter 3: Project Description. In summary onshore work is planned to commence in 2021 but could start as early as 2020. Hornsea Three may be constructed in a single phase or two phases, including the potential for an overlap or a gap between the completion of construction of one phase and the start of construction of another. However, if the construction activities of any phases are overlapping, the construction durations and total values for individual parameters will never exceed those stated for a single phase (i.e. the number of vehicle movements generated would be the same). Under a two-phase programme scenario, there could be a three year gap between phases and the total duration of the onshore cable corridor construction, including this three year gap, would be eight years. Under a single-phase construction programme, the minimum duration of the cable construction would be three years.

7.8.3.41 The shorter timescale would give rise to the highest daily traffic flows; therefore these assumptions have been used to calculate the construction vehicle movements.

Vehicle trip movements (construction)

7.8.3.42 The daily construction vehicle movements have been assigned onto the network in accordance with the above and are set out in Table 7.12.[1]

7.8.3.43 It can be seen that on the basis of the maximum design scenario with 100% of the haul road surfaced with aggregate the average number of HGV movements, assuming they are spread over an 11 hour working day, would be a maximum of 13 per hour for cable section 21 (B1113 to the end of the onshore cable corridor) and, for all other cable sections, less than 13 HGV movements per hour.

7.8.3.44 Using the assumptions above to estimate the potential number of vehicle movements at the main compound at Oulton Street, this equates to a peak of 130 daily staff vehicle movements) and a peak of 118 daily HGV movements).

Table 7.12: Daily construction vehicle movements

Link	Construction Staff	HGVs	Total Vehicle Movements
Link ID 35: A148, west of The Street and east of Green Lane	139	377	517
Link ID 34: A148 west of Holt and east of Letheringsett	139	377	517
Link ID 36: A148, east of the B1149 roundabout and west of Station Road	84	297	380
Link ID 50: B1354 between the Swanton Road junction and B1110 junctions	0	0	0
Link ID 55: B1354 east of Melton Constable and west of Briston	0	0	0
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	137	373	511
Link ID 37: A148 at High Kelling, south of Kelling Hospital	84	297	380
Link ID 41: A148, east of Bodham and west of the Woodlands Leisure centre	244	439	684
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	322	495	817
Link ID 190: B1436, east of Felbrigg	322	495	817
Link ID 49: A140, south of Roughton and north of the Topshill Road junction	322	495	817
Link ID 1: A149 west of Weybourne and east of The Pheasant Hotel	0	0	0
Link ID 2: A149 east of Weybourne, west of the North Norfolk Railway Line	133	221	354
Link ID 81: A1067, north of Bridge Road and east of Little Ryburgh	71	214	285
Link ID 84: B1145 at Bawdeswell, between The Street junction and Hall Road junction	0	0	0

[1] Table shows all links for which traffic data is available within the initial study area. Some of these links do not have any construction traffic flows generated along them and these links are retained within the table to illustrate this.

Link	Construction Staff	HGVs	Total Vehicle Movements
Link ID 86: B1145, west of Reepham and east of the Old Lane junction	0	0	0
Link ID 90: B1145 east of Cawston, west of the B1149 crossroads	243	379	622
Link ID 77: B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	81	0	81
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	283	495	777
Link ID 111: A1067, between Attlebridge and the Fir Covert Road junction	275	356	631
Link ID 145: A140 between the A47 and B1113 junctions	317	528	845
Link ID 146: B1113, south of the A47 near Norwich Sports ground	317	528	845
Link ID 129: A47 at Honingham	161	412	573
Link ID 157: A47 at Bawburgh	175	412	587
Link ID 147: A47 at Intwood	418	552	970
Link ID 153: A11 at Hethersett	128	283	411
Link ID 144: A47, between A140 and A146 junctions	412	392	803
Link ID 197: A1065, North of Swaffham	94	259	353
Link ID 195: A1065, east of Weasenham	94	259	353
Link ID 195: A1082, South of Sheringham	133	221	354
Link ID 200: A1270 Northern Distributor Road between A1067 and B1149 junction	316	356	671
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	416	562	978
Link ID 201: A1270 Northern Distributor Road between B1149 and A140 junctions	448	622	1070
Link ID 204: A1270 Northern Distributor Road between A140 and A47 junctions	465	629	1093
Link ID 118: A140 between A1270 and B1145	283	495	777
Link ID 204: A1270 between A140 and A47 (Near junction with A47)	465	629	1093
Link ID 137: A47 East of A1270 junction	401	263	664

7.9 Impact assessment methodology

7.9.1 Overview

7.9.1.1 The traffic and transport EIA has followed the methodology set out in volume 1, chapter 5: Environmental Impact Assessment Methodology. Specific to this chapter, the following guidance documents have also been considered:

- Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Management and Assessment (IEMA), 1993);
- Volume 11 – Environmental Impact Assessment of the Design Manual for Roads and Bridges (DMRB) (Highways Agency et al, 2008); and
- Guidance on TA, (DfT, 2007)[2].

Guidelines for the Environmental Assessment of Road Traffic

7.9.1.2 In accordance with the 'Guidelines for the Environmental Assessment of Road Traffic' (IEMA, 1993), the significance of effects has been assessed by considering the interaction between the magnitude of the impact and the sensitivity of the receptor in the vicinity of transport corridors. This assessment has compared the future baseline situation in the year of construction, taking into account other schemes that are likely to affect the future baseline condition in the year of construction, against a scenario which includes the development of Hornsea Three.

7.9.1.3 Consistent with the IEMA guidelines, the following has been considered in this chapter:

- Driver Delay;
- Severance of Routes;
- Pedestrian Delay;
- Pedestrian Amenity;
- Accidents and Road Safety; and
- Hazardous, Dangerous and Abnormal Loads.

[2] Although this guidance has since been withdrawn, it has not been replaced and in the absence of any such replacement remains a useful guide that is frequently referred to by Transport and Highways professionals.

Technical methodologies

7.9.1.4 The technical methodology for undertaking the assessment of transport impacts is based upon the IEMA Guidelines for the Environmental Assessment of Road Traffic, as set out above. A TA has been prepared in accordance with the guidance contained within the DfT's Guidance on Transport Assessment (2007), and accompanies this chapter at volume 6, annex 7.1: Transport Assessment.

7.9.1.5 The DfT guidance relates, in particular, to the description of existing transport conditions, the assessment of highway safety and public transport services, the identification of traffic growth forecasts, the derivation of generated traffic and the distribution and assignment of traffic.

7.9.1.6 The assessment of abnormal indivisible load movements is informed by the Road Vehicles (Construction and Use) Regulations 1986 (as amended) and the Road Vehicles (Authorisation of Special Types) (General) Order 2003. The ability of vehicles to negotiate links and junctions is assessed using the TRACK computer programme (Savoy Computing Services Ltd, 2012) that models the areas required to allow the passage of vehicles and loads.

Screening tests

7.9.1.7 In order to establish whether a highway link should be included as part of the detailed environmental assessment the following tests, that are set out in the IEMA Guidelines, are applied:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of HGV will increase by more than 30%); and
- Rule 2: include any other specifically sensitive areas where traffic flows will increase by 10% or more.

7.9.1.8 Based on the above, any link where changes in total traffic flows or HGV flows resulting from the development are predicted to be less than 10% and 30% respectively is screened out of the assessment. It should be noted that changes in total traffic flows of less than 10% are generally considered to be insignificant given that the daily variations in background traffic flows may fluctuate by this amount. Based on the above, any link where changes in total traffic flows are predicted to be less than 30% when not in a sensitive location are also screened out of the assessment.

7.9.1.9 On links where the predicted change in total traffic flows or HGV flows are in excess of 30% or on sensitive links where the predicted change in total traffic flows are between 10% and 30% have been carried forward and subjected to a more detailed level of assessment in relation to potential transport environmental effects.

7.9.2 Impact assessment criteria

7.9.2.1 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria to be applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. The terms used to define sensitivity and magnitude are based on those used in the DMRB methodology, which is described in further detail in volume 1, chapter 5: Environmental Impact Assessment Methodology.

7.9.2.2 The criteria for defining sensitivity in this chapter are outlined in Table 7.13.

Table 7.13: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition used in this chapter
Very High	Very High: Those receptors with greatest sensitivity due to site-specific characteristics which make them particularly sensitive to changes in traffic flow (e.g. community with high incidence of mobility impairment requiring residents to cross roads to access essential facilities).
High	High: Receptors of high sensitivity to traffic flows (e.g. schools, colleges, playgrounds, accident black spots, urban/residential roads without footways that are used by pedestrians).
Medium	Medium: Receptors of medium sensitivity to traffic flows (e.g. congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycle ways, community centres, parks, recreation facilities, retirement homes).
Low (or lower)	Low: Receptors with some sensitivity to traffic flows (e.g. places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision).
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

7.9.2.3 Links that are defined as high or very high sensitivity are deemed as sensitive, in accordance with the IEMA thresholds, and have been assessed against the rule 2 threshold. Links that are defined as medium low or negligible sensitivity are deemed as not being sensitive, in accordance with the IEMA thresholds, and have been assessed against the rule 1 threshold.

7.9.2.4 The criteria for defining magnitude in this chapter are outlined in Table 7.14.

Table 7.14: Definition of terms relating to the magnitude of an impact.

Magnitude of impact	Definition used in this chapter
Major	Substantial or total loss of capability for movement along or across transport corridors, loss of access to key facilities and loss of highway safety. Severe delays to travellers (adverse).
	Large scale improvement in the capability for movement along and across transport corridors, major improvement in access to key facilities, in highway safety and in delays to travellers (beneficial).
Moderate	Moderate loss of capability for movement along or across transport corridors, loss of access to key facilities and loss of highway safety. Severe delays to travellers (adverse).
	Moderate improvement in the capability for movement along and across transport corridors, major improvement in access to key facilities, in highway safety and in delays to travellers (beneficial).
Minor	Some measurable loss of capability for movement along and across transport corridors, some measurable loss of access to key facilities and some measurable loss of highway safety. Some measurable increase in delays to travellers (adverse).
	Some measurable increase in the capability for movement along and across transport corridors, some measurable increase in access to key facilities and some measurable increase in highway safety. Some measurable increase in delays to travellers. Reduced risk of negative impacts occurring (beneficial).
Negligible	Very minor loss of capability for movement along and across transport corridors, very minor loss of access to key facilities and very minor loss of highway safety. Very minor increase in delays to travellers (adverse).
	Very minor increase in capability for movement along and across transport corridors, very minor increase in access to key facilities and very minor increase in highway safety. Very minor decreases in delays to travellers (beneficial).
No change	No loss of capability for movement along and across transport corridors, no change of access to key facilities and highway safety. No delays to travellers.

7.9.2.5 The significance of the effect upon traffic and transport is determined by correlating the magnitude of the impact and the sensitivity of the receptor, as shown in Table 7.15. Where a range of significance of effect is presented in Table 7.15, the final assessment for each effect is based upon expert judgement.

7.9.2.6 For the purposes of this assessment, any effects with a significance level of minor or less will be concluded to be not significant in terms of the EIA Regulations.

Table 7.15: Matrix used for the assessment of the significance of the effect.

		Magnitude of impact				
Sensitivity of receptor		***No change***	***Negligible***	***Minor***	***Moderate***	***Major***
	Negligible	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
	Low	Negligible	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	Medium	Negligible	Negligible or minor	Minor	Moderate	Moderate or major
	High	Negligible	Minor	Minor or moderate	Moderate or major	Major or substantial
	Very high	Negligible	Minor	Moderate or major	Major or substantial	Substantial

7.9.3 Sensitivity of receptor

7.9.3.1 Table 7.16 highlights the qualification of the sensitivity assessment for each of the road links for which traffic flows are available and are subject to the EIA screening tests, in conjunction with the descriptions set out at volume 6, annex 7.3: Description of Network Links and Sensitivity. The sensitivity for each road link has been defined using Table 7.13 above, using professional judgement and by incorporating all receptor groups identified and discussed above.

Table 7.16: Sensitivity of Receptor

Receptor	Sensitivity	Qualification
Link ID 35: A148, west of The Street and east of Green Lane	Medium	Frontages, pedestrian footfall, high street shops
Link ID 34: A148 west of Holt and east of Letheringsett	Negligible	No sensitive receptors
Link ID 36: A148, east of the B1149 roundabout and west of Station Road	Negligible	No sensitive receptors
Link ID 50: B1354 between the Swanton Road junction and B1110 junctions	Negligible	No sensitive receptors
Link ID 55: B1354 east of Melton Constable and west of Briston	Medium	Residential area with narrow footways, frontages, on street parking narrowing effective width. Shared footway / cycleway, school
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	Medium	Narrow footways near residential area, park
Link ID 37: A148 at High Kelling, south of Kelling Hospital	Negligible	No sensitive receptors

Receptor	Sensitivity	Qualification
Link ID 41: A148, east of Bodham and west of the Woodlands Leisure centre	Negligible	No sensitive receptors
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	Medium	Narrow footways outside residences
Link ID 190: B1436, east of Felbrigg	Negligible	No sensitive receptors
Link ID 49: A140, south of Roughton and north of the Topshill Road junction	Negligible	No sensitive receptors
Link ID 1: A149 west of Weybourne and east of The Pheasant Hotel	High	Urban areas with no footways, high hedgerows limiting vis, church, no footways linking campsite to village / store / pub to village
Link ID 2: A149 east of Weybourne, west of the North Norfolk Railway Line	Negligible	No sensitive receptors
Link ID 81: A1067, north of Bridge Road and east of Little Ryburgh	Negligible	No sensitive receptors
Link ID 84: B1145 at Bawdeswell, between The Street junction and Hall Road junction	Medium	Residential area, car park for garden centre on opposite side of road
Link ID 86: B1145, west of Reepham and east of the Old Lane junction	Negligible	No sensitive receptors
Link ID 90: B1145 east of Cawston, west of the B1149 crossroads	Negligible	No sensitive receptors
Link ID 77: B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	Negligible	No sensitive receptors
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	Low	Frontages
Link ID 111: A1067, between Attlebridge and the Fir Covert Road junction	Negligible	No sensitive receptors
Link ID 145: A140 between the A47 and B1113 junctions	Negligible	No sensitive receptors
Link ID 146: B1113, south of the A47 near Norwich Sports ground	Negligible	No sensitive receptors
Link ID 129: A47 at Honingham	Negligible	No sensitive receptors
Link ID 157: A47 at Bawburgh	Negligible	No sensitive receptors
Link ID 147: A47 at Intwood	Negligible	No sensitive receptors
Link ID 153: A11 at Hethersett	Negligible	No sensitive receptors
Link ID 144: A47, between A140 and A146 junctions	Negligible	No sensitive receptors
Link ID 197: A1065, North of Swaffham	Negligible	No sensitive receptors
Link ID 195: A1065, east of Weasenham	Negligible	No sensitive receptors
Link ID 195: A1082, South of Sheringham	Negligible	No sensitive receptors
Link ID 200: A1270 Northern Distributor Road between A1067 and B1149 junction	Negligible	No sensitive receptors
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	Low	Residential area, wide footway
Link ID 201: A1270 Northern Distributor Road between B1149 and A140 junctions	Negligible	No sensitive receptors
Link ID 204: A1270 Northern Distributor Road between A140 and A47 junctions	Negligible	No sensitive receptors
Link ID 118: A140 between A1270 and B1145	Low	Frontages
Link ID 204: A1270 between A140 and A47 (Near junction with A47)	Negligible	No sensitive receptors
Link ID 137: A47 East of A1270 junction	Negligible	No sensitive receptors

7.10 Measures adopted as part of Hornsea Three

7.10.1.1 As part of the design process, a number of designed-in measures are proposed to reduce the potential for impacts on traffic and transport (see Table 7.17). As there is a commitment to implementing these measures, they are considered inherently part of the design of Hornsea Three and have therefore been considered in the assessment presented in section 7.11 below (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These measures are considered standard industry practice for this type of development and will be secured as a requirement of the DCO.

Table 7.17: Designed-in measures adopted as part of Hornsea Three.

Measures adopted as part of Hornsea Three	Justification
Suitable HGV routes have been identified.	To avoid adverse effects on communities and road users.
Video condition surveys will be undertaken before HGVs make use of a section of road and after the substantial completion of works on minor links used by HGVs to access the Hornsea Three onshore cable corridor. Damage to the highway caused by construction traffic will be repaired.	To ensure that construction traffic has no lasting adverse impact on the condition of highways.
A route for abnormal indivisible loads will be identified between the SRN and the relevant onshore infrastructure (i.e. onshore HVAC booster station and HVDC converter/HVAC substation). The route, timing and method of transport of abnormal indivisible loads will be discussed and agreed with HE, the police and relevant highways and bridge authorities.	To avoid damage to inappropriate highways, to minimise delays and risks to road users and to avoid adverse impacts on local communities.
Working hours are set out in the Outline CoCP (document reference A8.5). For the Hornsea Three onshore cable corridor and substation core working hours are 07.00 to 18.00 on weekdays and 07.00 to 13.00 on Saturdays. Up to one hour before and after for mobilisation ("mobilisation period") (i.e. 06:00 to 19:00 weekdays and 06:00 to 14:00 Saturdays); and Maintenance period 13:00 to 17:00 Saturdays. Mobilisation does not include heavy good vehicle (HGV) movements into and out of sites, but suppliers can make use of the wider highway network outside these hours to travel to site. In certain circumstances, specific works may have to be undertaken on a continuous working basis (00:00 to 00:00 Monday to Sunday). During this continuous working basis period, the contractor may also run support generators, emergency backup supplies, undertake remedial works (for example in the event of severe weather) and operate security of sites and protection of open assets. It may be beneficial to carry out several activities outside of the standard working hours to utilise periods such as abnormal indivisible loads/construction plant delivery, works within the highway, footpaths, works affecting operational railways. Activities outside of the standard working hours will be agreed with the relevant local authority EHO officer in consultation.	The use of core construction hours will minimise noise impacts (see volume 3, chapter 8; Noise and Vibration), however in some circumstances extended or continuous working hours could be requested to reduce the magnitude of environmental impacts of construction (e.g. to increase safety, reduce driver delays or reduce the duration of impacts etc.).
Restrictions on HGV operating hours, along those sections of the highway network that provide access to local schools.	To minimise adverse impacts on local communities and vulnerable highway users.
Where there is a risk of mud being deposited on the road, wheel wash facilities will be provided at each construction site. These include dry wheel 'wash' facilities (rumble grids).	To eliminate risks to highway users resulting from mud and debris on the highway.
The progression of Temporary Traffic Regulation Orders for a temporary 30 mph speed restriction at every site access which does not already have such a speed limit.	To reduce vehicle speeds, improve driver awareness of construction activity and to minimise any potential road safety issues arising.
Measures to minimise dust and dirt associated with the movement of construction vehicles are set out in the Outline CoCP (document reference A8.5).	To minimise adverse air quality effects (see volume 3, chapter 9: Air Quality).
The provision of appropriate parking facilities for construction workers.	To eliminate risks associated with inappropriate parking.
Traffic management measures at those points where cable trenches are cut across highways or where existing access rights are affected.	To minimise delays to existing highway users and to maintain highway safety.
The diversion of footways or any other rights of way that may be affected by the construction works with closures only when absolutely necessary (see volume 3, chapter 6: Land Use and Recreation).	Closure of rights of way to minimise risks to members of the public resulting from construction works. Diversions minimise delays and inconvenience to pedestrians, cyclists and equestrians.
Monitor load sizes and vehicle usage and, where possible, load consolidation and delivery to construction sites using alternative vehicles. Encouragement to re-use HGVs wherever possible, such as backloading. Where suitable, local suppliers will be used to minimise the distance travelled by HGVs.	To minimise the impact on sensitive receptors.
Where possible the appointed contractor should seek to minimise overall vehicle movement generation through measures to encourage and promote sustainable travel and transport, for example by using a minibus to shuttle staff between key pick up locations and the compounds (main compound and secondary compounds).	To minimise overall emissions and to minimise other traffic and transport impacts.
Local management of vehicle movements to minimise the risks of vehicles meeting each other on narrow sections.	To minimise highway risk and possible delays.
The design of HGV accesses, including visibility standards and, where necessary, temporary speed restrictions on the adjacent highway will be agreed with the relevant Highway Authorities.	To maintain highway safety.

Measures adopted as part of Hornsea Three	Justification
At all vehicle accesses where accommodation works are undertaken to allow the movement of vehicles between the Hornsea Three onshore cable corridor and the highway the original highway will be reinstated after construction work is completed.	To ensure the ongoing safe and efficient functioning of the highway.
It is expected that a number of abnormal indivisible loads comprising large components such as transformers will be transported to the onshore HVDC converter/HVAC substation site. The haulage contractor appointed to undertake this work will be required to comply with statutory regulations in terms of consulting with HE, police and Local Highway Authorities. The notification requirements differ depending on the weight, length and width of the abnormal indivisible load.	To minimise disruption and driver delay.
The timing of abnormal indivisible load deliveries will be discussed with the relevant highway authorities to minimise delay for other road users and to minimise risk to highway users. The timing of abnormal indivisible load deliveries to the HVDC converter/HVAC substation will be discussed to ensure that there is no adverse impact on the access road in terms of delays to vehicles using the site.	To minimise disruption and driver delay.
The routeing of abnormal indivisible load deliveries will be agreed with the relevant highway authorities. The delivery of abnormal indivisible loads would typically be undertaken in convoy and under escort. Where abnormal indivisible loads require the full width of the carriageway or for unusual manoeuvres at junctions, appropriate temporary road closures and traffic management will be put in place as appropriate to maintain the safety of other road users.	To minimise disruption and driver delay.
An Outline CTMP (document reference A8.2) and an Outline CoCP (document reference A8.5), which establish the principles that any subsequent CTMPs and CoCPs will follow, are submitted with this application. The draft DCO submitted with the application requires that no phase of any works landward of MLWS may commence, until for that phase, a CoCP (which must accord with the outline CoCP) has been submitted to, and approved by, the relevant planning authority, in consultation with the relevant highway authority (and if applicable the MMO).	This is to minimise the impacts of construction vehicle movements associated with Hornsea Three and to manage those movements in a manner that road safety is maintained.
Depending on the times of construction of individual Hornsea Three onshore cable corridor sections, HGVs will avoid tourist routes where possible during peak holiday season (or avoid tourist routes where possible during peak hours of the day). Management measures will be captured in CTMPs which will be developed in consultation with Norfolk County Council as the Local Highway Authority and HE, prior to submission to the Local Planning Authorities for approval.	To seek to minimise any disruption during these periods.

7.10.1.2 Further details of the mitigation measures are set out in the Outline CoCP (document reference A8.5) that is included as part of the DCO application.

7.11 Assessment of significance

7.11.1 Construction phase

7.11.1.1 The potential impacts arising from the construction of Hornsea Three are listed in Table 7.9 along with the maximum design scenario against which each construction phase impact will be assessed. The impacts of the onshore construction of Hornsea Three have been assessed on traffic and transport.

7.11.1.2 The identification of the traffic and transport environmental effects impacts requires an assessment of the amount of traffic associated with construction activities and the significance of this additional traffic. Volume 6, annex 7.7: Traffic Flows with Construction Traffic contains base traffic flows with construction traffic flows.

7.11.1.3 The traffic flows are expressed as AADT. Total vehicle flows and HGV flows are shown.

7.11.2 Screening for further assessment of transport environmental impacts

7.11.2.1 Table 7.18 sets out the road links for which baseline traffic information is available and calculates the percentage change in daily two-way traffic flows during construction based upon the numbers of total vehicles and HGVs predicted as a result of Hornsea Three.

7.11.2.2 Table 7.18 is calculated by dividing the Hornsea Three construction traffic flows by the baseline traffic flows for the year 2022 (see section 7.7.10).

7.11.2.3 The baseline traffic flows are set out at volume 6, annex 7.3: Baseline Traffic Flows, the Hornsea Three construction traffic flows are set out in Table 7.12 and the baseline flows growthed for the year 2022 plus Hornsea Three traffic flows are set out at volume 6, annex 7.7 Traffic Flows with Construction Traffic.

Table 7.18: Impact of Hornsea Three Construction Traffic Flows.

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change)	
	Total Vehicles (%)	HGV (%)
Link ID 35: A148, west of The Street and east of Green Lane	3.7	45
Link ID 34: A148 west of Holt and east of Letheringsett	4.5	55
Link ID 36: A148, east of the B1149 roundabout and west of Station Road	3.1	48
Link ID 50: B1354 between the Swanton Road junction and B1110 junctions	0.0	0
Link ID 55: B1354 east of Melton Constable and west of Briston	0.0	0
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	11.3	216
Link ID 37: A148 at High Kelling, south of Kelling Hospital	2.7	43
Link ID 41: A148, east of Bodham and west of the Woodlands Leisure centre	5.2	62
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	5.7	77
Link ID 190: B1436, east of Felbrigg	8.5	101
Link ID 49: A140, south of Roughton and north of the Topshill Road junction	6.8	83
Link ID 1: A149 west of Weybourne and east of The Pheasant Hotel	0.0	0
Link ID 2: A149 east of Weybourne, west of the North Norfolk Railway Line	7.4	675
Link ID 81: A1067, north of Bridge Road and east of Little Ryburgh	3.0	39
Link ID 84: B1145 at Bawdeswell, between The Street junction and Hall Road junction	0.0	0
Link ID 86: B1145, west of Reepham and east of the Old Lane junction	0.0	0
Link ID 90: B1145 east of Cawston, west of the B1149 crossroads	17.9	298
Link ID 77: B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	1.7	0
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	4.9	66
Link ID 111: A1067, between Attlebridge and the Fir Covert Road junction	7.0	57
Link ID 145: A140 between the A47 and B1113 junctions	3.4	40
Link ID 146: B1113, south of the A47 near Norwich Sports ground	9.6	175
Link ID 129: A47 at Honingham	1.9	14
Link ID 157: A47 at Bawburgh	1.2	12
Link ID 147: A47 at Intwood	1.7	12
Link ID 153: A11 at Hethersett	0.8	6
Link ID 144: A47, between A140 and A146 junctions	1.5	12

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change)	
	Total Vehicles (%)	HGV (%)
Link ID 197: A1065, north of Swaffham	4.2	49
Link ID 195: A1065, east of Weasenham	6.3	77
Link ID 195: A1082, south of Sheringham	4.0	185
Link ID 200: A1270 northern Distributor Road between A1067 and B1149 junction	3.1	26
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	8.6	95
Link ID 201: A1270 northern Distributor Road between B1149 and A140 junctions	4.3	39
Link ID 204: A1270 northern Distributor Road between A140 and A47 junctions	4.8	43
Link ID 118: A140 between A1270 and B1145	5.2	102
Link ID 204: A1270 between A140 and A47 (Near junction with A47)	3.1	28
Link ID 137: A47 east of A1270 junction	1.5	9

7.11.2.4 In terms of total vehicle flows, only the: B1149 at Edgefield (11.3%) and B1145 east of Cawston and west of the B1149 crossroads (17.9%) exceed 10%, however, neither of these links are deemed as sensitive in accordance with the IEMA guidance. Therefore, as the change in total vehicle movements does not exceed 30%, this means that there is no requirement for further assessment of transport environmental impacts.

7.11.2.5 In terms of HGV movements, it can be seen that 23 road links experience increases in daily two-way flows over 30% and thus require further assessment of transport environmental impacts.

7.11.2.6 Of these 23 road links, five have receptors of low or medium sensitivity along them. In accordance with Table 7.13, which is based on the IEMA guidance, the remaining 18 road links have receptors of negligible sensitivity.

7.11.2.7 Table 7.15 sets out the possible effects that could occur at receptors of negligible sensitivity. For negligible magnitudes of impact, a negligible effect would be predicted; for a minor or moderate magnitude of impact a negligible or minor effect would be predicted; and for a major magnitude of impact, a minor effect would be predicted.

7.11.2.8 Therefore, even if a major (the highest category) magnitude of impact was predicted on these 18 road links, a minor effect would be predicted. Such an effect would be not significant. Therefore, the highest magnitude of impact on these 18 road links would result in effects that are not significant.

7.11.2.9 The assessment therefore focusses on the five road links where a significant impact could occur. These are summarised in Table 7.19.

Table 7.19: Key Links for Transport Environmental Assessment

Link	Sensitivity of Receptor	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change)	
		Total Vehicles (%)	HGV (%)
Link ID 35: A148, west of The Street and east of Green Lane	Medium. Frontages, pedestrian footfall, high street shops	3.7	45
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	Medium. Narrow footways near residential area, park	11.3	216
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	Medium. Narrow footways outside residences	5.7	77
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	Low. Frontages	4.9	66
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	Low. Residential area, wide footway	8.6	95

The temporary impact of the construction works may affect driver delay

7.11.2.10 Driver delay can result from the following:

- An increase in traffic flows, particularly during peak hours resulting in increased queues on links and at junctions;
- The passage of slow moving vehicles such as abnormal indivisible loads; and
- Reduction in link capacity resulting from changes in carriageway width or other highway characteristics.

Magnitude of Impact

7.11.2.11 Volume 6, annex 7.1: Transport Assessment (sections 1.65 to 1.68) considers highway capacity and concludes that the construction of Hornsea Three would not create any severe impacts upon the operation of junctions on these five road links. This means that there would be negligible changes arising in relation to driver delay as a result of the construction vehicle movements.

7.11.2.12 The magnitude of impact in terms of driver delay resulting from additional traffic flows associated with the construction of Hornsea Three is therefore considered to be negligible short-term duration, continuous and fully reversible once works end.

7.11.2.13 The transport of abnormal indivisible loads is not expected to occur along the five links being considered here. However, it is recognised that the port of entry is not confirmed and neither is the transport route.

7.11.2.14 The transport of abnormal indivisible loads from the chosen port of entry to the onshore HVDC converter/HVAC substation site would be timed to minimise delays to other road users and would be controlled by the police (using their escort powers) to manage the abnormal indivisible loads and other road users accordingly to minimise driver delay. The magnitude of impact in terms of driver delay resulting from the transport of abnormal indivisible loads associated with the construction of Hornsea Three is therefore considered to be negligible.

7.11.2.15 Since the transport of abnormal indivisible loads would involve slow moving vehicles there would be some limited delay to other road users, which would be of short term duration, intermittent.

7.11.2.16 Operations such as the establishment of accesses may require temporary shuttle working or traffic control and these are likely to require temporary traffic signals. This would introduce some driver delay. These five road links are lightly trafficked routes and so there is low conflict between oncoming vehicles that would have to give way to one-another via traffic control, therefore the magnitude of delay would be negligible.

7.11.2.17 It is predicted that the impact would affect receptors directly. Driver delay impacts would be fully reversible once construction works are completed.

7.11.2.18 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the Receptor

7.11.2.19 The road links being considered are lightly trafficked and on typical days do not suffer from congestion. There is therefore low vulnerability with regards to driver delay.

7.11.2.20 There are a range of similar parallel or alternative routes to the roads adjacent to the onshore cable corridor with good connectivity. Therefore, the sensitivity of links that are predicted to carry construction traffic, in terms of driver delay, is considered to be low and due to the availability of alternative routes, low value.

7.11.2.21 The sensitivity of links along which abnormal indivisible loads could travel is considered to be low to medium for these same reasons.

7.11.2.22 The sensitivity of road links affected by the introduction of temporary shuttle working or traffic control in terms of driver delay is likely to be low to medium for these same reasons.

7.11.2.23 It is predicted that these effects would affect receptors directly.

7.11.2.24 The road links are deemed to be of low vulnerability, fully recoverable and low value. The sensitivity of the receptor is therefore, considered to be low.

Significance of the Effect

7.11.2.25 Overall, it is predicted that the sensitivity of the receptor is considered to be low and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect severance of routes

7.11.2.26 Severance is only likely to occur on highly trafficked roads and result from the perceived division the road and traffic creates between communities on either side.

7.11.2.27 The IEMA guidance set out above identifies that increases in total traffic volumes of between 30 % and 60 % could result in a slight impact (the lowest category) upon severance.

Magnitude of Impact

7.11.2.28 The change in traffic flow as a result of the construction traffic on the five road links are all significantly lower than the 30 % that the IEMA guidance sets out is required for a slight effect (the lowest category) to occur.

7.11.2.29 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the Receptor

7.11.2.30 The five road links being considered consist of some built up areas forming small communities and therefore the vulnerability and value of the receptor with regards to severance is medium but fully recoverable.

7.11.2.31 The communities along the road links are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.11.2.32 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect pedestrian delay

7.11.2.33 Highly trafficked roads and changes to the volume or speed of traffic may affect the ability of people to cross roads. The IEMA guidance set out above notes that studies have shown that pedestrian delay is perceptible or considered significant beyond a delay threshold of 10 seconds, for a link with no crossing facilities. It goes on to say that a 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour. This means that where two-way traffic flows on a road exceed 1,400 vehicle movements per hour, then a pedestrian seeking to cross that would perceive a delay.

Magnitude of Impact

7.11.2.34 To consider the potential for pedestrian delay to occur on the five road links, the base peak hour traffic flow for each has been set out below and summarised in Table 7.20 along with the with construction traffic flows and the resultant change in predicted pedestrian delay.

Table 7.20: Summary of Change in Pedestrian Delay.

Link	Baseline		Baseline plus Hornsea Three		Change in Pedestrian Delay (s)
	Traffic Flow (max hourly)	Pedestrian Delay (s)	Traffic Flow (max hourly)	Pedestrian Delay (S)	
Link ID 35: A148, west of The Street and east of Green Lane	1,409	10.1	1,443	10.3	0.2
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	441	3.2	475	3.4	0.2
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	1,586	11.3	1,631	11.6	0.3
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	1,410	10.1	1,455	10.4	0.3
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	1,140	8.1	1,191	8.5	0.4

7.11.2.35 Link ID 35: A148, west of The Street and east of Green Lane: Maximum of 1,409 increasing to 1,443 two-way vehicle movements per hour. Maximum pedestrian delay of 10.1 seconds increasing to 10.3 seconds. Change in maximum pedestrian delay of 0.2 seconds.

7.11.2.36 Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road: Maximum of 441 increasing to 475 two-way vehicle movements per hour. Maximum pedestrian delay of 3.2 seconds increasing to 3.4 seconds. Change in maximum pedestrian delay of 0.2 seconds.

7.11.2.37 Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction: Maximum of 1,586 increasing to 1,631 two-way vehicle movements per hour. Maximum pedestrian delay of 11.3 seconds increasing to 11.6 seconds. Change in maximum pedestrian delay of 0.3 seconds.

7.11.2.38 Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham: Maximum of 1,410 increasing to 1,455 two-way vehicle movements per hour. Maximum pedestrian delay of 10.1 seconds increasing to 10.4 seconds. Change in maximum pedestrian delay of 0.3 seconds.

7.11.2.39 Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions: Estimated maximum of 1,140 increasing to 1,191 two-way vehicle movements per hour. Maximum pedestrian delay of 8.1 seconds increasing to 8.5 seconds. Change in maximum pedestrian delay of 0.4 seconds.

7.11.2.40 The above shows that pedestrian delay along two of the road links (Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road and Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions) is lower than that which would be perceived and would remain as such. Therefore, the magnitude of change on these two road links would be negligible.

7.11.2.41 For the other three road links (Link ID 35: A148, west of The Street and east of Green Lane, Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction and Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham), the maximum change in pedestrian delay would be 0.3 seconds which would be difficult to perceive. Therefore, the magnitude of change on these three road links would also be negligible.

7.11.2.42 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the Receptor

7.11.2.43 The five road links being considered consist of some built up areas forming small communities where there is pedestrian activity and demand for crossing the roads. Therefore, the vulnerability and value of the receptor with regards to pedestrian delay is medium but fully recoverable.

7.11.2.44 The communities are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.11.2.45 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect pedestrian amenity

7.11.2.46 The term pedestrian amenity is broadly defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and footway width and separation from traffic.

7.11.2.47 The IEMA guidance refers to a tentative threshold for judging the significance of changes in pedestrian amenity where the traffic flow (or its HGV component) is halved or doubled.

Magnitude of Impact

7.11.2.48 In terms of total vehicle movements, the above sets out a maximum increase on the five links of 11.3%. Therefore, in accordance with the IEMA guidance, this on its own should not result in any significant changes in pedestrian amenity.

7.11.2.49 To consider the magnitude of change for pedestrian amenity on the five road links in relation to HGVs, the daily base HGV flow for each has been set out below along with the with construction traffic flows and the resultant change.

7.11.2.50 Link ID 35: A148, west of The Street and east of Green Lane: 838; increase of 377 to 1,215 two-way HGV movements per day; increase of 45%.

7.11.2.51 Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road: 173; increase of 373 to 546 two-way HGV movements per day; increase of 216%.

7.11.2.52 Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction: 645; increase of 495 to 1,140 two-way HGV movements per day; increase of 77%.

7.11.2.53 Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham: 750; increase of 495 to 1,245 two-way HGV movements per day; increase of 45%.

7.11.2.54 Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions: 594; increase of 562 to 1,156 two-way HGV movements per day; increase of 95%.

7.11.2.55 The above shows that three road links (Link ID 35: A148, west of The Street and east of Green Lane, Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction and Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham) are well beneath the doubling of HGV component that the IEMA guidance refers to and it is considered that the magnitude of change on these would be negligible.

7.11.2.56 For the remaining two road links (Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road and Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions), the IEMA guidance has been referred to where it sets out that one component of pedestrian amenity is fear and intimidation. It refers to a study which sets out that moderate (the lowest category of fear and intimidation which does not directly relate to the terminology of the magnitude of impact in Table 7.14) fear and intimidation[3] could be experienced when there are between 1,000 and 2,000 HGVs over an 18 hour day.

7.11.2.57 For link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road, there would be 173 two-way HGV movements per day, increasing to 546 two-way HGV movements per day. This is well within this range and it is considered that the magnitude of change on this road link would be negligible.

7.11.2.58 For link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions, there would be 594 two-way HGV movements per day increasing to 1,156 two-way HGV movements per day. The change suggests that the peak construction would take fear and intimidation of HGVs into the lowest category of moderate. It is considered that the magnitude of change on this road link would be minor (i.e. the lowest category of the magnitude of impact in Table 7.14).

7.11.2.59 The impact is predicted to be of local spatial extent, short term duration, continuous and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible to minor.

Sensitivity of the Receptor

7.11.2.60 The five road links being considered consist of some built up areas forming small communities where there is pedestrian activity. Therefore, the vulnerability and value of the receptor with regards to pedestrian amenity is medium but fully recoverable.

7.11.2.61 The communities are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

[3] The IEMA guidelines set out that when fear and intimidation occurs it is categorised as moderate (the lowest category), great (the median category) and extreme (the highest category). These categories do not directly relate to the magnitude of impacts set out in Table 7.14, however, professional judgement can be applied ben considering the impact to fear and intimidation.

Significance of the Effect

7.11.2.62 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible to minor. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect accidents and road safety

Magnitude of Impact

7.11.2.63 The impact of construction work in terms of road safety affects receptors directly and would be short-term, continuous and fully reversible once construction work is complete.

7.11.2.64 The magnitude of increase in total vehicle movements on the five road links is negligible/low (see Table 7.19).

7.11.2.65 An analysis of injury accident rates has been undertaken above and all five of these road links had a rate lower than the national average injury accident rate. It was therefore concluded that there is no injury accident problem on these road links, that they currently operate in a safe manner and thus there is no road safety concerns with the layout of the road network.

7.11.2.66 The construction works would generate vehicle classifications that are already generated on these road links.

7.11.2.67 There would be a temporary increase in the proportion of HGVs on these road links. Such HGV movements would be under contract and would be under the construction traffic management conditions and measures. There is no reason to suggest that the HGVs would travel in a manner that is unsafe or that the injury accident rate would change.

7.11.2.68 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be negligible.

Sensitivity of the Receptor

7.11.2.69 An analysis of injury accident rates showed that these road links operate in a safe manner with an injury accident rate lower than the national average.

7.11.2.70 It is considered that the vulnerability and value of the receptor with regards to accidents and road safety is low but fully recoverable.

7.11.2.71 The road users are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.11.2.72 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect hazardous, dangerous and abnormal indivisible loads

7.11.2.73 It is expected that some abnormal indivisible loads would be transported to the onshore HVDC converter/HVAC substation and HVAC booster station areas. The abnormal indivisible loads are expected to be components that exceed standard load weight and possibly exceed standard width and height.

7.11.2.74 The Port of entry would be chosen based on it being capable of accepting abnormal indivisible loads, in which case, the roads leading to the port would receive abnormal indivisible loads regularly.

Magnitude of Impact

7.11.2.75 The passage of abnormal indivisible loads would be discussed with the relevant highway authorities and police authority prior to delivery and measures adopted to ensure that the movement is undertaken safely and with minimal delay for other highway users.

7.11.2.76 Depending on the width, length or weight of the vehicle, different notice periods have to be provided to HE, Bridge Authorities and the Police. These can vary between two and five days. The following activities would need to be undertaken in accordance with the Road Vehicles (Authorisation of Special Types) Order 2003 (STGO):

- Before the start of any journey, notify in accordance with Schedule 5 the chief office of Police for each area in which the vehicle or vehicle-combination is to be used;
- Ensure that the vehicle or vehicle-combination is used in accordance with the requirements of that Schedule; and
- Ensure that the vehicle or vehicle-combination is accompanied during the journey by one or more attendants employed in accordance with Schedule 6.

7.11.2.77 The impact in relation to the transport of abnormal indivisible loads would be short-term and intermittent and would affect receptors directly.

7.11.2.78 The magnitude of the impact of abnormal indivisible loads would be negligible since the number of abnormal indivisible load movements would be low, each load would be present on the network for a short period of time and standard measures applied in terms of route, timing and method of delivering to minimise delays to other highway users.

7.11.2.79 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be negligible.

Sensitivity of the Receptor

7.11.2.80 The access used by the abnormal invisible load would necessarily be of good standard to accommodate the transport delivery vehicles.

7.11.2.81 Any restrictions would also necessarily be removed to accommodate the transport delivery vehicles and they would travel under controlled environments.

7.11.2.82 The passage of abnormal indivisible loads would, however, lead to some limited driver delay as the loads would move slowly. The sensitivity of the public roads to the passage of abnormal indivisible loads is therefore considered to be low.

7.11.2.83 It is considered that the vulnerability and value of the receptor with regards to abnormal indivisible loads is low but fully recoverable.

7.11.2.84 Given the controlled environment, the road users are deemed to be of negligible vulnerability, fully recoverable and negligible value. The sensitivity of the receptor is therefore, considered to be negligible.

Significance of the Effect

7.11.2.85 Overall, it is predicted that the sensitivity of the receptor is considered to be negligible and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

Future monitoring

7.11.2.86 No traffic and transport monitoring, to test the predictions made within the construction phase, is considered necessary.

7.11.3 Operation and maintenance phase

7.11.3.1 For the reasons set out in section 7.8.2, an assessment of this phase has been scoped out.

7.11.4 Decommissioning phase

The temporary impact of the decommissioning works may affect driver delay, severance of routes, pedestrian amenity, accidents and road safety, and hazardous, dangerous and abnormal indivisible loads

7.11.4.1 Impacts during the decommissioning phase of the onshore HVAC booster station and onshore HVDC converter/HVAC substation would be of a very similar nature to those described under the construction phase (see paragraphs 7.11.2.11 to 7.11.2.85). Vehicle movements generated during the decommissioning phase will generally be lower than those during the construction phase. Therefore, the assessment of the decommissioning phase as follows has been undertaken on precautionary basis.

7.11.4.2 Overall, it is predicted that the sensitivities of the receptor are considered to be low and the magnitudes are deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms. For pedestrian amenity it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible to minor. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Future monitoring

7.11.4.3 No traffic and transport monitoring, to test the predictions made within the decommissioning phase, is considered necessary.

7.12 Cumulative Effect Assessment methodology

7.12.1 Screening of other projects and plans into the Cumulative Effect Assessment

7.12.1.1 The Cumulative Effect Assessment (CEA) takes into account the impact associated with Hornsea Three together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of the 'CEA long list' of projects (see volume 4, annex 5.2: Cumulative Effects Screening Matrix and volume 4, annex 5.3 Location of Cumulative Schemes). Each project on the CEA long list has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

7.12.1.2 In undertaking the CEA for Hornsea Three, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside Hornsea Three. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with Hornsea Three (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors. For this reason, all relevant projects and plans considered cumulatively alongside Hornsea Three have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the CEA to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each Tier in the decision-making process when considering the potential cumulative impact associated with Hornsea Three (e.g. it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2). An explanation of each tier is included below:

- Tier 1: Hornsea Three considered alongside:
  - Other project/plans[4] currently under construction and/or;
  - Those with consent, and, where applicable (i.e. for low carbon electricity generation projects), that have been awarded a Contract for Difference (CFD) but have not been implemented; and/or
  - Those currently operational that were not operational when baseline data was collected, and/or those that are operational but have an on-going impact.
- Tier 2: All projects/plans considered in Tier 1, as well as:
  - Those project/plans that have consent but, where relevant (i.e. for low carbon electricity generation projects) have no CFD; and/or
  - Submitted but not yet determined.
- Tier 3: All projects/plans considered in Tier 2, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the Planning Inspectorate (PINS) programme of projects and the adopted development plan including supplementary planning documents are the most relevant sources of information from the relevant planning authorities regarding planned major works being consulted upon, but not yet the subject of a consent application). Specifically, this Tier includes all projects where the developer has advised PINS in writing that they intend to submit an application in the future, those projects where a Scoping Report is available and/or those projects which have published a PEIR.

7.12.1.3 It is noted that offshore wind farms seek consent for a maximum design scenario and the as built offshore wind farm will be selected from the range of consented scenarios. In addition, the maximum design scenario quoted in the application (and the associated Environmental Statement) are often refined during the determination period of the application. For example, it is noted that the Applicant for Hornsea Project One considered a maximum of 332 turbines within the Environmental Statement, but has gained consent for 240 turbines. Similarly, Hornsea Project Two has gained consent for an overall maximum number of turbines of 300, as opposed to 360 considered in the Environmental Statement and the as built number of turbines is likely to be less than this. A similar pattern of reduction in the project envelope from that assessed in the Environmental Statement, to the consented envelope and the 'as built' project is also seen across other offshore wind farms of relevance to this CEA. This process of refinement can result in a reduction to associated project parameters, for example, the number of cable trenches or the height of onshore substations. The CEA presented in this traffic and transport chapter has been undertaken on the basis of information presented in the Environmental Statements for the other projects, plans and activities. Given that this broadly represents a maximum design scenario, the level of impact on traffic and transport would likely be reduced from those presented here

7.12.1.4 The specific projects scoped into this CEA and the Tiers into which they have been allocated, are outlined in Table 7.21. The projects included as operational in this assessment have been commissioned since the baseline studies for Hornsea Three were undertaken and as such were excluded from the baseline assessment

7.12.1.5 No Tier 1 projects have been identified and therefore, only Tier 2 and 3 assessments have been undertaken.

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[4] 'Other projects/plans' are major developments as defined in the Town and Country Planning (Development Management Procedure) Order 2010, or as a Nationally Significant Infrastructure project under the Planning Act 2008.

Table 7.21: List of other projects and plans considered within the CEA.

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation and maintenance phase
2	Construction/Operation and Maintenance/Decommissioning	2014/2611	0 m	The erection of 890 dwellings; the creation of a village heart to feature an extended primary school, a new village hall, a retail store and areas of public open space; the relocation and increased capacity of the allotments; and associated infrastructure including public open space and highway works. Approved 1 November 2016	2018 to 2028	Yes	Yes
	Construction/Operation and Maintenance/Decommissioning.	2011/1804/O	0 m	Residential led mixed use development of 1196 dwellings and associated uses including Primary School, Local Services (up to 1,850 sq.mtrs (GIA) of A1, A2, A3, A4, A5, D1 & B1 uses) comprising shops, small business units, community facilities/ doctors' surgeries, sports pitches, recreational space, equipped areas of play and informal recreational spaces. Extension to Thickthorn Park and Ride including new dedicated slip road from A11. Approved 22 July 2013	2017 to 2026	Yes	Yes
	Construction/Operation and Maintenance/Decommissioning.	2012/1880	1.16 km	Proposed offices, laboratories and academic space for principally research and development activities, buildings for health and health related uses and buildings for further ancillary uses. Associated car parking, access infrastructure, internal accesses and strategic landscaping. Approved 09 April 2013	2017 to 2026	Yes	Yes
	Construction/Operation and Maintenance/Decommissioning	2013/1494	1.21 km	Outline planning application with all matters reserved (save access) for the creation of up to 650 residential dwellings (use class C3), up to 2,500 sq.mtrs of use class A1, A2, A3, A4, A5 and D1 floorspace, together with highways works, landscaping, public realm, car parking and other associated works. Appeal allowed 7 January 2016	2019 to 2024	Yes	Yes
	Construction/Operation and Maintenance/Decommissioning	2013/1793	1.64 km	Outline planning permission for a development for up to 650 dwellings together with a small local centre, primary school with early years facility, two new vehicular accesses off Colney Lane, associated on-site highways, pedestrian and cycle routes, public recreational open space, allotments, landscape planting and community woodland. Approved 20 July 2016	2019 to 2027	Yes	Yes

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation and maintenance phase
	Construction/Operation and Maintenance/Decommissioning.	2012/1477	1.84 km	Outline application for new offices and laboratories for research and development activities along with ancillary and complimentary uses with access from Colney Lane and Hethersett Lane and all other matters reserved. Demolition and re-provision of existing buildings. Associated car parking, infrastructure, internal accesses, landscaping and cycle parking. Approved 13 June 2013	2017 to 2026	Yes	Yes
	Construction/Operation and Maintenance/Decommissioning	20140883	1.93 km	Proposed Dual Carriageway between A1067 Fakenham Road Nr Attlebridge & A47 Trunk Road, Postwick (NDR) Approved 29 June 2015	Completion in 2018	No	Yes
	Construction/Operation and Maintenance/Decommissioning	PO/16/0253	2.08 km	Erection of up to 215 dwellings, employment land (A3, A4, B1, B2, B8, C1, C2, D1 and D2 class uses), public open space and provision of roundabout and vehicular link road from Cromer Road (A148) to Heath Drive with associated landscaping and infrastructure (Outline application) Approved 15 August 2016 (PM/16/1204) of appearance, landscaping, layout and scale; for erection of 214 dwellings, public open space, highway and other infrastructure, in respect of outline planning application PO/16/0253. Approved 16 March 2017	2019 to 2025	Yes	Yes
3	Construction/Operation and Maintenance/Decommissioning	EN010079	0 m	Norfolk Vanguard Offshore Wind Farm Pre-application stage PEIR October 2017	2020 to 2024	Yes	Yes

7.12.2 Maximum design scenario

7.12.2.1 The maximum design scenarios identified in Table 7.22 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative impact presented and assessed in this section have been selected from the details provided in the Hornsea Three project description (volume 1, chapter 3: Project Description), as well as the information available on other projects and plans, in order to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), to that assessed here be taken forward in the final design scheme.

Table 7.22: Maximum design scenario considered for the assessment of potential cumulative impacts on traffic and transport.

Potential impact	Maximum design scenario	Justification
Construction phase		
Construction traffic generation	Inclusion of all cumulative schemes: • PO/16/0253; • 20140883; • 2012/1477; • 2013/1793; • 2013/1494; • 2012/1880; • 2011/1804/O • 2014/2611; and • EN010079.	Inclusion of all sites maximises the cumulative traffic generation and therefore maximises the CEA.

7.13 Cumulative Effect Assessment

7.13.1.1 The estimated traffic generation from the Tier 2 and Tier 3 developments have been taken from their respective transport document submissions. These have then been added to the Hornsea Three construction traffic flows and assessed against the baseline traffic flows set out in volume 6, annex 7.3: Baseline Traffic Flows. The resultant cumulative percentage impacts for Tier 2 and for Tier 3 (including Tier 2) developments are calculated in Table 7.23 and Table 7.25 respectively (the corresponding percentage impacts for Hornsea Three are set out in Table 7.18). The cumulative developments would not generate traffic on all of the links being assessed and so some of the percentage impacts in Table 7.23 and Table 7.25 are the same as Table 7.18.

7.13.1.2 There are no Tier 1 developments relevant to traffic and transport and so these are not considered any further.

Table 7.23: Cumulative Impact (Tier 2).

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change) Plus Tier 2 Developments	
	Total Vehicles (%)	HGV (%)
Link ID 35: A148, west of The Street and east of Green Lane	3.7	45
Link ID 34: A148 west of Holt and east of Letheringsett	4.5	55
Link ID 36: A148, east of the B1149 roundabout and west of Station Road	21.6	49
Link ID 50: B1354 between the Swanton Road junction and B1110 junctions	0.0	0
Link ID 55: B1354 east of Melton Constable and west of Briston	0.0	0
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	11.3	216
Link ID 37: A148 at High Kelling, south of Kelling Hospital	19.5	43
Link ID 41: A148, east of Bodham and west of the Woodlands Leisure centre	5.2	62
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	5.7	77
Link ID 190: B1436, east of Felbrigg	8.5	101
Link ID 49: A140, south of Roughton and north of the Topshill Road junction	6.8	83
Link ID 1: A149 west of Weybourne and east of The Pheasant Hotel	0.0	0
Link ID 2: A149 east of Weybourne, west of the North Norfolk Railway Line	7.4	675
Link ID 81: A1067, north of Bridge Road and east of Little Ryburgh	3.0	39
Link ID 84: B1145 at Bawdeswell, between The Street junction and Hall Road junction	0.0	0
Link ID 86: B1145, west of Reepham and east of the Old Lane junction	0.0	0
Link ID 90: B1145 east of Cawston, west of the B1149 crossroads	17.9	298

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change) Plus Tier 2 Developments	
	Total Vehicles (%)	HGV (%)
Link ID 77: B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	1.7	0
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	4.9	66
Link ID 111: A1067, between Attlebridge and the Fir Covert Road junction	7.0	57
Link ID 145: A140 between the A47 and B1113 junctions	3.4	40
Link ID 146: B1113, south of the A47 near Norwich Sports ground	9.6	175
Link ID 129: A47 at Honingham	7.7	14
Link ID 157: A47 at Bawburgh	12.4	12
Link ID 147: A47 at Intwood	7.1	12
Link ID 153: A11 at Hethersett	7.4	6
Link ID 144: A47, between A140 and A146 junctions	1.5	12
Link ID 197: A1065, North of Swaffham	4.2	49
Link ID 195: A1065, east of Weasenham	6.3	77
Link ID 195: A1082, South of Sheringham	4.0	185.1
Link ID 200: A1270 Northern Distributor Road between A1067 and B1149 junction	3.1	26
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	8.6	95
Link ID 201: A1270 Northern Distributor Road between B1149 and A140 junctions	4.3	39
Link ID 204: A1270 Northern Distributor Road between A140 and A47 junctions	4.8	43
Link ID 118: A140 between A1270 and B1145	5.2	102
Link ID 204: A1270 between A140 and A47 (Near junction with A47)	3.1	28
Link ID 137: A47 East of A1270 junction	1.5	9

Table 7.24: Cumulative Impact (Tier 3, including Tier 2).

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change) Plus Tier 3 (including Tier 2) Developments	
	Total Vehicles (%)	HGV (%)
Link ID 35: A148, west of The Street and east of Green Lane	8.8	121
Link ID 34: A148 west of Holt and east of Letheringsett	10.7	146
Link ID 36: A148, east of the B1149 roundabout and west of Station Road	25.7	103
Link ID 50: B1354 between the Swanton Road junction and B1110 junctions	0.0	0
Link ID 55: B1354 east of Melton Constable and west of Briston	0.0	0
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	14.4	277
Link ID 37: A148 at High Kelling, south of Kelling Hospital	22.9	104
Link ID 41: A148, east of Bodham and west of the Woodlands Leisure centre	8.8	121
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	9.0	142
Link ID 190: B1436, east of Felbrigg	11.7	156
Link ID 49: A140, south of Roughton and north of the Topshill Road junction	12.1	155
Link ID 1: A149 west of Weybourne and east of The Pheasant Hotel	0.0	0
Link ID 2: A149 east of Weybourne, west of the North Norfolk Railway Line	7.4	675
Link ID 81: A1067, north of Bridge Road and east of Little Ryburgh	5.0	63
Link ID 84: B1145 at Bawdeswell, between The Street junction and Hall Road junction	1.7	0
Link ID 86: B1145, west of Reepham and east of the Old Lane junction	1.9	0
Link ID 90: B1145 east of Cawston, west of the B1149 crossroads	25.3	416

Link	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change) Plus Tier 3 (including Tier 2) Developments	
	Total Vehicles (%)	HGV (%)
Link ID 77: B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital	2.9	0
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	7.5	90
Link ID 111: A1067, between Attlebridge and the Fir Covert Road junction	10.6	94
Link ID 145: A140 between the A47 and B1113 junctions	3.4	40
Link ID 146: B1113, south of the A47 near Norwich Sports ground	9.6	175
Link ID 129: A47 at Honingham	8.9	19
Link ID 157: A47 at Bawburgh	13.1	16
Link ID 147: A47 at Intwood	7.6	15
Link ID 153: A11 at Hethersett	7.4	6
Link ID 144: A47, between A140 and A146 junctions	2.0	17
Link ID 197: A1065, North of Swaffham	6.8	84
Link ID 195: A1065, east of Weasenham	7.7	94
Link ID 195: A1082, South of Sheringham	4.0	185
Link ID 200: A1270 Northern Distributor Road between A1067 and B1149 junction	4.4	43
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	10.0	112
Link ID 201: A1270 Northern Distributor Road between B1149 and A140 junctions	5.4	54
Link ID 204: A1270 Northern Distributor Road between A140 and A47 junctions	7.0	77
Link ID 118: A140 between A1270 and B1145	7.9	140
Link ID 204: A1270 between A140 and A47 (Near junction with A47)	4.5	50
Link ID 137: A47 East of A1270 junction	2.9	30

7.13.1.3 For Tier 2, these developments are all commercial, residential or residential led. Their respective transport submissions set out the traffic generation for each of them and estimated private car trips on a daily basis. There are no HGV generations.

7.13.1.4 As a result, a cumulative assessment with Hornsea Three results in the same HGV impacts, the same magnitude of impact, the same sensitivity of receptor and the same significance of effect as reported in 7.11.

7.13.1.5 In terms of total traffic flows, none of the impacts exceed the IEMA thresholds. Although some links exceed the IEMA 10 % threshold, these are not sensitive links and are therefore assessed against the IEMA 30% threshold, which is not exceeded. Therefore, a cumulative assessment with Hornsea Three results in the same total vehicle impacts as reported in section 7.11.

7.13.1.6 On the basis of the above, the cumulative assessment for Tier 2 sites, is the same as that assessed in 7.11. The Tier 2 cumulative assessment has therefore already been assessed, as reported in 7.11 and this is therefore not considered any further.

7.13.1.7 For Tier 3 (including Tier 12) developments, there are no exceedances of the IEMA thresholds in terms of total traffic flows. In accordance with the assessment of road links due to HGV increases as described in section 7.11, five road links are assessed. These are summarised in Table 7.25.

7.13.1.8 HE is developing proposals for improvement works on the A47 however they do not form part of the cumulative assessment. As set out in section 7.7.10, there are no construction traffic flows available for the potential A47 improvement works but any such traffic flows, in relation to the Hornsea Three traffic and transport study area, would be limited to the A47. Based on the increases in traffic flows in Table 7.25, it would require over 300 additional HGV movements to come close to the IEMA thresholds. The construction traffic flows generated by the A47 improvement works would be low and not anywhere near this level. For example, reference to the Norwich Northern Distributor Road application documents sets out that it, which is a new build road, would generate a maximum of up to only 75 HGV movements per day. On this basis, there are no additional road links that would require detailed assessment and the traffic flows on the five road links being assessed do not change. No further consideration of the traffic flows generated by the potential A47 improvement works is necessary.

Table 7.25: Key Links for Cumulative Transport Environmental Assessment (Tier 3).

Link	Sensitivity of Receptor	Percentage Change due to Hornsea Three Construction Traffic (maximum daily change) Plus Tier 3 (including Tier 1) Developments)	
		Total Vehicles	HGV
Link ID 35: A148, west of The Street and east of Green Lane	Medium. Frontages, pedestrian footfall, high street shops	8.8%	121%
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	Medium. Narrow footways near residential area, park	14.4%	277%
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	Medium. Narrow footways outside residences	9.0%	142%
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	Low. Frontages	7.5%	90%
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	Low. Residential area, wide footway	10%	112%

7.13.2 Construction phase

The temporary impact of the construction work may affect driver delay

7.13.2.1 Driver delay can result from the following:

- An increase in traffic flows, particularly during peak hours resulting in increased queues on links and at junctions;
- The passage of slow moving vehicles such as abnormal indivisible loads; and
- Reduction in link capacity resulting from changes in carriageway width or other highway characteristics.

Tier 3

Magnitude of Impact

7.13.2.2 Volume 6 annex 7.1: Transport Assessment (sections 1.65 to 1.68) considers highway capacity and concludes that the construction of Hornsea Three would not create any severe impacts upon the operation of junctions on these five road links. This means that there would be negligible changes arising in relation to driver delay as a result of the construction vehicle movements.

7.13.2.3 The additional traffic over and above that, generated by the Tier 3 developments, do not increase total traffic volumes by an amount that would change the magnitude of impact beyond negligible in terms of driver delay.

7.13.2.4 The magnitude of impact in terms of driver delay resulting from the cumulative developments is therefore considered to be negligible short and long-term duration, continuous and, in terms of driver delay in these locations, fully reversible once works end.

7.13.2.5 The transport of abnormal indivisible loads is not expected to occur along the five links being considered here. However, it is recognised that the ports of entry are not confirmed and neither are the transport routes.

7.13.2.6 The transport of abnormal indivisible loads from the chosen ports of entry to the onshore HVDC converter/HVAC substation and HVAC booster station sites would be timed to minimise delays to other road users and would be controlled by the police (using their escort powers) to manage the abnormal indivisible loads and other road users accordingly to minimise driver delay. The magnitude of impact in terms of driver delay resulting from the transport of abnormal indivisible loads is therefore considered to be negligible.

7.13.2.7 Operations such as the establishment of accesses may require temporary shuttle working or traffic control and these are likely to require temporary traffic signals. This would introduce some driver delay. These five road links are lightly trafficked routes and so there is low conflict between oncoming vehicles that would have to give way to one-another via traffic control, therefore the magnitude of delay would be negligible.

7.13.2.8 It is predicted that the impact would affect receptors directly. Driver delay impacts, in the context of Hornsea Three, would be fully reversible once construction works are completed.

7.13.2.9 The impact is predicted to be of local spatial extent, short term duration, intermittent and, in the context of Hornsea Three, fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the Receptor

7.13.2.10 The road links being considered are lightly trafficked and on typical days do not suffer from congestion. There is therefore low vulnerability with regards to driver delay.

7.13.2.11 There are a range of similar parallel or alternative routes to the roads adjacent to the road links with good connectivity. Therefore, the sensitivity of links being considered, in terms of driver delay, is considered to be low and due to the availability of alternative routes, low value.

7.13.2.12 The sensitivity of links along which abnormal indivisible loads could travel is considered to be low to medium for these same reasons.

7.13.2.13 The sensitivity of road links affected by the introduction of temporary shuttle working or traffic control in terms of driver delay is likely to be low to medium for these same reasons.

7.13.2.14 It is predicted that these effects would affect receptors directly.

7.13.2.15 The road links are deemed to be of low vulnerability, fully recoverable, in the context of Hornsea Three, and low value. The sensitivity of the receptor is therefore, considered to be low.

Significance of the Effect

7.13.2.16 Overall, it is predicted that the sensitivity of the receptor is considered to be low and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect severance of routes

7.13.2.17 Severance is only likely to occur on highly trafficked roads and result from the perceived division the road and traffic creates between either side.

7.13.2.18 The IEMA guidance set out above identifies that increases in total traffic volumes of between 30 % and 60 % could result in a slight impact (the lowest category) upon severance.

Tier 3

Magnitude of Impact

7.13.2.19 The change in traffic flow as a result of the Tier 3 developments on the five road links are all significantly lower than the 30 % that the IEMA guidance sets out is required for a slight impact (the lowest category) to occur.

7.13.2.20 The impact is predicted to be of local spatial extent, short term duration, intermittent and, in the context of Hornsea Three, fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the Receptor

7.13.2.21 The five road links being considered consist of some built up areas forming small communities and therefore the vulnerability and value of the receptor with regards to severance is medium but fully recoverable.

7.13.2.22 The communities along the road links are deemed to be of medium vulnerability, fully recoverable, in the context of Hornsea Three, and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.13.2.23 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect pedestrian delay

7.13.2.24 Highly trafficked roads and changes to the volume or speed of traffic may affect the ability of people to cross roads. The IEMA guidance set out above notes that studies have shown that pedestrian delay is perceptible or considered significant beyond a delay threshold of 10 seconds, for a link with no crossing facilities. It goes on to say that a 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour. This means that where two-way traffic flows on a road exceed 1,400 vehicle movements per hour, then a pedestrian seeking to cross that would perceive a delay.

Tier 3

Magnitude of Impact

7.13.2.25 To consider the potential for pedestrian delay to occur on the five road links, the base peak hour traffic flow for each has been set out below and summarised in Table 7.26 along with the with Tier 3 cumulative traffic flows and the resultant change in predicted pedestrian delay.

Table 7.26: Summary of Change in Pedestrian Delay (Cumulative Impact).

Link	Baseline		Baseline plus Hornsea Three		Change in Pedestrian Delay (s)
	Traffic Flow (max hourly)	Pedestrian Delay (s)	Traffic Flow (max hourly)	Pedestrian Delay (S)	
Link ID 35: A148, west of The Street and east of Green Lane	1,409	10.1	1,533	11.0	0.9
Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road	441	3.2	504	3.6	0.4
Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction	1,586	11.3	1,729	12.4	1.1
Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham	1,410	10.1	1,516	10.8	0.7

Link	Baseline		Baseline plus Hornsea Three		Change in Pedestrian Delay (s)
	Traffic Flow (max hourly)	Pedestrian Delay (s)	Traffic Flow (max hourly)	Pedestrian Delay (S)	
Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions	1,140	8.1	1,254	9.0	0.9

7.13.2.26 Link ID 35: A148, west of The Street and east of Green Lane: Maximum of 1,409 increasing to 1,533 two-way vehicle movements per hour. Maximum pedestrian delay of 10.1 seconds increasing to 11.0 seconds. Change in maximum pedestrian delay of 0.9 seconds.

7.13.2.27 Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road: Maximum of 441 increasing to 504 two-way vehicle movements per hour. Maximum pedestrian delay of 3.2 seconds increasing to 3.6 seconds. Change in maximum pedestrian delay of 0.4 seconds.

7.13.2.28 Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction: Maximum of 1,586 increasing to 1,729 two-way vehicle movements per hour. Maximum pedestrian delay of 11.3 seconds increasing to 12.4 seconds. Change in maximum pedestrian delay of 1.1 seconds.

7.13.2.29 Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham: Maximum of 1,410 increasing to 1,516 two-way vehicle movements per hour. Maximum pedestrian delay of 10.1 seconds increasing to 10.8 seconds. Change in maximum pedestrian delay of 0.7 seconds.

7.13.2.30 Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions: Estimated maximum of 1,140 increasing to 1,254 two-way vehicle movements per hour. Maximum pedestrian delay of 8.1 seconds increasing to 9.0 seconds. Change in maximum pedestrian delay of 0.9 seconds.

7.13.2.31 The above shows that pedestrian delay along two of the road links (Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road and Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions) is lower than that which would be perceived and would remain as such. Therefore, the magnitude of change on these two road links would be negligible.

7.13.2.32 For the other three road links (Link ID 35: A148, west of The Street and east of Green Lane, Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction and Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham), the maximum change in pedestrian delay would be 1.1 seconds, when delay would already be perceived. Therefore, the magnitude of change on these three road links would be minor.

7.13.2.33 The impact is predicted to be of local spatial extent, short term duration, intermittent and, in the context of Hornsea Three, fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of the Receptor

7.13.2.34 The five road links being considered consist of some built up areas forming small communities where there is pedestrian activity and demand for crossing the roads. Therefore the vulnerability and value of the receptor with regards to pedestrian delay is medium but fully recoverable.

7.13.2.35 The communities are deemed to be of medium vulnerability, fully recoverable, in the context of Hornsea Three, and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.13.2.36 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be minor. The effect will, therefore, be of **negligible** to **minor adverse** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect pedestrian amenity

7.13.2.37 The term pedestrian amenity is broadly defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and footway width and separation from traffic.

7.13.2.38 The IEMA guidance refers to a tentative threshold for judging the significance of changes in pedestrian amenity where the traffic flow (or its HGV component) is halved or doubled.

Tier 3

Magnitude of Impact

7.13.2.39 In terms of total vehicle movements, the above sets out a maximum increase on the five links of 14.4%. Therefore, in accordance with the IEMA guidance, this on its own should not result in any significant changes in pedestrian amenity.

7.13.2.40 To consider the magnitude of change for pedestrian amenity on the five road links in relation to HGVs, the daily base HGV flow for each has been set out below along with the with Tier 3 cumulative traffic flows and the resultant change.

7.13.2.41 Link ID 35: A148, west of The Street and east of Green Lane: 838; increase of 1,012 to 1,850 two-way HGV movements per day; increase of 121%.

7.13.2.42 Link ID 59: B1149 at Edgefield, north of the village hall and south of Hempstead Road: 173; increase of 479 to 652 two-way HGV movements per day; increase of 277%.

7.13.2.43 Link ID 43: A148, west of the B1436 junction and east of the Lion's Mouth junction: 645; increase of 919 to 1,564 two-way HGV movements per day; increase of 142%.

7.13.2.44 Link ID 118: A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham: 750; increase of 676 to 1,426 two-way HGV movements per day; increase of 90%.

7.13.2.45 Link ID 114: B1149 between A1270 Northern Distributor Road and Buxton Road junctions: 594; increase of 666 to 1,260 two-way HGV movements per day; increase of 112%.

7.13.2.46 The above shows that all five road links predict a doubling of their HGV component which the IEMA guidance refers to.

7.13.2.47 The IEMA guidance has therefore been referred to where it sets out that one component of pedestrian amenity is fear and intimidation. It refers to a study which sets out that moderate (the lowest category of fear and intimidation which does not directly relate to the terminology of the magnitude of impact in Table 7.14) fear and intimidation could be experienced when there are between 1,000 and 2,000 HGVs over an 18 hour day.

7.13.2.48 Four of the road links are beneath this range under base conditions and are predicted to be within this range with the Tier 3 cumulative developments.

7.13.2.49 In the context of Hornsea Three, the impact is predicted to be of local spatial extent, short term duration, continuous and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of the Receptor

7.13.2.50 The five road links being considered consist of some built up areas forming small communities where there is pedestrian activity. Therefore, the vulnerability and value of the receptor with regards to pedestrian amenity is medium but fully recoverable.

7.13.2.51 The communities are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.13.2.52 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be minor. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect accidents and road safety

Tier 3

Magnitude of Impact

7.13.2.53 The magnitude of increase in total vehicle movements on the five road links is negligible / low (see Table 7.25).

7.13.2.54 An analysis of injury accident rates has been undertaken above and all five of these road links had a rate lower than the national average injury accident rate. It was therefore concluded that there is no injury accident problem on these road links, that they currently operate in a safe manner and thus there is no road safety concerns with the layout of the road network.

7.13.2.55 The Tier 3 cumulative developments would generate vehicle classifications that are already generated on these road links.

7.13.2.56 There would be a temporary increase in the proportion of HGVs on these road links. Such HGV movements would be under contract and would be under construction traffic management conditions and measures. There is no reason to suggest that the HGVs would travel in a manner that is unsafe or that the injury accident rate would change.

7.13.2.57 In the context of Hornsea Three, the impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be negligible.

Sensitivity of the Receptor

7.13.2.58 An analysis of injury accident rates showed that these road links operate in a safe manner with an injury accident rate lower than the national average.

7.13.2.59 It is considered that the vulnerability and value of the receptor with regards to accidents and road safety is low but, in the context of Hornsea Three, fully recoverable.

7.13.2.60 The road users are deemed to be of medium vulnerability, fully recoverable and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the Effect

7.13.2.61 Overall, it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

The temporary impact of the construction work may affect hazardous, dangerous and abnormal indivisible loads

7.13.2.62 It is expected that some abnormal indivisible loads would be transported to the two onshore HVDC converter/HVAC substation and HVAC booster station sites. The abnormal indivisible loads are expected to be components that exceed standard load weight and possibly exceed standard width and height.

7.13.2.63 The Ports of entry would be chosen based on them being capable of accepting abnormal indivisible loads, in which case, the roads leading to the ports would receive abnormal indivisible loads regularly.

Tier 3

Magnitude of Impact

7.13.2.64 The passage of abnormal indivisible loads would be discussed with the relevant highway authorities and police authority prior to delivery and measures adopted to ensure that the movement is undertaken safely and with minimal delay for other highway users.

7.13.2.65 Depending on the width, length or weight of the vehicle, different notice periods have to be provided to HE, Bridge Authorities and the Police. These can vary between two and five days. The following activities would need to be undertaken in accordance with the Road Vehicles (Authorisation of Special Types) Order 2003 (STGO):

- Before the start of any journey, notify in accordance with Schedule 5 the chief office of Police for each area in which the vehicle or vehicle-combination is to be used;
- Ensure that the vehicle or vehicle-combination is used in accordance with the requirements of that Schedule; and
- Ensure that the vehicle or vehicle-combination is accompanied during the journey by one or more attendants employed in accordance with Schedule 6.

7.13.2.66 The impact in relation to the transport of abnormal indivisible loads would be short-term and intermittent and would affect receptors directly.

7.13.2.67 The magnitude of the impact of abnormal indivisible loads would be negligible since the number of abnormal indivisible load movements would be low, each load would be present on the network for a short period of time and standard measures applied in terms of route, timing and method of delivering to minimise delays to other highway users.

7.13.2.68 The impact is predicted to be of local spatial extent, short term duration, intermittent and fully reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be negligible.

Sensitivity of the Receptor

7.13.2.69 The accesses used by the abnormal invisible load would necessarily be of good standard to accommodate the transport delivery vehicles.

7.13.2.70 Any restrictions would also necessarily be removed to accommodate the transport delivery vehicles and they would travel under controlled environments.

7.13.2.71 The passage of abnormal indivisible loads would, however, lead to some limited driver delay as the loads would move slowly. The sensitivity of the public roads to the passage of abnormal loads is therefore considered to be low.

7.13.2.72 It is considered that the vulnerability and value of the receptor with regards to abnormal indivisible loads is low but fully recoverable.

7.13.2.73 Given the controlled environment, the road users are deemed to be of negligible vulnerability, fully recoverable and negligible value. The sensitivity of the receptor is therefore, considered to be negligible.

Significance of the Effect

7.13.2.74 Overall, it is predicted that the sensitivity of the receptor is considered to be negligible and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

Future monitoring

7.13.2.75 No traffic and transport monitoring to test the predictions made within the construction phase cumulative impact assessment is considered necessary.

7.13.3 Operation and maintenance phase

7.13.3.1 For the reasons set out in section 7.8.2 an assessment of this phase has been scoped out.

7.13.4 Decommissioning phase

The temporary impact of the decommissioning works may affect driver delay, severance of routes, pedestrian amenity, accidents and road safety, and hazardous, dangerous and abnormal indivisible loads

Tier 3

7.13.4.1 Vehicle movements generated during the decommissioning phase will be lower than those during the construction phase. Therefore, the assessment of the decommissioning phase is as follows has been undertaken on precautionary basis. Overall, it is predicted that the sensitivities of the receptor are considered to be low and the magnitudes are deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms. For pedestrian amenity it is predicted that the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible to minor. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Future monitoring

7.13.4.2 No traffic and transport monitoring to test the predictions made within the decommissioning phase cumulative impact assessment is considered necessary.

7.14 Transboundary effects

7.14.1.1 A screening of transboundary impacts has been carried out and is presented in volume 4, annex 5.4: Transboundary Impacts Screening Note. This screening exercise identified that there was no potential for significant transboundary effects with regard to traffic and transport from Hornsea Three upon the interests of other EEA States.

7.15 Inter-related effects

7.15.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of Hornsea Three on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the project (construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. construction noise, operational noise and noise during decommissioning and dismantling of the onshore HVDC converter/HVAC substation).
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on a given receptor such as local residents – construction dust and noise, increased traffic and visual change etc. may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation.

7.15.1.2 A description and assessment of the likely inter-related effects arising from Hornsea Three is provided in volume 3, chapter 11: Inter-related Effects (Onshore).

7.16 Conclusion and summary

7.16.1.1 The construction of the Hornsea Three onshore cable corridor will generate the greatest number of vehicle movements, with operational traffic flows negligible in comparison. Decommissioning will generate fewer HGV movements than construction. This Environmental Statement chapter has set out the estimated construction HGV movements along the adjacent highway network.

7.16.1.2 Baseline traffic flows were identified using manual and automatic traffic counts and have been established within a study area that extends from the A148 at Fakenham to the A149 at Cromer, following the A1067 and A140 to the south to the Norwich ring road. Observations indicate that there are no existing highway capacity problems in this area under annual average conditions. Access to the onshore elements of Hornsea Three has been assumed to be via the A148 west, A1065, A11, A140, A146 and A47 west. and A140/B1145 four-arm roundabout at Aylsham. In addition, sustainable mode of travel which could be impacted by Hornsea Three have also been identified. Finally, PIA data obtained from Norfolk County Council has been used to consider the road safety record of the Traffic and Transport study area.

7.16.1.3 Environmental impact assessments determined that the effects of driver delay, severance, pedestrian delay, accidents and road safety and hazardous, dangerous and abnormal indivisible loads would be **negligible** and the effects of pedestrian amenity would be **minor adverse**. Therefore, the assessment has identified that there would be no significant effects as a result of the construction vehicle movements.

7.16.1.4 During operation and maintenance phase, the effect of the impact of Hornsea Three on traffic and transport has been scoped out as not only vehicle movements generated will be maintenance visits for the HVDC converter/HVAC substation and HVAC booster station, which will not result in any significant effects on traffic and transport.

7.16.1.5 During the decommissioning phase, it is considered that the impacts of Hornsea Three on traffic and transport will not result in any effects with a greater significance than those of the construction phase.

7.16.1.6 A summary of the findings of the EIA related to traffic and transport are presented in Table 7.27.

7.16.1.7 Screening of potential transboundary impacts (as presented in volume 4, annex 5.4: Transboundary Impacts Screening Note) has identified that there was no potential for significant transboundary effects with regard to traffic and transport.

Table 7.27: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Construction Phase							
Driver Delay	See Table 7.17	Negligible	Low	**Negligible** (not significant in EIA terms)	None	N/A	None
Severance	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Pedestrian Delay	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Pedestrian Amenity	See Table 7.17	Negligible to Minor	Medium	**Minor Adverse** (not significant in EIA terms)	None	N/A	None
Accidents and Road Safety	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Abnormal Indivisible Loads	See Table 7.17	Negligible	Negligible	**Negligible** (not significant in EIA terms)	None	N/A	None
Operation and Maintenance Phase							
N/A							
Decommissioning Phase							
Driver Delay	See Table 7.17	Negligible	Low	**Negligible** (not significant in EIA terms)	None	N/A	None
Severance	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Pedestrian Delay	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Pedestrian Amenity	See Table 7.17	Negligible to Minor	Medium	**Minor Adverse** (not significant in EIA terms)	None	N/A	None
Accidents and Road Safety	See Table 7.17	Negligible	Medium	**Negligible** (not significant in EIA terms)	None	N/A	None
Abnormal Indivisible Loads	See Table 7.17	Negligible	Negligible	**Negligible** (not significant in EIA terms)	None	N/A	None

7.17 References

Broadland District Council (2015). Development Management DPD.

Department for Communities and Local Government (2012) National planning policy framework. London, Department for Communities and Local Government.

Department for Communities and Local Government (DCLG) (2014) *Planning Practice Guidance - Travel Plans, Transport Assessments and Statements in Decision-Taking*,

Department for Transport (DfT) and Highways Agency (HA) (September, 2013). *The Strategic Road Network and the Delivery of Sustainable Development*, Circular 02/2013

Department for Transport (DfT) (2007). *Guidance on Transport Assessment*.

Department for Transport (DfT) (2017). *Transport Analysis Guidance - WebTAG* [online]. Available at: https://www.gov.uk/transport-analysis-guidance-webtag [Accessed May 2017].

Department of Energy and Climate Change (DECC) (2011a). *Overarching National Policy Statement for Energy (EN-1)*. London, The Stationery Office.

Department of Energy and Climate Change (DECC) (2011b). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. London, The Stationery Office.

Greater Norwich Growth Board (2014) Joint Core Strategy for Broadland, Norwich and South Norfolk. [Online]. Available at: http://www.greaternorwichgrowth.org.uk/planning/joint-core-strategy/ (Accessed 13/03/2017).

Highways Agency, Scottish Office Development Department, Welsh Office and the Department of the Environment for Northern Ireland (HA et al) (1999). *Traffic Capacity of Urban Roads. Design Manual for Roads and Bridges*. Volume 5, Section 1, Part 3. TA 79/99.

Highways Agency, Scottish Government, Welsh Assembly Government and the Department for Regional Development Northern Ireland (HA et al) (2008). *Assessment and Management of Environmental Effects*, *Design Manual for Roads and Bridges.* Volume 11.

Highways Agency, The Scottish Office Development Department, Welsh Office and the Department of the Environment for Northern Ireland (HA et al) (1997). *Traffic Flow Ranges for the Assessment of New Rural Roads: Design Manual for Roads and Bridge.* Volume 5, Section 1, Part 3. TA 46/97.

Infrastructure Planning Commission (2010). *Proposed Hornsea Project One Offshore Windfarm Scoping Opinion.*

Institute of Environmental Assessment (1993) Guidelines for the Assessment of Road Traffic. Institute of Environmental Assessment.

Institute of Environmental Management and Assessment (IEMA) (2004). *Guidelines for Environmental Impact Assessment.*

Institution of Highways and Transportation (IHT), 1999. *Guidelines for Planning for Public Transport in Developments.*

Institution of Highways and Transportation (IHT), 2000. *Guidelines for Providing for Journeys on Foot.*

North Norfolk District – *The Adopted Core Strategy and Development Management Policies Development Plan Documents (DPDs)*

PINS (2012) Advice note six: Preparation and submission of application documents. Bristol, PINS.

Planning Inspectorate (PINS) (2012). *Advice Note Nine*. Rochdale Envelope. Version 2.

Road Vehicles (Authorisation of Special Types) (General) Order 2003. 2003 SI 2003/1998. London, The Stationary Office.

Road Vehicles (Construction and Use) Regulations 1986. 1985 SI 1986/1078. London, HMSO.

Savoy Computing Services Ltd (2012) TRACK computer programme. Tunbridge Wells, Savoy Computing Services

South Norfolk District Joint Core Strategy for Broadland, Norwich and South Norfolk Local Plan