REPORT

Boston Alternative Energy Facility - Preliminary Environmental Information Report

Chapter 19 Traffic and Transport

Client: Alternative Use Boston Projects Ltd

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Boston Alternative Energy Facility

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Project Related

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Non-Technical Summary

The Boston Alternative Energy Facility (the 'Facility') is proposed to be located at Riverside Industrial Estate, Boston, Lincolnshire. The Riverside Industrial Estate is adjacent to the tidal River Witham (known as 'The Haven') and down-river from the Port of Boston.

The construction, operation and decommissioning of the proposed Facility has the potential to result in Traffic and Transport impacts for the effects of pedestrian severance, pedestrian amenity, road safety and driver delay.

To inform the Preliminary Environmental Information Report (PEIR) of the significance of potential impacts, an Assessment has been undertaken in conformance with recognised environmental guidelines and in accordance with relevant national, regional and local policy.

The Assessment provides a review of the existing traffic and transport baseline within the Study Area and has been informed through, desktop studies, site visits, consultation with stakeholders and on-site surveys.

The Facility's traffic demand has been calculated using material and personnel information supplied by industry expertise. During construction, a peak worst-case traffic demand scenario and average worst case scenario has been established and assigned to the highway network.

Where appropriate, mitigation has been proposed to reduce the significance of moderate and major impacts (most notably it is proposed to divert traffic away from the A52 Liquorpond Street during peak construction). Mitigation measures will be secured through commitments contained in a Construction Traffic Management Plan to be submitted in support of the DCO application.

The assessment concludes a predicted residual impact of negligible to minor adverse for the effects of pedestrian severance, pedestrian amenity during construction.

With regard to Road Safety and Driver Delay impact, details are presented on the construction traffic demand impacting on collision sites and congested junctions respectively, to contextualise potential impacts and facilitate and further engagement with key stakeholders

Similar to the construction phase assessment, the operational traffic demand has also been determined and assessed with input from industry expertise. The assessment concludes a predicted residual impact of negligible to minor adverse for the effects of pedestrian severance, pedestrian amenity, road safety and driver delay.

Impacts during decommissioning are assumed to be no worse to those predicted for the construction phase.

The projects that could cumulatively impact with the Facility have been identified and the potential traffic and transport interactions discussed. A detailed Cumulative Impact Assessment will be contained in the Environmental Statement that accompanies the DCO application.

19 Traffic and Transport

19.1 Introduction

19.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) describes the existing environment in relation to Traffic and Transport and details the assessment of the potential impacts during the construction, operational and decommissioning phases of the proposed Boston Alternative Energy Facility (the Facility). Mitigation measures are detailed, and a discussion of the residual impacts provided where significant impacts were identified.

19.1.2 The assessment also considers cumulative impacts of existing and proposed projects. The proposed methodology adhered to for the PEIR and Cumulative Impact Assessment (CIA) is discussed in **Section 19.8**: Cumulative Impact Assessment.

19.1.3 It should be noted that the Facility also has the potential to impact other receptors with a link to traffic and transport, which are discussed in other chapters within this PEIR. Therefore, this chapter refers to other chapters where appropriate. The relevant chapters are:

- **Chapter 10 Noise and Vibration**; and
- **Chapter 14 Air Quality**

19.1.4 This chapter is supported by three appendices:

- **Appendix 19.1: Personal Injury Collision Location Plan;**
- **Appendix 19.2: Transport Assignment on Indicative Construction Programme; and**
- **Appendix 19.3: 2021 and 2025 Background Forecast Traffic Flows.**

19.1.5 This Traffic and Transport chapter has been prepared in accordance with the requirements set out in the National Policy Statement (NPS) for Energy (EN-1) and (EN-3).

19.2 Legislation, Policy and Guidance

Traffic and Transport Legislation

19.2.1 The Traffic and Transport assessment will be predominantly governed by the statutory framework provided by the Highways Act 1980 which directs the management and operation of the road network in England and Wales.

Policy

19.2.2 This section sets out the salient traffic and transport legislation, policy and guidance that has informed the development of the PEIR.

National Policy Statements (NPS)

19.2.3 The assessment of potential traffic and transport impacts has been made with specific reference to the NPSs. NPSs set out policies or circumstances that the UK Government consider should be taken into account when making decisions on Nationally Significant Infrastructure Projects (NSIP). All six NPSs received designation by the Secretary of State (SoS) for energy and climate change on 19 July 2011. Those relevant to the project are:

- Overarching NPS for Energy (EN-1) (DECC, 2011a); and
- NPS for Renewable Energy Infrastructure (EN-3) (DECC, 2011b);

19.2.4 For the specific assessment requirements for traffic and transport, EN-1 and EN-3 is applicable. This is summarised in **Table 19.1**.

Table 19.1 NPS Assessment Requirements

NPS Requirement	NPS reference	PEIR Response
EN-1 Overarching NPS for Energy		
If a project is likely to have significant transport implications, the applicant's ES should include a Transport Assessment, using the New Approach To Appraisal (NATA) / Transport Analysis Guidance (WebTAG) methodology stipulated in Department for Transport (DfT) guidance, or any successor to such methodology.	Section 5.13.3	The chapter has been produced in accordance with DfT transport guidance.
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 car parking associated with the proposal and to mitigate transport impacts.	Section 5.13.4	The PEIR chapter outlines potential mitigation measures, such as car-share and Heavy Goods Vehicle (HGV) controls. These parameters will be secured in an outline Travel Plan (OTP) and an Outline Construction Traffic Management Plan (OCTMP) which are to be submitted as part of the DCO application.
EN-3 for Renewable Energy Infrastructure		
Biomass or EfW generating stations are likely to generate considerable transport movements. For example, a biomass or EfW plant that uses 500,000 tonnes of fuel per annum might require a large	Section 2.5.24	The Facility is located next to the River Haven with proposals to construct a wharf to take deliveries of Refuse Derived Fuel (RDF) by barge.

NPS Requirement	NPS reference	PEIR Response
number of heavy goods vehicle (HGV) movements per day to import the fuel. There will also be residues which will need to be regularly transported off site.		This is considered 'embedded mitigation' and as a result would remove the majority of HGV movements off the highway network to be transported by water during the operational phase.
Government policy encourages multi-modal transport and the IPC should expect materials (fuel and residues) to be transported by water or rail routes where possible. (See Section 5.13 of EN-1 on transport impacts). Applicants should locate new biomass or waste combustion generating stations in the vicinity of existing transport routes wherever possible. Although there may in some instances be environmental advantages to rail or water transport, whether such methods are viable is likely to be determined by the economics of the scheme. Road transport may be required to connect the site to the rail network, waterway or port. Therefore, any application should incorporate suitable access leading off from the main highway network. If the existing access is inadequate and the applicant has proposed new infrastructure, the IPC will need to be satisfied that the impacts of the new infrastructure are acceptable as set out in Section 5.13 of EN-1.	Section 2.5.25	

National Planning Policy Framework

19.2.5 The National Planning Policy Framework (NPPF) was published in July 2018 (subsequently updated in February 2019) by the 'Ministry of Housing, Communities and Local Government' and is the primary source of national planning guidance in England. The NPPF contains the Government's strategies for economic, social and environmental planning policies in England and it is designed to be a single, tightly focused document.

19.2.6 At the heart of the NPPF (Paragraph 11) is a "presumption in favour of sustainable development", which for decision making means:

> "*c) Approving development proposals that accord with an up-to-date development plan without delay; or*
> *d) Where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*

the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or

any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."

19.2.7 Under the heading 'Promoting Sustainable Transport' paragraphs 102 and 103 of the NPPF requires the planning system to actively manage patterns of growth to address the potential impacts of development on transport networks.

19.2.8 Paragraph 109 of the NPPF states that "development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

19.2.9 Paragraph 111 of the NPPF states that "all developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed."

19.2.10 The NPPF has 'set the approach' for the development of the PEIR.

Local Planning Policy

19.2.11 EN-1 states that the Planning Inspectorate will also consider Development Plan Documents or other documents in the Local Development Framework relevant to its decision making. Notwithstanding, where there is a conflict between local policy and the NPS, the NPS requirements would take precedence.

19.2.12 The Facility Traffic and Transport Study Area falls under the jurisdiction of Lincolnshire County Council (LCC) as the local highway authority and Boston Borough Council (BBC) as the local planning authority (LPA).

19.2.13 **Table 19.2** provides details of the local planning policy documents and the policies contained within these which are pertinent to traffic and transport.

Table 19.2 Pertinent Local Planning Policies

Policy	Section/Policy Reference
Joint Strategic Planning committee (Boston Borough, South Holland District and Lincolnshire County Councils)	
South-East Lincolnshire Local Plan 2011 - 2036	Policy 2: Development Management Proposals requiring planning permission for development will be permitted provided that sustainable development considerations are met, specifically in relation to:

Policy	Section/Policy Reference
Adopted March 2019	• access and vehicle generation levels. Policy 33: Delivering a More Sustainable Transport Network • To achieve this the following priorities and actions have been identified including; o Working with the Local Highway authority to mitigate against congestion at pinch points and continuing to manage roads under its control. o Securing the delivery of new local access roads to open up allocations and other locations for development. o Protecting existing footpaths, cycle routes and public rights of way from development. o Ensuring that major new developments provide for walking and cycling routes and/or links to existing networks to key public transport corridors and to transport interchanges. To demonstrate compliance with this policy, a Transport Assessment and associated Travel Plan should be submitted with proposals.
Lincolnshire County Council	
4th Lincolnshire Local Transport Plan (2013/14- 2022/23) Adopted in April 2013	The Local Transport Plan overarching aims are to: • Assist the sustainable economic growth of Lincolnshire, and the wider region, through improvements to the transport network; • Improve access to employment and key services by widening travel choices, especially for those without access to a car; • Make travel for all modes safer and, in particular, reduce the number and severity of road casualties; • Maintain the transport system to standards which allow safe and efficient movement of people and goods; • Protect and enhance the built and natural environment of the county by reducing the adverse impacts of traffic, including HGVs; • Improve the quality of public spaces for residents, workers and visitors by creating a safe, attractive and accessible environment; • Improve the quality of life and health of residents and visitors by encouraging active travel and tackling air quality and noise problems; and • Minimise carbon emissions from transport across the county.
Lincolnshire Network Management Plan April 2018	The County Council's key aims to facilitate the objectives of the Network Management Plan are: • Safeguarding the quality and effectiveness of highways as the major transport network; • Developing a consistent and appropriate implementation of regulations. Fairly balancing the legitimate needs of road users and works promoters of all types; • Identifying and promoting good practice to all aspects of traffic and works co-ordination; • Maintaining an attitude of co-operation and pursuit of efficiency of operation of works, whilst remaining mindful of regulatory responsibilities; • Managing the road network and maintaining quality with reduced budgets through use of innovative partnerships; • Contribute to minimising carbon emissions from transport across the

Policy	Section/Policy Reference
	county; and • Investing in Infrastructure and Provision of Services.
Boston Borough Council	
Boston Transport Strategy 2016 – 2036 Published 2006	The vision for the Boston Transport Strategy is: "The Transport Strategy will support a prosperous town with an attractive and safe environment and a high quality of life for all helping to make Boston a great place to live, work and visit." The aims of the Boston Transport Strategy considered pertinent to the project are to: • Reduce car usage for journeys wholly within Boston; • Reduce delays for traffic on the A52/A16 corridor with safe facilities for vulnerable users; • Improve public transport provision; • Improve road safety for pedestrians and cyclists, especially near schools; • Improve air quality in the designated AQMA; and • Improve cycling and pedestrian management in the town centre.

Guidance

Guidelines for the Environmental Assessment of Road Traffic

19.2.14 The Guidelines for the Environmental Assessment of Road Traffic (GEART) was published in January 1993 by the Institute of Environmental Assessment. These guidelines assess the environmental impacts of road traffic associated with new developments, irrespective of whether the developments are to be subject to formal Environmental Impact Assessments (EIA).

19.2.15 The purpose of the guidelines is to provide the basis for systematic, consistent and comprehensive coverage for the appraisal of traffic impacts arising from development projects. Impacts that may arise include: pedestrian severance and pedestrian amenity, driver delay, accidents and safety and noise, vibration and air quality.

19.2.16 GEART has informed this assessment and **Section 19.4** of this report contains full details of how the guidance has been applied.

DfT Transport Assessment Guidance and Successors

19.2.17 The DfT Transport Assessment guidance referred to in NPS EN-1, was withdrawn in October 2014 and was replaced with DCLG Planning Practice Guidance (PPG). For assessing the project's impact the relevant PPG is 'Travel Plans, Transport Assessment and Statements' (henceforth referred to as the Transport PPG).

19.2.18 The Transport PPG sets out the key principles to be adopted when developing a Transport Assessment to ensure that the assessment is:

- Proportionate to the size and scope of the proposed development to which they relate and build on existing information wherever possible;
- Established at the earliest practicable possible stage of a development proposal;
- Tailored to particular local circumstances (other locally-determined factors and information beyond those which are set out in this guidance may need to be considered in these studies provided there is robust evidence for doing so locally); and
- Developed through collaborative ongoing working between the local planning authority/transport authority, transport operators, rail network operators, Highways Agency (now Highways England) where there may be implications for the strategic road network and other relevant bodies.

19.2.19 The Transport PPG key principles have shaped the development of the PEIR and can be seen throughout the document.

19.3 Consultation

19.3.1 Consultation undertaken throughout the pre-application phase informed the approach and the information provided in this chapter. A summary of the consultation of particular relevance to Traffic and Transport is detailed in **Table 19.3**.

Table 19.3 Consultation and Responses

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Planning Inspectorate Scoping Opinion, July 2018	The Scoping Report states that an alternative access point will be provided from Marsh Road via Bittern Way. The ES should confirm whether this route would be used and assess the impacts associated. Cross references should be made to the air quality assessment chapter.	An application for the Boston Household Waste Recycling Centre (HWRC) provided the access point and the corresponding connecting private road linking Marsh Lane via Bittern Way.
Planning Inspectorate	The Scoping Report states that the Macmillan Way will require a permanent diversion. The ES should assess	PRoW impacts are discussed in

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Scoping Opinion, July 2018	any likely significant effects associated with this proposal. Cross reference should be made to the socio-economic assessment with respect to tourism.	**Section 19.7** including any potential mitigation strategies.
Planning Inspectorate Scoping Opinion, July 2018	Very little information has been provided regarding whether traffic modelling will be undertaken and what data would be used to undertake such modelling. The ES should describe the numbers and types of traffic movements associated with the construction and operation of the Proposed Development. The ES should also include details of the routes for construction vehicles and assess the associated significant effects.	**Section 19.5** provides details of the traffic and transport Study Area including data sources used to inform the baseline environment. **Section 19.6** provides a detailed audit of the existing environment. Traffic derivation is discussed in **Section 19.7** including mitigation strategies.
Planning Inspectorate Scoping Opinion, July 2018	The Scoping Report states that the Proposed Development may impact on equestrians but does not provide further detail. The ES should ensure that any user groups likely to experience significant effects as a result of the Proposed Development are assessed.	**Section 19.7** details the potential impacts on all affected road users including mitigation strategies.
Planning Inspectorate Scoping Opinion, July 2018	The ES should provide information regarding the anticipated transport routes which will be used to transport materials to and from the Proposed Development during construction and operation. The ES should explain if road closures will be required during construction phase and assess the impacts where significant effects are likely to occur.	**Section 19.5** provides details of the traffic and transport study area. **Section 19.7** details the potential impacts including mitigation strategies
Planning Inspectorate Scoping Opinion, July 2018	The Scoping Report does not describe what happens to material which is received but cannot be used by the facility. The ES should explain what contrary material is, how much is anticipated to be derived and how it would be removed from the Proposed Development. The assessment should include details relating to how many additional HGV or ship movements will result from these arisings.	Traffic derivation for operation is discussed in **Section 19.7** including any potential mitigation strategies.
Planning Inspectorate Scoping	The ES should explain the Study Area used for the assessment. The Study Area should be shown on a supporting plan contained within the ES.	**Section 19.5** provides details of the traffic and

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Opinion, July 2018		transport study area. The traffic and transport Study Area is illustrated in **Figure 19.2**.
Lincolnshire County Council, Formal Consultation meeting, 1 March 2019	Discussions on the Public Rights of Way where certain sections will require closure. Details of diversion routes and mitigation measures discussed including potential improvements.	PRoW impacts are discussed in **Section 19.7** including any potential mitigation strategies.
Natural England (pers. Comm. Email 27/03/2019)	Discussions on the route of the England Coast Path where certain sections will require closure and diversion along existing public rights of way. Details of diversion routes and mitigation measures discussed including potential improvements	PRoW impacts are discussed in **Section 19.7** including any potential mitigation strategies.

19.4 Assessment Methodology

19.4.1 This section describes the assessment methodology, including data collation, impacts and impact assessment criteria that were used in the traffic and transport assessment.

Impact Assessment Methodology

19.4.2 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 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 adopted from GEART.

Sensitive Receptors

19.4.3 GEART identifies that it is useful to identify particular groups or locations which may be sensitive to changes in traffic conditions and provides a checklist of sensitive locations and groups; however, the list is not exhaustive and can be added to by the assessor. Sensitive locations include:

- Hospitals;
- Churches;
- Schools;
- Tourist attractions, including historical buildings;

- Open spaces and recreational sites;
- Shopping areas;
- Residential areas; and
- Sites of ecological/nature conservation value.

19.4.4 Sensitive groups include:

- Children;
- The elderly;
- The disabled; and
- People walking and cycling.

Receptor Susceptibility to Changes in Traffic

19.4.5 GEART notes that

> The perception of changes in traffic by humans, and the impact of traffic changes on various ecological systems will also vary according to such factors as:

- Existing traffic levels;
- The location of traffic movements;
- The time of day;
- Temporal and seasonal variation in traffic;
- Design and layout of the road;
- Land-use activities adjacent to the route; and
- Ambient conditions of adjacent land-uses.

19.4.6 A desktop exercise augmented by site observations has been undertaken to identify the main sensitive receptors in the study area.

19.4.7 The highway network within the Study Area has been divided up into discrete lengths (links) reflecting the highway/spatial character. The sensitive receptors within the Study Area have been assigned to the nearest highway link, and the relationship with the highway environment has been examined to understand the sensitivity of those receptors to change.

19.4.8 The sensitivity of a road (link) can be defined by the type of user groups who may use it, e.g. the elderly or children. A sensitive area may be a village environment or areas of high pedestrian or cyclist activity, for example, near a school.

19.4.9 The link sensitivity has been determined by the concentration of sensitive receptors and the highway environment. For example, pedestrians are less sensitive to changes in traffic if there are adequate footways and crossing facilities. However, links where there will be high concentrations of sensitive locations (such as hospitals and schools) are likely to be highly sensitive to changes in traffic flow unless there is separation from traffic.

19.4.10 **Table 19.4** sets out broad definitions of the different sensitivity levels which have been applied to the assessment.

Table 19.4 Link Based Sensitive Receptors

Link Sensitivity	Link Characteristics
Negligible	Links that fall below screening thresholds.
Low	Few sensitive receptors and/or highway environment can accommodate changes in volumes of traffic.
Medium	A low concentration of sensitive receptors (e.g. residential dwellings, pedestrian desire lines, etc.) and limited separation from traffic provided by the highway environment. Junctions approaching or at capacity.
High	High concentrations of sensitive receptors (e.g. hospitals, schools, areas with high tourist footfall etc.) and limited separation provided by the highway environment. Defined Collision Cluster (four personal injury collisions occurring in a five year period in a 50m radius). Junctions with negative spare capacity.

19.4.11 All links within the traffic and transport Study Area have been assessed and assigned link sensitivity. The sensitivity of the links is detailed in **Table 19.5** and illustrated in **Figure 19.3**

Table 19.5 Link Sensitivity

Link	Description	Link sensitivity	Rationale for link sensitivity
1	Marsh Lane	Low	Industrial area with minimal residential development.
2	Marsh Lane	Medium	Public House, wide road with footway provision.
3	A16	Low	A modern 'A' road with no frontage development, designed to carry high quantities of traffic.
4	A16	Low	A modern 'A' road with non frontage development, designed to carry high quantities of traffic.
5	A16 (Spalding Road)	Low	A modern 'A' road with no frontage development, designed to carry high quantities of traffic. Access to industrial areas; no frontage development.

Link	Description	Link sensitivity	Rationale for link sensitivity
6	A52 (Liquorpond Street)	High	Main 'A' road with direct frontage development (residential properties and shops) with little separation from the road.
7	A16 (John Adams Way)	Medium	Main 'A' road fronted by residential properties with little separation from the road, high quantities of traffic.
8	B1397 (London Road)	High	Direct frontage development and a church along the road with minimal separation from traffic. Cycle links line the road, leading to a school.
9	Wyberton Low Road	High	Residential area with narrow carriageway and on street parking, leading to a school.
10	Nursery Road	Low	Industrial area.
11	Marsh Lane	Low	Industrial area.
12	Bittern Way	Low	Industrial area.

Scale of Assessment

19.4.12 To develop a proportional assessment, the following rules, taken from the GEART, have been used;

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows (or HGV component) are predicted to increase by 10% or more.

19.4.13 In justifying these rules, GEART examines the science of traffic forecasting and states:

> *"It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day to day variation of traffic on a road is frequently at least some + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact. …a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment"*.

19.4.14 Therefore, changes in traffic flows below the GEART Rules (thresholds) are assumed to result in no discernible or negligible environmental effects and have therefore not been taken further in this traffic and transport assessment.

19.4.15 The exception to the GEART Rule 1 and 2 is the consideration of the effects of driver delay and road safety. These effects can be potentially significant for lower changes in traffic flow.

Assessment of Impacts

19.4.16 Having applied the screening exercise to narrow down the traffic and transport Study Area to only those links that have the potential to experience a significant impact, it is necessary to establish the significance of any impact. The methodology achieves this by quantifying the 'magnitude of effect' on the sensitive routes.

19.4.17 A magnitude of effect is derived by applying GEART recommendations, which sets out considerations and, in some cases, thresholds in respect of changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance.

19.4.18 The following environmental effects have been identified as being susceptible to changes in traffic flow and are appropriate to gauge the magnitude of effect within the traffic and transport study area.

Severance

19.4.19 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists, cyclists or pedestrians.

19.4.20 GEART suggests that changes in total traffic flow of 30%, 60% and 90% are considered to be 'slight', 'moderate' and 'substantial' respectively.

Pedestrian Amenity

19.4.21 Pedestrian amenity is broadly defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic. The definition of amenity also takes into consideration pedestrian fear and intimidation, consideration of the exposure to noise and air pollution, and the overall relationship between pedestrians and traffic.

19.4.22 GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative impact upon pedestrian amenity.

19.4.23 Public Rights of Way (PRoW) area also considered within the context of pedestrian amenity impacts. If a PRoW would require a permanent or temporary closure / diversion because of construction or operation activities, the assessment would determine if the alternative route was equally convenient or enjoyable to the public.

Road Safety

19.4.24 The salient GEART guidance on road safety is as follows:

> *"Where a development is expected to produce a change in the character of traffic (e.g. HGV movements on rural roads), then data on existing accidents levels may not be sufficient. Professional judgement will be needed to assess the implications of local circumstances, or factors which may elevate or lessen the risk of accidents, e.g. junction conflicts."*

19.4.25 In accordance with the guidance, an examination of the existing collisions within the Study Area has been undertaken to identify any areas with an emerging pattern of collision types (cluster sites). These sites are considered to be sensitive to changes in traffic flows (sensitive receptors) and therefore more detailed analysis is required.

Driver Delay

19.4.26 GEART recommends the use of proprietary software packages to model junction delay and therefore estimate increased vehicle delays. However, it is noted that vehicle delays are only likely to be significant when the surrounding highway network is at, or close to, capacity.

19.4.27 Four potentially sensitive junctions have been identified that would require an assessment of potential delays for drivers during peak hours. The junctions are detailed below and the locations are shown graphically in **Figure 19.4**

- Junction 1 - Roundabout junction of the A16 / Marsh Lane.
- Junction 2 - Signalised junction of the Marsh Road / Wyberton Low Road.
- Junction 3 - Roundabout junction B1397 (London Road)/A16.
- Junction 4 - Signalised Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street).

19.4.28 The assessment seeks to disaggregate the peak hour traffic movements on the junctions to facilitate a judgement of the potential significance of the driver delay effects.

Abnormal Indivisible Loads

19.4.29 The importing of large Abnormal Indivisible Loads (AILs) may lead to delays on the highway network. The Facility will likely require a number of long, wide and heavy loads for a number of the Facilities infrastructure components. **Table 19.6** identifies the AIL requirements that are currently known.

Table 19.6 Potential AIL Information

Infrastructure Components	AIL Type	Quantity	Weight / Width / Length	Origin	Distance from the Facility
Civils Works (Crane)	Wide Load	2	3m+	Crowland	25 miles
Refuse derived fuel (RDF) Processing Facility	Long Load	30	16.5m	TBC	TBC
	Wide Load	6	3.4m	Hull	69 miles
	Heavy Load	8	60t	Hull	69miles
Gasification Plant	Heavy Load	3	140t	TBC	TBC
Air Cooled Condenser	Wide and Long Load	30	3.5m (w)	TBC	TBC

19.4.30 The movement of AILs would be subject to separate agreement with the relevant highway authorities and police through the Electronic Service Delivery for Abnormal Loads (ESDAL) system which regulates the process to ensure minimum disruption to the public and property. Therefore, no further assessment of AIL is undertaken in the PEIR.

Other Impacts

19.4.31 Traffic-borne noise and vibration effects and air quality effects will be informed by the traffic data outlined in this chapter. These impacts are assessed in **Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality**, respectively.

Impact Evaluation

19.4.32 **Table 19.7** details the assessment framework used herein adapted from GEART. These thresholds are guidance only and provide a starting point from which additional evidence (for example more detailed traffic analysis and site observations) and professional judgement will inform an analysis of the magnitude of effect.

Table 19.7 Transport and Traffic Assessment Framework

Effect	Magnitude of effect			
	Very low	**Low**	**Medium**	**High**
Severance	Change in total traffic flow of less than 30%	Change in total traffic flows of 30-60%	Change in total traffic flows of 60-90%	Changes in total traffic flows of over 90%
Pedestrian amenity	Changes in traffic flow (or HGV component) less than 100%	Greater than 100% increase in traffic (or HGV component) and a review based upon the quantum of vehicles, vehicle speed and pedestrian/cycle demand.		
Road safety	Informed by a review of existing collision patterns and collision clusters based upon the existing personal injury collision records and the forecast increase in traffic.			
Driver delay	Informed by projected traffic increases through sensitive junctions within the Study Area and further detailed junction modelling analysis as required.			

Impact Significance

19.4.33 **Table 19.8** sets out the assessment matrix adopted for routes that meet the screening criteria (Rule 1 and 2). This combines the assessment of the magnitude of effect, derived from the framework included in **Table 19.7**, with the receptor value presented in **Table 19.5** in order to determine the significance of the predicted impact.

19.4.34 The predicted impact is then further evaluated against the criteria of timescale frequency and extents to refine the predicted impact determination.

Table 19.8 Impact Significance Matrix

Receptor/link sensitivity	Magnitude of effect			
	High	**Medium**	**Low**	**Very Low**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

19.4.35 Note that for the purposes of the PEIR, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not strictly considered to be significant in their own right, it is important to distinguish these from other non-significant impacts, as they may contribute to significant impacts cumulatively or through impact interactions.

Cumulative Impact Assessment

19.4.36 For a general introduction to the methodology used for the cumulative impact assessment, please refer to **Chapter 6 Approach to EIA**. This chapter assesses those cumulative impacts that are specific to traffic and transport.

19.4.37 To take account of sub-regional growth in housing and employment, light vehicle flows have been factored to the future year baseline traffic demand using the Department for Transport Trip End Model Presentation Programme (TEMPro) Version 7.2 with data set 7.0 for Boston geographical areas.

19.4.38 In addition to TEMPro growth, it will be necessary to identify where the project has potential to overlap with similar impacts arising from:

- Recent development, either built or under construction (which is not considered as part of the baseline);
- Approved development, awaiting implementation: and
- Proposals awaiting determination within the planning process with design information in the public domain.

19.4.39 The CIA considers whether impacts on a receptor can occur on a cumulative basis between the project and other activities, projects and plans for which sufficient information regarding location and scale exist.

19.4.40 For further details of the methods used for the cumulative impact assessment for traffic and transport, see **Section 19.8.**

19.5 Scope

Study Area

19.5.1 The traffic and transport Study Area has been informed by the most probable routes for traffic, for both the movement of materials and personnel, during the construction and operational phase of the Facility. The traffic and transport Study Area is illustrated in **Figure 19.2**.

Data Sources

19.5.2 Existing traffic flow data for all key links within the traffic and transport Study Area have been captured from several primary and secondary sources. The datasets used in the assessment are summarised in **Table 19.9.**

Table 19.9 Data Sources

Data Source	Year	Link Coverage	Confidence	Notes
Classified Automatic Traffic Counts (ATC)	2018	A16	High	Seven day continuous ATC undertaken on the A16 south of the roundabout junction with Marsh Lane commissioned by RHDHV.
Manual Classified Turning Counts (MCTC)	2018	1-9	High	8 Hour Traffic counts commissioned by RHDHV. The 8 hour totals have been factored to 24hour AADT* via the A16
Estimated Traffic Flows	2019	10-12	Medium	For links with limited baseline flows have been estimated based on data sources for similar links within the traffic and transport study area.
Personal Injury Collision (PIC) Data	30/06/2018	1-9	High	PIC data obtained from Lincolnshire County Council for the most recent 5 year period.
2011 Census Data	2011	n/a	High	Census data utilised for employee's method of travel to work within the Boston area.
*	Annual Average Daily Traffic			

Assumptions and Limitations

19.5.3 The baseflows for three links have been estimated based on their location, characteristics and compared with adjacent link base flows which are of similar nature.

19.6 Existing Environment

19.6.1 **Figure 19.2** details the local highway network surrounding the Facility.

19.6.2 The primary routes within the Study Area are the A52 and A16. The A52 routes in a predominantly west to east direction and connects Grantham with Skegness. The A16 routes in a south to north direction linking Peterborough and Spalding with Grimsby. Both the A16 and A52 are of good standard and accommodate large volumes of HGV movements.

19.6.3 A full commentary of the characteristics of the key roads (links) is set out below.

Link 1 – Marsh Lane

19.6.4 Marsh Lane routes westbound until its crossroads with Wyberton Low Road and provides access to the Riverside Industrial Estate to the east. The road is a single carriageway road subject to a speed limit of 30mph. Footways along both sides of the road are provided with street lighting present.

Link 2 – Marsh Lane

19.6.5 Marsh Lane continues westbound until its roundabout junction with the A16. The road allows access to industrial units on both sides of the road. The road is a single carriageway road subject to a speed limit of 30mph. A footway is provided along the north verge of the road with street lighting present.

Link 3 – A16

19.6.6 The A16 is a principal single carriageway road which connects Spalding to the south with Boston to the north. Link 3 (of the A16) encompasses the southern entry into the traffic and transport Study Area and terminates at the roundabout junction with Marsh Lane. The A16 is subject to the National Speed Limit.

Link 4 – A16

19.6.7 North from the roundabout junction with Marsh Lane, the A16 becomes a two lane dual carriageway and terminates at the roundabout junction with the B1397. The road is subject to the National Speed Limit. The road has street lighting and an intermittent footway along the east side of the road.

Link 5 – A16 (Spalding Road)

19.6.8 After the roundabout junction with the B1397 (London Road) the A16 continues northbound (Spalding Road) and reverts to a single carriageway road with dual lanes northbound and a single lane southbound. The A16 passes over the South Forty Foot Drain and is subject to the National Speed Limit. There is an intermittent footway with street lighting along the east side of the road.

Link 6 – A52 (Liquorpond Street)

19.6.9 The A52 (Liquorpond Street) routes westbound from its roundabout adjoining The A16 to the south with the A16 (John Adams Way) to the northeast. The A52 (Liquorpond Street) is a single carriageway with two lanes westbound and a single lane eastbound. The road is subject to a speed limit of 30mph and street lighting and footways are provided along both sides of the roads.

Link 7 – A16 (John Adams Way)

19.6.10 The A16 (John Adams Way) is a dual carriageway which routes northeast from its roundabout junction with the A52. The road is subject to a 40mph speed limit and has a footway with street lighting along the west side of the road.

Link 8 – B1397 (London Road)

19.6.11 London Road is a single carriageway which routes northeast until it joins a roundabout which links Spalding Road to the north and the A16 to the south. The road is subject to a 30mph speed limit and has street lighting. There are footways on both sides of the road and a on road marked cycle lane when travelling southwest.

Link 9 – Wyberton Low Road

19.6.12 Wyberton Low Road is a single carriageway road which routes northbound until it meets a junction with Marsh Lane which routes east-west. The road is in a residential area and is subject to a 30mph speed limit. There is street lighting and footways on both sides of the road. On street parking is also present on the road.

Link 10 – Lealand Way / Nursery Road

19.6.13 Lealand Way is a single carriageway road which routes northwest through an industrial estate until reaching its T-junction with Nursery Road. Nursery Road continues south through further industrial buildings and terminates at the entrance to the project site boundary. The link is subject to a 30mph national speed limit and there is street lighting and a footway to the west of the road.

Link 11 – Marsh Lane

19.6.14 Link 11 encompasses Marsh Lane from its junction with Lealand Way southbound to Bittern Way. The road is subject to a 30mph speed limit and has a footway with street lighting along the East side of the road. A segregated cycle/pedestrian path is provided on the western side of Marsh Lane with further street lighting.

Link 12 – Bittern Way

19.6.15 Bittern Way links between Marsh Lane and the southwestern boundary of the project site. The road is subject to a 30mph speed limit and has footways with street lighting along both sides of the carriageway.

Baseline Traffic Flows

19.6.16 Table 19.10 provides a summary of the daily traffic flows for links 1 to 12 within the traffic and transport Study Area and details the source of the data.

Table 19.10 Traffic Flow Data

Link	Description	Year	Background flows (24hr AADT*)		Background flows (18hr AAWT*)		Source
			All vehicles	HGVs	All vehicles	HGVs	
1	Marsh Lane	2018	6,654	433	6,683	481	MCTC
2	Marsh Lane	2018	9,165	449	9,205	498	MCTC
3	A16	2018	19,143	941	19,227	1,045	MCTC
4	A16	2018	24,535	950	24,642	1,056	MCTC
5	A16 Spalding Road	2018	27,324	1,082	27,443	1,202	MCTC
6	A52 (Liquorpond Street)	2018	29,808	681	29,938	757	MCTC
7	A16 (John Adams Way)	2018	39,970	1,424	40,145	1,582	MCTC
8	B1397 (London Road)	2018	12,315	235	12,369	261	MCTC
9	Wyberton Low Road	2018	2,924	10	2,937	11	MCTC
10	Nursery Road / Lealand Way	2019	1,500	100	1,500	100	Estimated
11	Marsh Lane	2019	3,000	200	3,000	200	Estimated
12	Bittern Way	2019	1,000	50	1,000	50	Estimated

* Derived from an 8hr MCTC surveys factored utilising a seven-day ATC located on the A16 - South of Marsh Lane roundabout.

19.6.17 This assessment uses the term HGV as a proxy for a collective of those vehicle types above 3.5 tonnes (i.e. Other Goods Vehicles, HGVs, buses and coaches) for both baseline data, development generated traffic and the impact assessment (recognising the similar environment characteristics of the vehicle types).

Sustainable Transport

Walking

19.6.18 Walking represents the most sustainable mode of travel. The Chartered Institution of Highways and Transportation (CIHT) document ‘Guidelines for Providing for Journeys on Foot’, notes that an average walking speed of three miles per hour could be assumed. By this measure, in 15 minutes, a pedestrian could walk approximately 1,200 metres (m) (1.2km) and in 25 minutes, up to 2,000m (2km).

19.6.19 A walking distance of 2km is the maximum desirable commuting distance stated by the CIHT. The 2km walking catchment covers the entirety of central Boston town centre as well as south and north western areas of nearby settlements. In total, approximately 65% of Boston is within walking distance of the Facility work areas.

19.6.20 The presence of continuous footways and Public Rights of Way within the Study Area suggests that the Facility is highly accessible by walking.

Public Rights of Way

19.6.21 There are several public rights of way that cross the Facility area. The Boston Public Footpath No.14 (Macmillan Way) starts in Boston and follows the A16 (London Road) south over The Haven and merges with the existing footpaths along The Haven: BOST/14/12, BOST/14/2, BOST/14/4, BOST/14/5 and BOST/14/7). Footpaths 'BOST14/4' and 'BOST14/5' follow the crest of the primary flood bank that routes in parallel to The Haven. Footpath 'BOST/14/11' and 'BOST14/9', follow the route of Roman Bank (also known as 'Sea Bank'), which continues along the banks heading south from the Application Site.

Cycling

19.6.22 Although there is no specific cycling infrastructure in the immediate vicinity of the Facility, the rural nature, gentle gradients and lightly trafficked nature suggests that it provides a conducive environment for cycling.

19.6.23 The CIHT guidance 'Cycle Friendly Infrastructure, Guidelines for Planning and Design[1]' states that three quarters of journeys by all modes are 8km (less than 5 miles) and that this distance could be cycled comfortably by a fit person. This distance corresponds to an approximate 25-minute travel time.

19.6.24 Using 8km as the basis for assessing cycle accessibility of the site, it is possible to obtain a cycling 'catchment area'. Applying this, the town of Boston is entirely in the catchment area to the northeast as are the outlying settlements of Fishtoft, Wyberton, Frampton. Freiston and Hubbert's Bridge.

19.6.25 To the north of the Facility, the National Cycle Route (NCR) 1 provides a connection between Wisbech to the south and Lincoln to the north. As it passes through Boston the NCR1 utilises Wyberton Low Road (Link 9) before crossing over Marsh Lane (Link 1). Most of the route is on road, with a small section using a segregated cycle lane at the junction between Marsh Lane and Wyberton Low Road.

[1] *Cycle Friendly infrastructure: Guidelines for Planning for Design. The Institute of Highways and Transportation, 10 April 1996*

Equestrian Routes

19.6.26 There are no designated or formal equestrian routes that exist in the study area.

Bus

19.6.27 The nearest bus stops to the Facility are the Boston Middlecott Close and the St Thomas Church bus stops stop which are located 1.3km from the Facility.

19.6.28 Details of the approximate daytime frequency of buses for the Boston Middlecott Close and St Thomas Church stops is set out in Table 19.11 Summary of Bus Frequencies**Table 19.11**.

Table 19.11 Summary of Bus Frequencies

Service number	Route	Approximate frequency								
		Monday - Friday			Saturday			Sunday		
		First	Freq.	Last	First	Freq.	Last	First	Freq.	Last
Boston Middleton Close										
K58	Boston - Kirton	08:28	Every 60 mins	16:36	09:36	Every 60 mins	16:36	No service		
St Thomas Church										
B13	Boston – Pinchbeck – Spalding	06:46	Every 60 mins	19:42	06:46	Every 60 mins	19:42	No service		
B13	Spalding - Boston	06:32	Every 60 mins	19:27	06:46	Every 60 mins	19:42	No service		
F41	Wyberton – Old Leake	07:49*			No service					
F41	Old Leake – Wyberton	16:18*			No service					
G68	Boston - Kirton	15:55*			No service					
G68	Kirton - Boston	08:08*			No service					
K58	Boston – Kirton	08:28	Every 60 mins	16:36	09:36	Every 60 mins	16:36	No service		
K58	Kirton - Boston	09:05	Every 60 mins	15:32	09:05	Every 60 mins	15:02	No service		
*Service runs only on schooldays.										

Rail

19.6.29 Boston Railway station is located 2.3km from the Facility. The train station is managed by East Midlands Trains and provides services to Nottingham and Skegness.

19.6.30 Direct services run from Boston to Nottingham to the west (via Sleaford and Grantham) and to Skegness to the north-west on an hourly basis. Services to Nottingham start from 06:13am daily from Boston and the last train departs at 21:37pm. Services to Skegness start at 06:25am leaving Boston and the last train to depart is at 20:18pm.

Summary of Sustainable Transport

19.6.31 The review of the existing sustainable transport options set out above demonstrates that there are good opportunities for personnel and visitors based in nearby settlements to travel by sustainable modes of transport.

19.6.32 The Outline Traffic Management Plan (OTMP) to be submitted with the DCO will examine the validity of sustainable travel in detail and set out action plan for reducing single occupancy car travel.

Road Safety

19.6.33 To establish whether there are any inherent safety issues, a search of the traffic and transport Study Area utilising data obtained from LCC has been undertaken.

19.6.34 Within the Traffic and Transport study area, a total of 51 collisions occurred within the most recent five year period available (30-06-2013 to 30-06-2018), of these, 44 were slight, six were serious and one fatal collision occurred. **Table 19.12** provides a summary of the collisions and their locations are detailed in **Appendix 19.1.**

Table 19.12 Summary of Collision Data

Link	Description	No. of collisions			Summary
		Fatal	Serious	Slight	
1	Marsh Lane	1	0	4	One fatal and four slight collisions recorded; no patterns identified.
2	Marsh Lane	0	2	2	Two serious collisions recorded; no pattern identified. Two slight collisions recorded at the roundabout which links with the A16.

Link	Description	No. of collisions			Summary
		Fatal	Serious	Slight	
3	A16	0	0	1	One slight collision recorded at the roundabout which links with Marsh Lane.
4	A16	0	1	10	One serious collision recorded; no pattern identified. Ten slight collisions recorded. • One collision at the roundabout which links with Marsh Lane. • Five collisions at the roundabout which links to the B1397 (London Road).
5	A16 (Spalding Road)	0	3	11	Three serious collisions recorded. • One collision identified at a protected level crossing. • One collision identified at the roundabout which links to the A52 (Liquorpond Street). Eleven slight collisions recorded. • Two collisions at the roundabout which links to the B1397 (London Road). • Two collisions were recorded at the protected level crossing. • Four collisions recorded at the roundabout which links to the A52 (Liquorpond Street).
6	A52 (Liquorpond Street)	0	0	7	Seven slight collisions recorded. • Six collisions recorded at the roundabout which links to the A16.
7	A16 (John Adams Way)	0	0	4	Four slight collisions recorded. • Two collisions recorded at the roundabout which links to the A52 (Liquorpond Street).
8	B1397 (London Road)	0	0	5	• Five slight collisions recorded. • Four collisions recorded on the roundabout which links to the A16.
9	Wyberton Road	0	0	0	No recorded collisions within the last five years.
10	Nursery Road	0	0	0	No recorded collisions within the last five years.
11	Marsh Lane	-	-	-	Data to be obtained for the ES
12	Bittern way	-	-	-	Data to be obtained for the ES
Total		**1**	**6**	**45**	

19.7 Potential Impacts

Embedded Mitigation

19.7.1 As part of the project design, several embedded mitigation measures have been proposed to reduce potential impacts on Traffic and Transport and are detailed in **Table 19.13**. These measures are considered standard industry practice for this type of the development.

Table 19.13 Embedded Mitigation Measures for Traffic and Transport

Parameter	Mitigation Measures Embedded into the Project Design
General	
Delivery of RDF by water	By delivering the RDF by water to the proposed wharf. To minimise vehicle movements into the project site.
Provision of a park and ride scheme.	Potential to secure construction worker parking offsite. To minimise vehicle movements into the project site.
Access Strategy	The operational access strategy consists of two accesses a main site access on Nursery Road for employees and HGVs. An 'Exit Only' access is provided on Bittern Way for the majority of HGVs. This strategy reduces HGV conflicts at the main site entrance increasing site safety and reducing traffic delay.

Worst Case

19.7.2 This section establishes the Worst Case Scenario (WCS) for each key impact category, forming the basis for the subsequent impact assessment.

19.7.3 Full details of the range of development options being considered are provided within **Chapter 5 Project Description**.

19.7.4 For the Traffic and Transport chapter, only those design parameters with the potential to influence the level of impact to relevant receptors are identified. Therefore, if the design parameter is not described below in **Table 19.14**, it is not considered to have a material bearing on the outcome of this assessment.

Table 19.14 Worst Case Assumptions

Impact	Parameter
Construction	
Earliest start of construction	2021 is the earliest realistic construction start date for the assessment of environmental impacts.
Construction Duration	The minimum realistic duration the works can be completed in is 48 months.
Construction Programme – Peak	Construction of the RDF Silos are required early in the construction programme and is a critical establishing phase for sub-dividing the Application Site into two areas (Northern and Southern zones) to

Impact	Parameter
	allow future work to proceed safely. Slip forming silos is a rapid and continuous process which resulting in the highest traffic demand due to the intensification of material deliveries over a sustained period.
Construction Timings: Typical Working Week	Assessment based upon a 6 day working week Monday to Saturday) 8am to 8pm (with option of 7am to 7pm) No Bank Holidays or Public Holidays. Vehicle movements associated with transport of employees and deliveries are condensed over six days rather than seven.
Construction Timings: Working Week (during peak activity)	Slip forming silos is a continuous process which requires a constant stream of material deliveries thus 24 hour working is required.
Construction Timings – Material and Equipment Deliveries	Typically, an 8am to 8pm (with option of 7am to 7pm) (12hr) ‘delivery window’; has been assumed with 10 hours delivery time allocated. During the slip forming silo peak construction period, a full 24 hour delivery window will be required
Construction Worker Hours	Workers departing for home are assumed to overlap the evening network peak hour (5pm to 6pm) The nature of construction works typically requires that employees work longer hours in the summer and shorted hours in the winter to take advantage of the available daylight. Therefore, as a worst case, peak construction worker movements are assumed to overlap with peak background traffic.
Contingency	An appropriate level of contingency (10%) reflecting uncertainties in the design is applied to all infrastructure material quantities. This ensures minor omissions or design changes can be accommodated within the assessed traffic flows.
Construction Worker Quantum	250 to 300 at peak construction. As a worst case, 300 construction workers will be assessed.
Construction Worker Access	No on-site parking. Parking off-site with 12 seater mini buses provided to transport construction workers to site. Collection points to be determined in the OTMP.
Visitors Parking & Access	No on-site parking – access via off-site car park and shuttle bus transport.
Operation	
Earliest start of operation	2025 is the earliest realistic opening year of operation for the assessment of environmental impacts.
HGV Movement Limits	7am to 7pm Monday to Friday. 8am to 1pm Saturday.
Operational Worker Hours	The Facility will operate 24 hours a day consisting of three shifts.
Decommissioning	

Impact	Parameter
No Worst Case Assumptions have been defined for Decommissioning.	

Potential Impacts during Construction

19.7.5 This section examines the WCS assumptions, forecasts the traffic generated by the Facility and distributes vehicle trips to the traffic and transport highway Study Area to establish a basis for assessing the potential transport impacts.

Construction Programme

19.7.6 A draft construction programme has been produced and provided in **Appendix 19.2**. The construction programme identifies a total construction duration of 48 months. For the transport assessment, it is considered that construction will commence in January 2021 and peak activity occurs five weeks later. To assess this, a reference year of 2021 for background traffic has been derived. Background traffic flows for 2021 are presented in **Appendix 19.3**.

HGV Traffic Demand

19.7.7 Draft details of materials, plant and timescales for the Facility have been informed by work undertaken by the Developer's Principal Contractor. **Appendix 19.2** shows the disaggregation of component traffic demand by activity over time. This data facilitates the derivation of total deliveries and HGV movements per day.

Peak HGV Construction Demand

19.7.8 **Appendix 19.2** shows high levels of HGV demand in weeks four and five of the construction programme with 738 and 1273 daily movements respectively. These movements relate to the delivery of concrete for the construction of the RDF Silos which are a critical establishing phase for sub-dividing the Application Site into two areas (Northern and Southern zones) to allow future work to proceed safely. The slip forming construction method of the silos is a rapid and continuous process which results in the highest traffic demand due to the intensification of material deliveries over a sustained period.

19.7.9 During this intensified period of activity, it is necessary to operate 24 hour working due to the construction method of slip forming.

Average (typical) HGV Construction Demand

19.7.10 **Table 19.15** presents the yearly daily average HGV movements that the Facility would generate over the remainder of the construction programme outside of the peak period.

Table 19.15 Average Yearly Daily HGV Movements

Year	Average Daily HGV Movements
Year 1 (2021)	163*
Year 2 (2022)	85
Year 3 (2023)	79
Year 4 (2024)	41
*	Average values do not include peak weeks 4 and 5

19.7.11 As shown in **Table 19.15**, the Average Worst Case Scenario would occur in Year 1 (2021) with an average of 163 daily HGV movements. This figure would reduce year on year until Year 4 when the Facility would generate on average, 41 daily HGV construction movements.

19.7.12 The Year 1 average figure of 163 daily HGV movements represents a decrease of 1,110 movements from the week five peak figure of 1273 daily HGV movements

19.7.13 To ensure the assessment considers both the maximum short term impacts and the average longer term impacts within the traffic and transport study area, this chapter will present two assessment scenarios to assess for impacts and are as follows:

- Peak Worst Case Scenario (Peak WCS) of 1273 daily HGV movements.
- Average Worst Case Scenario (Average WCS) of 163 daily HGV movements.

<u>Employee Traffic Demand</u>

19.7.14 The Developer's Principal Contractor has provided details of the expected resourcing requirements during the construction programme. Based on this input, it is estimated that a workforce of 300 employees will be required during construction peaks.

19.7.15 It is envisaged that construction employees will work during the hours of 8am to 8pm (with option of 7am to 7pm).

19.7.16 The 2011 'method to travel to work' census data identified that 63% of employees travel to work by Single Occupancy Vehicle (SOV) within the Boston area. This equates to 188 out of 300 employees using a car to travel to the Facility with the remaining employees utilising sustainable transport.

HGV Distribution

19.7.17 During the Peak WCS, most of the HGV traffic movements would comprise of formwork trucks for the construction of the six RDF silos. The Developer's Principal Contractor has indicated that these are likely to be sourced within one mile of the Facility.

19.7.18 The appointed engineers have indicated that the large contingent of Ready Mix Concrete (RMC) trucks that will be required for the slab/ base foundations and for slip forming of the silos will likely be sourced from within Lincolnshire. This assumption has also been applied to the traffic movements associated with the spoil/surcharge activities.

19.7.19 For the Average WCS, it has been assumed by the Developer's Principal Contractor that most traffic movements would originate from within Lincolnshire.

19.7.20 At this stage, as definitive sources of materials and plant are unknown, it has been assumed that both the Peak and Average WCSs traffic demand would be assigned to both the A16 from the north (Link 7), the A16 from the south (Link 3) and the A52 from the west (Link 6).

Employee Distribution

19.7.21 The appointed engineers are proposing to operate a Park and Ride scheme to control the available parking during the Facility's construction and to minimise the employee movements to the facility. However, the P&R strategy is at a very early stage and currently no collection locations have been identified.

19.7.22 As a proxy to provisionally inform the employee traffic assignment to the road network, five public car parks situated around Boston have been identified as centralised locations for employee collections. The car park locations are detailed in **Table 19.16** and shown graphically in **Figure 19.5**

Table 19.16 Provisional Park and Ride Collection Locations

Car Park	Location	Spaces	Employees
Tunnard Street	Boston Borough Council Tunnard Street Lincolnshire Boston PE21 6PL	145	34
St Geaorges Road	Boston Borough Council St Georges Road Lincolnshire Boston	195	46

Car Park	Location	Spaces	Employees
	PE21 8YB		
Staniland	Boston Borough Council Staniland Fydell Crescent Lincolnshire Boston PE21 8SS	150	35
Cattle Market	Boston Borough Council Cattle Market Lincolnshire Boston PE21 6RX	158	37
Market Place	NCP Market Place Red Lion Street Lincolnshire Boston PE21 6NY	150	35
	Totals	798	188

19.7.23 The following distributions have been assumed for the 188 employees who would drive to the P&R collection sites:

- 50% of employees are assumed to arrive from the north of Boston
- 25% arrive from Link 8 (Skirbeck Road)
- 25% arrive from Link 3 (A16 South)

19.7.24 Construction workers would then transfer to 12 seater minibuses and be driven to the Facility.

19.7.25 The remaining 112 employees are assumed to use sustainable modes of transport to travel directly to the Facility.

Traffic Impact Screening

19.7.26 With reference to the GEART (Rule 1 and Rule 2), a screening process has been undertaken for the traffic and transport Study Area to identity routes that are likely to have an increase in traffic flows that would require further impact assessment.

19.7.27 **Table 19.17** summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials, personnel and plant for both the Peak and average periods. The table also provides a comparison of the peak daily construction flows with the forecast background daily traffic flows for 2021 (assumed worst cast realistic start of construction). Cells highlighted blue indicate GEART Rule 1 or Rule 2 screening thresholds have been met.

Royal HaskoningDHV

baef Boston Alternative Energy Facility

Table 19.17 Link Screening (Construction)

Link	Description	Link Sensitivity	Background 2021 Flows (24hr AADT*)		2021 Peak Daily Construction Vehicle Movements		Percentage Increase		2021 Average Daily Construction Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
1	Marsh Lane	Low	6,921	451	1,307	1,273	20.2%	282.6%	197	163	3.1%	36.3%
2	Marsh Lane	Medium	9,532	467	1,307	1,273	14.4%	272.9%	197	163	2.2%	35.0%
3	A16	Low	19,911	979	1,330	1,273	7.0%	130.1%	220	163	1.2%	16.7%
4	A16	Low	25,519	988	1,364	1,273	5.6%	128.9%	254	163	1.0%	16.5%
5	A16 (Spalding Road)	Low	28,420	1,125	1,364	1,273	5.0%	113.2%	254	163	0.9%	14.5%
6	A52 (Liquorpond Street)	High	31,003	709	1,364	1,273	4.5%	179.7%	253	163	0.8%	23.0%
7	A16 (John Adams Way)	Medium	41,573	1,481	1,363	1,273	3.3%	86.0%	220	163	0.5%	11.0%
8	B1397 (London Road)	High	12,809	244	56	0	0.4%	0.0%	56	0	0.4%	0.0%
9	Wyberton Low Road	High	3,042	10	0	0	0.0%	0.0%	0	0	0.0%	0.0%
10	Nursery Road / Lealand Way	Low	1,664	104	1,114	1,273	83.8%	1224.3%	197	163	12.7%	157.0%

Link	Description	Link Sensitivity	Background 2021 Flows (24hr AADT*)		2021 Peak Daily Construction Vehicle Movements		Percentage Increase		2021 Average Daily Construction Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
11	Marsh Lane	Low	3,328	208	0	0	0.0%	0.0%	0	0	0.0%	0.0%
12	Bittern Way	Low	1,092	52	0	0	0.0%	0.0%	0	0	0.0%	0.0%

19.7.28 It is noted from **Table 19.17** that eight of the 12 links are above the GEART screening thresholds during the Peak WCS and four during the remaining Average WCS. **Table 19.18** provides a summary of those links that will be taken forward for further assessment and those that are screened out for both Peak and Average WCSs.

Table 19.18 Link Screening Summary

WCS Period	Further Assessment (Links)	No Further Assessment (Links)
Peak	1,2,3,4,5,6,7 and 10	8,9,11 and 12
Average	1,2,6 and 10	3,4,5,7,8,9,11 and 12

19.7.29 From the screening exercise it is evident that the Peak WCS includes a higher number of highway links with the potential to be impacted by the Facility's traffic demand. It can be noted that a greater magnitude of change (and therefore greater impact significance) would potentially be experienced as a result of the Peak WCS occurring over a short duration (one week peak). whereas the Average WCS would see a reduced magnitude of impact over a smaller number of links but sustained over most of the construction programme.

19.7.30 For ease of review and to minimise repetition, the assessment of effects for both Peak and Average WCSs will be assessed side by side with the relevant mitigations proposed for both.

Impact 1: Severance

19.7.31 With reference to **Table 19.17** it is noted that the forecast daily change in total traffic flow for Link 10 during the Peak WCS is greater than the 30% change in total traffic threshold whereby GEART suggests negative impacts may be experienced.

19.7.32 The remaining links during both Peak and Average WCSs all experience traffic flows significantly below the 30% thresholds. This results in the magnitude of effect assessed as very low on low to high sensitivity links leading to impact significance on all links of **negligible** to **minor adverse**.

19.7.33 Link 10 (shown on **Figure 19.2**) is the final link to accessing the Facility during the construction stage and comprises of Lealand Way and Nursery Road. Link 10 shows the peak daily change in total traffic during the Peak WCS as 83.8% which represents a **medium** increase in the magnitude of effect.

19.7.34 Link 10 is assessed as a low sensitive route noting that it serves an existing industrial estate with several commercial properties.

19.7.35 It is therefore considered that the impact on the link would be local, short term and infrequent resulting in a **medium** magnitude of effect.

19.7.36 The medium magnitude of effect on a low sensitive link would lead to an impact significance of **minor adverse.**

Impact 2: Pedestrian Amenity

19.7.37 GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative impact upon pedestrian amenity.

19.7.38 **Table 19.19** provides a summary of the magnitude of impact for each of the screened links.

Table 19.19 Magnitude of Pedestrian Amenity Impacts

WCS Period	Peak Daily Change in traffic flow or HGV Component is Greater than 100% (Links)	Peak Daily Change in traffic flow or HGV Component is Less than 100% (Links)
Peak	1,2,3,4,5,6 and 10	7
Average	10	1,2 and 6

19.7.39 The links which experience traffic flows significantly below the 100% threshold as identified by **Table 19.19** results in a magnitude of effect as very low on low to high sensitive links giving impact significance on all links of **negligible** to **minor adverse**.

19.7.40 The links identified within **Table 19.19** as being greater than the 100% GEART impact thresholds whereby GEART suggests negative impacts may be experienced are assessed further in **Table 19.20** and **Table 19.21.**

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Table 19.20 Pedestrian Amenity Assessment – Peak WCS

Link	Link Description	2021 HGV Base Flows (Movements)		HGV Flow Increase	Magnitude of Effect	Link Sensitivity	Impact Significance
		Base	Base + Const				
1	Marsh Lane	451	1,724	282.6%	Medium	Low	**Minor Adverse**
2	Marsh Lane	467	1,740	272.9%	Medium	Medium	**Moderate Adverse**
3	A16	979	2,252	130.1%	Low	Low	**Minor Adverse**
4	A16	988	2,262	128.9%	Low	Low	**Minor Adverse**
5	A16 (Spalding Road)	1,125	2,398	113.2%	Low	Low	**Minor Adverse**
6	A52 (Liquorpond Street)	709	1,982	179.7%	Medium	High	**Major Adverse**
10	Nursery Road / Lealand Way	104	1,377	1224.3%	High	Low	**Moderate Adverse**

Table 19.21 Pedestrian Amenity Assessment – Average WCS

Link	Link Description	2021 HGV Base Flows (Movements)		HGV Flow Increase	Magnitude of Effect	Link Sensitivity	Impact Significance
		Base	Base + Const				
10	Nursery Road / Lealand Way	104	267	157.0%	Low	Low	**Minor Adverse**

19.7.41 With reference to **Table 19.20** and **Table 19.21** the links initially assessed as having significant amenity impacts (**moderate** and **major adverse**) are considered in more detail.

Moderate Adverse Impacts

19.7.42 It can be noted from **Table 19.20** that links 2 and 10 would experience potentially **moderate adverse** impacts during the Peak WCS.

19.7.43 Link 2 (shown on **Figure 19.2**) comprises of Marsh Lane which links from the A16 to Wyberton Low Road. Link 2 shows the peak daily change in total traffic during the Peak WCS as 272.9% which represents a medium increase in the magnitude of effect

19.7.44 Link 2 is assessed as a medium sensitive route noting that it routes through several car sales properties and adjacent to a public house. Notwithstanding the link serves the industrial area to the east with footway provided.

19.7.45 Further assessment of the link considers the impact would be local, short term and infrequent. It is therefore considered that the effect upon magnitude of effect would be low.

19.7.46 As a result, the low magnitude of effect on a medium sensitive link would lead to an impact significance of **minor adverse.**

19.7.47 Link 10 (shown on **Figure 19.2**) is the final link for accessing the Facility during the construction stage and comprises of Lealand Way and Nursery Road. Link 10 shows the peak daily change in total traffic during the Peak WCS as 1224.4% which represents a high increase in the magnitude of effect.

19.7.48 Link 10 is assessed as a low sensitive route noting that it serves an existing industrial estate with several commercial properties.

19.7.49 Further assessment of the link considers the impact would be local, short term and infrequent. It is therefore considered that the effect upon magnitude of effect would be medium.

19.7.50 As a result, the medium magnitude of effect on a low sensitive link would lead to an impact significance of **minor adverse.**

Major Adverse Impacts

19.7.51 It can be noted from **Table 19.20** that Link 6 would experience potentially **major**

adverse impacts during the Peak WCS.

19.7.52 Link 6 (shown on **Figure 19.2**) comprises of the A52 (Liquorpond Street) which connects from the roundabout junction with the A16. Link 2 shows the daily change in total traffic during the Peak WCS as 179.9% which represents a medium increase in the magnitude of effect

19.7.53 Link 6 is assessed as a high sensitive route as it passes adjacent to direct frontage development (residential properties and shops) with little separation from the road.

19.7.54 Further assessment of the link considers the impact would be regional, short term and infrequent. However, it is therefore considered that the magnitude of effect could be reduced to medium.

19.7.55 As a result, the medium magnitude of effect on a medium sensitive link would still lead to an impact significance of **moderate adverse** and still be considered a significant impact in EIA terms.

19.7.56 A mitigation strategy during the Peak WCS would be to divert traffic away from using Link 6 and route traffic along the regional routes of the A52 and A17 west of Boston. HGVs could then approach the Facility from the south via the A16 (Link 3) which has already been assessed for this magnitude of traffic and results in a **minor adverse** impact.

19.7.57 With the application of this mitigation strategy (secured in the OCTMP) the magnitude of effect is predicted to reduce to very low on a high value sensitive receptor; resulting in a residual **minor adverse** residual impact.

Public Right of Way Closures

19.7.58 During the construction, the following footpath sections would be permanently closed: Bost/14/4, Bost/14/10 and Bost/14/5. The closure would also affect the England Coast Path route which follows these footpaths, as does Macmillan Way. The diversion for these route closures would follow the route of an existing footpath, which follows the route of Roman Bank (also known as ‘Sea Bank’) along footpath sections Bost/14/11 and Bost/14/9. See **Chapter 5 Project Description**, **Figure 5.3** which shows the footpath network and identifies the footpath sections to be closed.

19.7.59 The diversion would affect pedestrians because the route of footpath section Bost/14/11 at the intersection with Bost/14/9 is within the construction boundary of the Facility. Therefore, pedestrians would be routed to cross the site road within closer proximity of construction traffic vehicles, thus decreasing the relative pleasantness of the journey. This would result in a low magnitude of effect in perception of amenity for pedestrians.

19.7.60 The low magnitude of effect on a high sensitive receptors would result in a **moderate adverse** impact.

19.7.61 To mitigate and allow continued footpath access along 14/11 and 14/9, there is potential to use traffic lights, barrier gates or banksmen to monitor the crossing of 14/11 by construction traffic during the construction period.

19.7.62 This strategy would negate the need for a total diversion route around the Facility whereby increasing the distance. The resultant impact would be continuous, local and short term. The magnitude of effect could be reduced to very low on a high sensitive receptor resulting in a **minor adverse** residual impact.

Impact 3: Road Safety

19.7.63 **Section 19.6** established the road safety environment for the Traffic and Transport study area. This data has been screened to identify sites that could be sensitive to changes in traffic, known as 'collision cluster sites. The collision cluster screening criteria has been based on four personal injury collisions occurring in a five year period in a 50m radius.

19.7.64 Three collision cluster sites have been identified with the locations shown in **Figure 19.6**. For the ES, the collision clusters will be investigated further determining the type and potential emerging patterns or trends that could potentially be exacerbated by an increase in traffic.

19.7.65 The following **Table 19.22** provides a summary of the collision cluster analysis.

Table 19.22 Summary of Collision Cluster Analysis

Cluster Notation	Location	Further Assessment (Y/N)
Cluster 1	Signalised Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	Y
Cluster 2	Roundabout junction B1397 (London Road)/A16	Y
Cluster 3	Roundabout junction of the A16 / Marsh Lane	Y

Impact 4: Driver Delay

19.7.66 The GEART screening thresholds do not apply to this effect because the potential impact is defined as significant when the traffic system surrounding the proposed project under consideration is at or close to capacity.

19.7.67 To facilitate the assessment of driver delay four junctions are considered potentially sensitive to an increase in construction traffic.

19.7.68 The Facility's peak hour traffic demand for both the Peak WCS and Average WCS has been assigned to the potentially sensitive junctions to facilitate an assessment of impact significance. **Table 19.23** details the resultant traffic flows at the junctions during the peak hour.

Table 19.23 Peak Hour Traffic Flows Through Sensitive Junctions

Junction ID	Junction Arm	Arrivals Per Arm – Peak WCS		Arrivals Per Arm – Average WCS	
		Light Vehicles	HGVs	Light Vehicles	HGVs
Junction 1 Roundabout junction of the A16 / Marsh Lane	A16 (South)	0	*27	0	*14
	Marsh Lane	28	27	28	14
	A16 (North)	17	*27	17	*14
Total Arrivals		45	54	45	28
Junction 2 Signalised junction of the Marsh Road / Wyberton Low Road	Marsh Lane (West)	17	27	*17	14
	Wyberton Low Road (North)	0	0	0	0
	Marsh Lane (East)	0	27	*17	14
	Wyberton Low Road (South)	0	0	0	0
Total Arrivals		17	54	17	28
Junction 3 Roundabout junction B1397 (London Road)/A16	B1397 (London Road)	28	0	28	0
	A16 (North)	17	27	17	14
	London Road	0	0	0	0
	A16 (South)	28	27	28	14
Total Arrivals		73	54	73	28
Junction 4 Signalised Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	A52 (Liquorpond Street)	0	*27	0	0
	A16 (East)	0	*27	0	14*
	A16 (South)	34	27	34	14*
Total Arrivals		34	54	34	28

*As a worst case, HGVs have been assigned to all potential origin locations. Total figures for junctions only include for one origin.

** Peak WCS HGVs divided by 24 hour working. Average WCS divided by 12 hour working.

Potential Impacts during Operation

19.7.69 This section examines the WCS assumptions, forecasts the traffic generated by the Facility and assigns vehicle trips to the traffic and transport highway Study Area to establish a basis for assessing the potential transport impacts.

HGV Traffic Assumptions

19.7.70 The Developer's Principal Contractor has provided details of the predicted HGV traffic demand required for the Facilities infrastructure components. These are discussed below and include the predicted traffic distribution. **Chapter 5 Project Description** provides a full detail on the operation and process required of the Facility.

19.7.71 The RDF processing plant will be required to segregate inert fine materials, medium/Heavy fraction and metals. Approximately 33,000 tonnes of ferrous metals and 9,000 tonnes of non-ferrous metals per annum will be removed by road to an off-site recycling facility in accordance with the waste hierarchy. There are several local options for metal recycling within the Riverside Industrial Estate.

19.7.72 The total 42,000 tonnes of metal removal would equate to approximately 14 HGV movements per day (based on 312 working days a year (Monday to Saturday)).

19.7.73 The segregated fines and medium / heavy fraction will be sent to the fines de-stoning facility for further segregation into material that is suitable for recovery in the lightweight aggregate (LWA) plant and material that is not (for example hard stone and other dense material).

19.7.74 Material that is not suitable will be assessed for potential off-site recycling opportunities in accordance with the waste hierarchy. There are several local options within the Riverside Industrial Estate for recycling or recovery of inert material.

19.7.75 It is predicted that approximately 30,000 tonnes of unsuitable heavy fraction (stones) removal will be required. This equates to approximately 10 HGV movements per day (based on 312 working days a year (Monday to Saturday).

19.7.76 The following raw materials are required per annum for the gasification process.

- Limestone (984 tonnes p.a.).
- 25.5% Aqueous Amonia (5.528 tonnes p.a.).
- 100.0% Hydrated Lime (5,968 tonnes p.a.).

- Activated Carbon (224.8 tonnes p.a.).

19.7.77 This equates to approximately 4 HGV movements per day (based on 312 working days a year (Monday to Saturday) and delivery by typical 20t HGVs.

19.7.78 The Fuel Store will require a constant supply of oil which will be delivered by oil tankers and is predicted to be approximately six HGV movements per day.

19.7.79 The Carbon capture plant is anticipated to require 12 HGV movements per day in relation to the carbon dioxide (CO_2) recovery process.

19.7.80 To cover for unseen HGV movements such as miscellaneous deliveries associated with servicing and waste management of the Facility, an additional 4 HGV movements per day have been included.

19.7.81 In summary, 50 HGV daily movements are predicted to be required during operation of the Facility. Most HGV movements are removal of materials to local recycling sites which are within 500m of the Facility. Notwithstanding to fully assess the impacts of the HGV demand, the HGVs have been assumed to travel outside of the immediate Boston area into the wider Lincolnshire county as a worst case scenario.

Employee Traffic Assumptions

19.7.82 The Developer's Principal Contractor has provided details of the expected resourcing requirements during operation. Based on this input, it is estimated that a workforce of 114 employees will be required during construction peaks. Details of the know workforce and likely shift patterns are provided in **Table 19.24.**

Table 19.24 Employee Demand and Shift Patterns

Operational Activity	Shift Pattern	Quantum of Operatives
Wharf and RDF bale storage area	24/7 utilising a three shift pattern	To be confirmed for ES
Conveyor systems	No employees required	
RDF Processing plant	To be confirmed for ES	3
Power-generation plant	Monday to Friday Dayshift	12
	24/7 utilising a three shift pattern	20
Air Cooled Condensers	No employees required	
Carbon Capture Plant	9 hour day - Monday to Saturday	1
LWA Plant	To be confirmed for ES	59
Totals Totals (inc 20% contingency)		95 114

19.7.83 The 2011 ‘method to travel to work’ census data identified that 63% of employees travel to work by Single Occupancy Vehicle (SOV) within the Boston area. This equates to 72 out of 114 employees using a car to travel to the Facility. To cover uncertainties in required operative a 25% contingency factor has been applied to the employees for assessment resulting in a total of 89 arrivals and 89 departures.

19.7.84 Distribution of operatives has been provided with a 70% arriving from the north of the Facility and 30% from the south.

Traffic Impact Screening

19.7.85 With reference to the GEART (Rule 1 and Rule 2), a screening process has been undertaken for the traffic and transport Study Area to identity routes that are likely to have an increase in traffic flows that would require further impact assessment.

19.7.86 **Table 19.25** summarises the total daily peak vehicle movements (i.e. arrivals and departures) of all materials, personnel for operation. The table also provides a comparison of the peak daily operational flows with the forecast background daily traffic flows for 2025 (assumed realistic start of operation). Cells highlighted blue indicate GEART Rule 1 or Rule 2 screening thresholds have been met.

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Table 19.25 Link Screening (Operation)

Link	Description	Link Sensitivity	Background 2025 Flows (24hr AADT*)		2025 Peak Daily Operational Vehicle Movements		Percentage Increase	
			All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
1	Marsh Lane	Low	6,921	451	228	50	3.1%	10.4%
2	Marsh Lane	Medium	9,532	467	228	50	2.2%	10.0%
3	A16	Low	19,911	979	77	50	0.4%	4.8%
4	A16	Low	25,519	988	201	50	0.7%	4.7%
5	A16 (Spalding Road)	Low	28,420	1,125	175	50	0.6%	4.2%
6	A52 (Liquorpond Street)	High	31,003	709	112	50	0.3%	6.6%
7	A16 (John Adams Way)	Medium	41,573	1,481	112	50	0.3%	3.2%
8	B1397 (London Road)	High	12,809	244	27	0	0.2%	0.0%
9	Wyberton Low Road	High	3,042	10	0	0	0.0%	0.0%
10	Nursery Road / Lealand Way	Low	1,664	104	228	50	12.8%	44.9%
11	Marsh Lane	Low	3,328	208	0	0	0.0%	0.0%
12	Bittern Way	Low	1,092	52	0	0	0.0%	0.0%

19.7.87 In accordance with GEART only those links that are showing greater than a 10% increase in total traffic flows (or HGV component) for sensitive links, or greater than 30% increase in total traffic or HGV component for all other links, are considered when assessing the traffic impact upon receptors.

19.7.88 It is noted from Table 19.25 Link Screening (Operation)**Table 19.25** that one of the 12 links are above the GEART screening thresholds during operation with a HGV increase of 44.9%.

19.7.89 **Impact 1 Pedestrian Severance** and **Impact 2 Pedestrian Amenity**

19.7.90 As detailed in the Potential Impacts During Construction Section, Link 10 was screened for further assessment during the Average WCS with a 157.0% increase in HGVs. Further assessment identified that Link 10 would experience **minor adverse** impacts as a worst case for both pedestrian impacts and amenity.

19.7.91 As Link 10 would experience a lower HGV increase of 44.9% than the construction Average WCS of 157.0% it would be reasonable to assess that link 10 would experience a **negligible** to **minor adverse** impact during operation.

Impact 3: Road safety

19.7.1 Three collision cluster sites have been identified with the locations shown in **Figure 19.6**. For the ES, the collision clusters will be investigated further determine the type and potential emerging patterns or trends that could potentially be exacerbated by an increase in traffic.

19.7.2 The following **Table 19.26** provides a summary of the collision cluster analysis.

Table 19.26 Summary of Collision Cluster Analysis

Cluster Notation	Location	Further Assessment (Y/N)
Cluster 1	Signalised Roundabout junction A16 (Spalding Road and John Adams Way) / A52 (Liquorpond Street)	Y
Cluster 2	Roundabout junction B1397 (London Road)/A16	Y
Cluster 3	Roundabout junction of the A16 / Marsh Lane	Y

Impact 4: Driver Delay

19.7.3 The GEART screening thresholds do not apply to this effect as the potential impact is defined as significant when the traffic system surrounding the proposed project under consideration is at or close to capacity.

19.7.4 As set out in **Table 19.25**, 50 HGVs are predicted to be generated by the Facility per day in operation, This equates to approximately 5 HGV movements per hour when profiled over a 10 hour day within a typical 12 hour delivery window (7am to 7pm).

19.7.5 It is also likely that the 89 arrivals and 89 departures of operatives, when disaggregated to the different shift patterns and shift times would average approximately 29 arrivals and departures in a peak hour.

19.7.6 The workforce shift patterns have yet to be confirmed. However, it is unlikely that the operatives would arrive and depart within the traditional highway peak hours (considered to be 8am to 9am and 5pm to 6pm) as the times of the shift patterns would fall outside of these hours . As such construction traffic would be present on the highway network during relatively quieter traffic periods and in isolation would not significantly increase existing highway network congestion issues.

19.7.7 The magnitude of effect for the combined profile of HGVs and operatives is therefore assessed as very low on a high value receptor resulting in a **minor adverse** impact.

Public Right of Way Closures

19.7.8 During the operation of the Facility, the footpath sections closed during construction would remain permanently closed: Bost/14/4, Bost/14/10 and Bost/14/5. The closure would also affect the England Coast Path route which follows these footpaths, as does Macmillan Way. The diversion for these route closures would follow the route of an existing footpath, which follows the route of Roman Bank (also known as 'Sea Bank') along footpath sections Bost/14/11 and Bost/14/9. See **Chapter 5 Project Description**, **Figure 5.3** which shows the footpath network and identifies the footpath sections to be closed.

19.7.9 The diversion would affect pedestrians because the route of footpath section Bost/14/11 at the intersection with Bost/14/9 is within the operational boundary of the Facility. Therefore, pedestrians would be routed to cross the site road within close proximity of operational site traffic vehicles, thus decreasing the relative pleasantness of the journey. This would result in a low magnitude of effect in perception of amenity for pedestrians.

19.7.10 The low magnitude of effect on a high sensitive receptors would result in a **moderate adverse** impact.

19.7.11 To mitigate and allow continued footpath access along 14/11 and 14/9, safety measures will be implemented to prevent unauthorised access to the secure site;

and to ensure passenger safety when crossing. This will include a range of features, for example: traffic lights, barrier gates or alternative monitoring of the crossing point, and the specific safety measures will be confirmed in the detailed design stage.

19.7.12 To provide additional community benefit it has been discussed with LCC to provide potential improvements to 14/11 such as:

- relocation of flood bank fencing;
- vegetation clearance;
- aesthetic improvements; and
- improving accessibility to the remaining routes in the area.

19.7.13 Thus, a very low magnitude of effect on a high sensitive receptors would result in a **minor adverse** impact.

19.7.14 Potential Impacts during Decommissioning

Assessment assumptions and limitations

19.7.15 The following assumptions have been made for the decommissioning of the Facility:

1. The Facility will be demolished or redeveloped (except for the wharf which forms the flood defence).
2. Demolition will be undertaken to current best practices.

19.7.16 Whilst details regarding the decommissioning of the Facility are currently unknown, considering the worst case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be no worse than those during construction.

19.7.17 The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the project to be in line with guidance, policy and legislation at the point of decommissioning. Any such methodology would be agreed with the relevant authorities and statutory consultees. The decommissioning works could be subject to a separate licensing and consenting approach.

19.7.18 It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.

19.8 Cumulative Impacts

19.8.1 The assessment of cumulative impact will be undertaken as a two stage process. Firstly, all the impacts from previous section will be assessed for potential to act cumulatively with other projects. This summary assessment is set out in **Table 19.27**.

Table 19.27 Potential Cumulative Impacts

Impact	Potential for cumulative impact	Rationale
Construction		
Severance	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Amenity	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Road Safety	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Driver Delay	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Operation		
Amenity	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Road Safety	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Driver Delay	Yes	Cumulative impacts arising from two or more projects are possible due to an increase in traffic from the projects.
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the relevant authorities. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.		

19.8.2 The second stage of the CIA is an assessment of the Facility's Study Area and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA which are to be identified.

19.8.3 The projects identified for potential cumulative impacts with the Facility have been discussed with Boston Borough Council. **Table 19.28** summarises those projects which have been scoped into the CIA due to their temporal or spatial overlap with the potential effects arising from the project.

Table 19.28 Summary of Projects Considered for the CIA in Relation to the Topic

Project	Status	Development period	Distance from the Facility (km)	Project definition	Project data status	Included in CIA	Rationale
Boston Barrier Flood Defence	Transport and Works Act Order consented	2017 – ongoing	Boston Barrier at closest point to the Application Site is 500 m.	Environmental Statement	Complete/high	Yes	Overlapping proposed project boundaries may result in impacts of a direct and / or indirect nature during construction. However, it is anticipated that construction of the Barrier would be completed before consent for the Facility is given.
Triton Knoll Offshore Wind Farm	DCO consented	2008 - ongoing	Onshore cable corridor and Construction compound at Langrick 9.7 km from the	Environmental Statement	Complete/ high	No	Triton Knoll Sequencing Document ((J.Murphys, 2018) document indicates a construction finish of Q3

Project	Status	Development period	Distance from the Facility (km)	Project definition	Project data status	Included in CIA	Rationale
			Application Site				2019. Which is before the 2021 start of the Facility construction.
Viking Link Interconnector B/17/0340	Application approved	2014 - 2023	Bicker Fen substation 14.4 km from the Application Site	Environmental Statement	Incomplete	Yes	Overlapping proposed project boundaries may result in impacts of a direct and / or indirect nature during construction.
Battery Energy Storage Plant (Marsh Lane) B/17/0467	Application approved	2017 - ongoing	Beeston Farm less than 10 m from the Application Site	Detailed application	Incomplete	No	Project would not result in a significant increase in traffic movements, therefore not taken forward into CIA.
The Quadrant Mixed-use development of 502 dwellings and	Application approved Construction started	2014 – ongoing	Quadrant 1 1.2 km from the Application Site	Details within ES	Quadrant 1 – Complete/ high Quadrant 2 - Incomplete/low	Yes	Overlapping proposed project boundaries may result in impacts of a

Project	Status	Development period	Distance from the Facility (km)	Project definition	Project data status	Included in CIA	Rationale
commercial/ leisure uses B/14/0165							direct and / or indirect nature during construction.
Land to the west of Stephenson Close Residential Development of up to 85 dwellings B/17/0515	Application not yet determined	2017 – ongoing	From the most eastern part of the Scheme to the Application Site is 550 m.	Outline only	Incomplete/low	No	Project would not result in a significant increase in traffic movements, therefore not taken forward into CIA.

19.8.4 A full assessment of potential cumulative traffic and transport impacts arising from the proposed scheme and other plans and projects will be undertaken within the traffic and transport assessment. The findings of the assessment from a cumulative perspective will be reported within the ES, with mitigation measures proposed as required.

19.9 Transboundary Impacts

19.9.1 There are no transboundary impacts with regard to traffic and transport as the Facility is within the UK and would not be sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out the assessment and are not considered further.

19.10 Inter-Relationships with Other Topics

19.10.1 To address the environmental impact of the Facility as a whole, this section establishes the inter-relationships between traffic and transport and other physical, environmental and human receptors. The objective is to identify where the accumulation of impacts on a single receptor, and the relationship between those impacts, may give rise to a need for additional mitigation. **Table 19.29** summarises the inter-relationships that are considered of relevance to traffic and transport and identifies where they have been considered within the ES.

Table 19.29 Chapter Topic Inter-relationships

Topic and Description	Related Chapter	Where addressed in this Chapter
The relationship between traffic and noise upon local residents.	**Chapter 10 Noise and Vibration**	Traffic data included in the assessment in **Sections 19.5** and **19.7** informs Chapter 10 – Noise and Vibration.
The relationship between traffic and related air quality upon local residents.	**Chapter 14 Air Quality**	Traffic data included in the assessment in **Sections 19.5** and **19.7** informs Chapter 14 – Air Quality.
The relationship between traffic and related emissions upon the health of local residents.	**Chapter 21 Health Impacts**	Traffic data included in the assessment in **Sections 19.5** and **19.7** informs Chapter 12 – Health Impacts.

19.11 Interactions

19.11.1 The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts because of that interaction. The worst case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity, the areas of interaction between impacts are presented in **Table 19.30**, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 19.30 Interaction Between Impacts

Potential interaction between impacts				
Construction				
	1 Severance	2 Pedestrian Amenity	3 Road Safety	4 Driver Delay
1 Severance	**-**	**Yes**	**Yes**	**Yes**
2 Pedestrian Amenity	**Yes**	**-**	**Yes**	**Yes**
3 Road Safety	**Yes**	**Yes**	**-**	**Yes**
4 Driver Delay	**Yes**	**Yes**	**Yes**	**-**
Operation				
	1 Pedestrian Amenity	2 Road Safety	3 Driver Delay	
1 Pedestrian Amenity	**-**	**Yes**	**Yes**	
2 Road Safety	**Yes**	**-**	**Yes**	
3 Driver Delay	**Yes**	**Yes**	**-**	
Decommissioning				
It is anticipated that the decommissioning impacts will be similar in nature to those of construction.				

19.12 Summary

19.12.1 Detail conclusions of the assessment here and summarise the impacts in the **Table 19.31** below.

Table 19.31 Impact Summary

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Construction – Peak WCS						
Impact 1: Pedestrian Severance	1, 2, 3, 4, 5, 6, 7.	Low to High	Very Low	Negligible - Minor	N/A	Negligible - Minor
	10.	Low	Medium	Minor	N/A	Minor
Impact 2: Pedestrian Amenity	7	Medium	Very Low	Minor	N/A	Minor
	1, 3, 4, 5.	Low – Medium	Low - Medium	Minor	N/A	Minor
	2, 10.	Low - Medium	Medium - High	Minor	N/A	Minor
	6.	High	Medium	Major	HGV diversion to alternative route (Link 3)	Minor
Impact 2: PRoW Closures	Boston Public Footpath No. 14.	High	Low	Moderate	Utilise traffic lights or banksmen to monitor crossing of section 14/3 during construction period.	Minor
Impact 3: Road Safety	Clusters 1, 2, 3.	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES
Impact 4: Driver Delay	Junctions 1, 2, 3, 4.	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES
Construction – Average WCS						
Impact 1: Pedestrian Severance	1, 2, 6, 10.	Low to High	Very Low	Negligible - Minor	N/A	Negligible - Minor

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Impact 2: Pedestrian Amenity	1, 2, 6.	Low to High	Very Low	Negligible - Minor	N/A	Negligible - Minor
	10	Low	Low	Minor	N/A	Minor
Impact 2: PRoW Closures	Boston Public Footpath No. 14	High	Low	Moderate	Utilise traffic lights or banksmen to monitor crossing of section 14/3 during construction period.	Minor
Impact 3: Road Safety	Clusters 1, 2, 3.	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES
Impact 4: Driver Delay	Junctions 1, 2, 3, 4.	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES
Operation						
Impact 1: Pedestrian Severance	10	Low	Low	Negligible	N/A	Negligible
Impact 2: Pedestrian Amenity	10	Low	Very Low	Negligible	N/A	Negligible
Impact 2: PRoW Closures	Boston Public Footpath No. 14	High	Low	Moderate	Utilise traffic lights or banksmen to monitor crossing of section 14/3 during construction period.	Minor
Impact 3: Road Safety	Clusters 1, 2, 3.	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES	TBD in the ES

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Impact 4: Driver Delay	Junctions 1, 2, 3, 4.	High	Very Low	Minor	N/A	Minor
Decommissioning						
Whilst details regarding the decommissioning of the Facility are currently unknown, considering the worst case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be no worse than those during construction. It is anticipated that the impacts during decommissioning will be similar in nature to those of construction with reduced traffic generation.						

19.13 References

Anon., 2011. National Policy Statement for Renewable Energy Infrastructure (EN-3). [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment data/file/37048/1940-nps-renewable-energy-en3.pdf [Accessed 05 06 2019].

Boston Borough Council with Lincolnshire County Council, 2017. Boston Transport Strategy 2016 - 2036. [Online] Available at: https://www.lincolnshire.gov.uk//Download/104017 [Accessed 14 05 2019].

Chartered Institution of Highways and Transportation, 1996. Cycle-friendly Infrastructure: Guidelines for Planning and Design, London: Chartered Institution of Highways and Transportation.
Department for Transport, 2018. Traffic Counts. [Online] Available at: https://www.dft.gov.uk/traffic-counts/ [Accessed 08 09 2017].

Department of Energy and Climate Change, 2011. Overarching National Policy Statement for Energy (EN-1). [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment _data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 5 6 2019].

J.Murphys, 2018. Triton Knoll Electrical System Cable Route Sequencing Plan. [Online] Available at: http://www.tritonknoll.co.uk/wp-content/uploads/2018/10/2505-JMS-OSC-K-TA-0001_06_Sequence-Plan.pdf [Accessed 6 June 2019].

Lincolnshire Country Council, 2018. Lincolnshire Network Management Plan. [Online] Available at: https://www.lincolnshire.gov.uk//Download/113304 [Accessed 11 12 2019].

Lincolnshire County Council, 2013. 4th Lincolnshire Local Transport Plan 2013/14 - 2022/23. [Online]
Available at: https://www.lincolnshire.gov.uk//Download/102928 [Accessed 19 05 2019].

South East Lincolnshire Joint Strategic Planning Committee (2019). South East Lincolnshire Local Plan 2011-2036.

Ministry of housing, Communities & Local Government, 2014. https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements. [Online]

Available at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements [Accessed 06 05 2019].

Ministry of Housing Communities and Local Government (MHCLG) (2019). National Planning Policy Framework.

The Chartered Institute of Highways and Transportation, 2000. Guidelines for Providing for Journeys on Foot, London: The Chartered Institute of Highways and Transportation.