REPORT

Boston Alternative Energy Facility – Preliminary Environmental Information Report

Chapter 13 Surface Water, Flood Risk and Drainage Strategy

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Non-Technical Summary

This chapter of the PEIR assesses the potential impacts of the Facility of surface water and flood risk. This chapter is supported by a separate Flood Risk Assessment, which assesses the flood risk implications of the Facility in detail, and a Water Framework Directive (WFD) Compliance Assessment, which determines whether the Facility is compliant with the objectives of the WFD.

The Facility is located in the lower catchment of the River Witham, and is drained by a number of ordinary watercourses that are maintained by the Black Sluice IDB. The watercourses have been extensively modified or are largely artificial, and the drainage catchment discharges into the tidal Witham (known as The Haven) through a pumping station. Water quality in the catchment is adversely affected by pressures from sewage discharges, agricultural and rural land management, and industrial discharges. Although the site is at risk from tidal flooding, it currently benefits from primary flood defences which provide a 1 in 150-year standard of protection. Flood risk from fluvial, surface water, groundwater and sewer flooding is low.

The potential impacts of the construction and operation of the Facility on water resources and flood risk receptors are identified in this chapter, and their significance is assessed. The following key potential impacts are described for the construction stage:

- Direct impacts on drainage systems.
- Increased sediment supply.
- Accidental release of contaminants.
- Changes to surface water runoff and flood risk.

In addition, the following impacts are described for the operation stage:

- Changes to surface water runoff and flood risk.
- Supply of fine sediment and other contaminants.

Following the application of embedded measures to manage sediment, pollution and drainage, none of these potential imapcts were determined to be significant in EIA terms. The Facility is also compliance with the WFD, and would not result in increased flood risk on or off the site.

13 Surface Water, Flood Risk and Drainage Strategy

13.1 Introduction

13.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) describes the existing environment in relation to surface water, flood risk and drainage, and considers the potential impacts during the construction, operational and decommissioning phases of the Boston Alternative Energy Facility ('the Facility'). Mitigation measures are identified and a discussion of the residual impacts are provided where significant impacts were identified.

13.1.2 The assessment also considers the cumulative impacts of other proposed projects. The proposed methodology adhered to for the Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) is discussed in **Section 13.5**.

13.1.3 This chapter should also be read in conjunction with **Chapter 11 Contaminated Land, Land Use and Hydrogeology**, **Chapter 12 Terrestrial Ecology**, **Chapter 15 Marine Water and Sediment Quality**, **Chapter 16 Estuarine Processes** and **Chapter 17 Marine and Coastal Ecology**.

13.1.4 This chapter is supported by two appendices:

- **Appendix 13.1**: **Water Framework Directive (WFD) Compliance Assessment.**
- **Appendix 13.2: Flood Risk Assessment (FRA).**

13.1.5 This chapter has been prepared in accordance with the relevant National Policy Statements (NPS): The Overarching National Policy Statement for Energy (EN-1); and the National Policy Statement for Renewable Energy (EN-3).

13.2 Legislation, Policy and Guidance

International Legislation

Water Framework Directive (2000/60/EC)

13.2.1 The Water Framework Directive (WFD) (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission (EC) in December 2000 (European Parliament, 2000). The WFD requires that all European Union (EU) Member States must protect and enhance the status of all aquatic ecosystems and prevent their deterioration. Therefore, it must be ensured that new schemes do not

adversely impact upon the status of aquatic ecosystems. In addition, historical modifications that are currently impacting on them need to be addressed.

13.2.2 Unlike the EU Birds and Habitats Directives (European Commission (EC) Directive on the Conservation of Wild Birds (2009/147/EC) (European Parliament, 2009) and EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (European Parliament, 1992), respectively), which apply only to designated sites, the WFD applies to all water bodies, including those that are man-made.

13.2.3 There are two separate classifications (ecological and chemical) for surface water bodies which include rivers, lakes, estuaries and coastal waters. The ecological status of a surface water body is assessed according to the condition of:

- The biological quality elements, including fish, benthic invertebrates and aquatic flora;
- Hydromorphological quality elements, including morphological conditions, hydrological regime and tidal regime; and
- Physico-chemical quality elements, including thermal conditions, salinity, pH, nutrient concentrations and concentrations of specific pollutants such as copper.

13.2.4 The ecological status of surface waters is recorded on a scale of ‘high’, ‘good’, ‘moderate’, ‘poor’ and ‘bad’. The ecological status of a water body is determined by the worst scoring quality element, which means that the condition of a single quality element can cause a water body to fail to reach its WFD classification objectives. The overall environmental objective of reaching Good Ecological Status (GES) applies to these water bodies.

13.2.5 The chemical status of surface waters is assessed by compliance with environmental standards that are listed in the EC Environmental Quality Standards Directive (2008/105/EC) (European Parliament, 2008). These chemicals include priority substances and priority hazardous substances. Chemical status is recorded as either ‘good’ or ‘fail’ and is determined by the lowest scoring chemical.

13.2.6 Where the hydromorphology of a surface water body has been significantly altered as a result of anthropogenic activities, it can be designated as an Artificial or Heavily Modified Water Body (A/HMWB). An alternative environmental objective, Good Ecological Potential (GEP), applies in these cases.

Floods Directive (2007/60/EC)

13.2.7 The Floods Directive (Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks) (European Parliament, 2007) came into force in November 2007. The Floods Directive requires all EU Member States to assess whether all watercourses and coast lines are at risk of flooding and to map the associated flood extent, to identify the assets and people at risk within these areas. It requires Member States to establish flood risk management plans focused on the prevention, protection and preparedness to flooding.

National Legislation and Policy

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

13.2.8 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (HMSO, 2017) recently replaced the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (HMSO, 2003a). This transposes the WFD into national law and provides for its implementation, including the designation of all surface waters (rivers, lakes, transitional (estuarine) waters, coastal waters and ground waters) as water bodies, and the requirement to achieve GES or GEP.

Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

13.2.9 The WFD (Standards and Classification) Directions (England and Wales) 2015 (HMSO, 2015) provide the standards used to determine the ecological or chemical status of a water body. These include:

- The thresholds for determining the biological, hydromorphological and physico-chemical status of surface water bodies; and
- The thresholds for determining the quantitative and chemical status of groundwater bodies.

Flood Risk Regulations 2009

13.2.10 The Floods Directive was transposed into UK law by the Flood Risk Regulations 2009 (HMSO, 2009) requiring the assessment and management of flood risk in England and Wales. The Regulations set out requirements related to the duties of the Environment Agency and Lead Local Flood Authorities with regard to the preparation of Preliminary Flood Risk Assessments (PFRAs), flood hazard maps and flood risk maps and flood risk management plans.

Flood and Water Management Act 2010

13.2.11 The Flood and Water Management Act (FWMA) (HMSO, 2010) aims to improve both flood risk management and the way we manage our water resources by creating clearer roles and responsibilities. This includes a lead role for local authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role of all flood risk for the Environment Agency. The FWMA provides opportunities for a comprehensive, risk-based approach on land use planning and flood risk management by local authorities and other key partners.

Land Drainage Act 1991

13.2.12 The Land Drainage Act 1991 (HMSO, 1991a) assigns landowners as the responsible parties for maintaining flows in watercourses, and provides Local Authorities with powers to compel landowners to maintain flows in watercourses.

Water Resources Act 1991, Water Act 2003 and The Environmental Permitting (England and Wales) Regulations 2016

13.2.13 The Water Resources Act 1991 (HMSO, 1991b) makes it an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act 2003 (HMSO, 2003b), which establishes regulatory controls for water abstraction, water impoundment and protection of water resources. The Environmental Permitting (England and Wales) Regulations 2016 (HMSO, 2016) establish provisions for the regulation of water discharges to controlled waters, which replaced provisions from the earlier Acts.

National Planning Policy Framework (2019) and Supporting Guidance

13.2.14 The National Planning Policy Framework (NPPF) was updated in 2019 (MHCLG, 2019) and sets out the UK Government's planning policies for England. The NPPF seeks to:

- Ensure that flood risk is considered at all stages in the planning and development process;
- Avoid inappropriate development in areas at highest risk of flooding (whether existing or future);
- Safeguard land from development that is required, or likely to be required, for current or future flood management; and
- Direct development to areas with lowest risk of flooding.

13.2.15 The National Planning Practice Guidance (NPPG) on Flood Risk and Coastal Change (MHCLG, 2014) supports the NPPF with additional guidance on flood risk vulnerability classifications and managing residual risks. The NPPG makes use of the concepts of Flood Zones, Vulnerability Classifications and Compatibility in order to assess the suitability of a specific site for a certain type of development:

- Flood Zone 3 represents land with a "high" flood risk classification. Flood Zone 3a comprises land having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. Flood Zone 3b comprises land where water has to flow or be stored in times of flood.
- Flood Zone 2 represents land with a "medium" flood risk classification and refers to land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in any year.
- Flood Zone 1 represents land with a "low" flood risk classification and refers to land having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).

13.2.16 The NPPF directs development away from areas at the highest risk of flooding via application of the Sequential Test. If, following application of the Sequential Test, it is not possible for the project to be located in zones with a lower probability of flooding; the Exception Test can be applied if appropriate. Additional information on the requirements of the NPPF are provided in **Appendix 13.2**.

The Planning Act 2008

13.2.17 The Planning Act 2008 (HMSO, 2008) is the primary legislation that establishes the legal framework for applying for, examining and determining applications for Nationally Significant Infrastructure Projects (NSIPs), considering the guidance in National Policy Statements. NSIPs are usually large-scale developments such as power generating stations, electricity lines, waste and water developments or pipelines. They require a Development Consent Order (DCO) which allows permission to construct and operate, governed by the Planning Act 2008.

13.2.18 The Planning Act 2008, the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009, the Overarching National Policy Statement for Energy (EN-1) and the National Policy Statement for Renewable Energy Infrastructure (EN-3) together set out the overarching DCO process and obligations for renewable forms of energy infrastructure. This includes projects generating energy using advanced thermal technologies, such as gasification

facilities, with a generating capacity of greater than 50 megawatts (MW).

National Policy Statements

13.2.19 Section 104 of the Planning Act 2008 requires the Secretary of State (SoS) to determine applications for NSIPs in accordance with any relevant National Policy Statements (NPSs). NPSs are produced by the UK Government and provide the national policy framework against which proposals for major infrastructure projects are examined and decided on by the Planning Inspectorate. NPSs include the Government's objectives for the development of NSIPs in particular sectors and must be taken into account by the Planning Inspectorate in the examination of applications for development consent and by Ministers when making decisions.

13.2.20 There are twelve NPSs in total, of which six are relevant to energy and were produced by the former Department of Energy and Climate Change (DECC). The DECC was recently replaced by the Department for Business, Energy and Industrial Strategy (BEIS). The NPSs relating to nationally significant energy infrastructure received designation by the SoS for DECC in July 2011.

13.2.21 The NPSs that are relevant to the Project include:

- Overarching National Policy Statement for Energy (EN-1) (DECC, 2011a); and
- National Policy Statement for Renewable Energy (EN-3) (DECC, 2011b).

13.2.22 Part 4 of EN-1 sets out a number of 'assessment principles' that must be considered by applicants and the Secretary of State in preparing and determining applications for nationally significant energy infrastructure. General points include (paragraph 4.1.2); the requirement for the SoS, given the level and urgency of need for the infrastructure covered by the energy NPSs, to start with a presumption in favour of granting consent for applications for energy NSIPs. This presumption applies unless any more specific and relevant policies set out in the relevant NPS clearly indicate that consent should be refused or any of the considerations referred to in Section 104 of the 2008 Act (noted above) apply.

13.2.23 In addition to a number of the assessment principles and generic impacts covered by EN-1 (where relevant to fossil fuel generating stations); EN-3 sets out the factors (e.g. factors influencing site selection) and 'assessment and technology specific' considerations to be taken into account in the preparation and assessment of applications for renewable energy infrastructure; including relevant environmental matters, such as, amongst others, noise and vibration, landscape

and visual, air quality, water quality, soil and geology, transport, and biodiversity.

13.2.24 **Table 13.1** below summarises the specific assessment requirements for surface water, flood risk and drainage, as detailed in the NPS, together with an indication of the section of the PEIR chapter where each is addressed.

Table 13.1 NPS EN-1 and EN-3 Assessment Requirements with Relevance to Water Resources and Flood Risk

NPS Requirement	NPS Reference	PEIR Reference
Overarching National Policy Statement for Energy (EN-1)		
'Where a proposed development on land within or outside an SSSI [Site of Special Scientific Interest] is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.'	Section 5.3.11	**Chapter 17 Marine and Coastal Ecology**
'Applications for energy projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales and all proposals for energy projects located in Flood Zones 2 and 3 in England or Zones B and C in Wales should be accompanied by a flood risk assessment (FRA). A FRA will also be required where an energy project less than 1 hectare may be subject to sources of flooding other than rivers and the sea (for example surface water), or where the Environment Agency (EA), Internal Drainage Board or other body have indicated that there may be drainage problems. This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.'	Section 5.7.4	**Appendix 13.2: Flood Risk Assessment (FRA)**
'Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. The ES should in particular describe:	Section 5.15.2, 5.15.3	**Chapter 13 Surface Water, Flood Risk and Drainage Strategy.**

NPS Requirement	NPS Reference	PEIR Reference
• The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges; • Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies); • Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and • Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.'		
'Where the development is subject to EIA [Environmental Impact Assessment] the applicant should ensure that the ES [Environmental Statement] clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Infrastructure Planning Commission (IPC) [now the Planning Inspectorate] consider thoroughly the potential effects of a proposed project.'	Section 5.3	**Chapter 17 Marine and Coastal Ecology** (and **Appendix 17.1**).
National Policy Statement for Renewable Energy Infrastructure (EN-3)		
Generic water quality and resource impacts are set out in Section 5.15 of EN-1. The design of water cooling systems for EfW (Energy from Waste) and biomass generating stations will have additional impacts on water quality, abstraction and discharge. These may include: • Discharging water at a higher temperature than the receiving water, affecting the biodiversity of aquatic flora and fauna; • Use of resources may reduce the flow of watercourses, affecting the rate at which sediment is deposited, conditions for aquatic flora and potentially affecting migratory fish species (e.g. salmon); • Fish impingement and/or entrainment – i.e. being taken into the cooling system during abstraction; and	Section 2.5	**Chapter 15 Marine Water and Sediment Quality**

NPS Requirement	NPS Reference	PEIR Reference
• Discharging water containing chemical anti-fouling treatment of water for use in cooling systems may have adverse impacts on aquatic biodiversity.		

Regional Policy

Anglian River Basin District River Basin Management Plan

13.2.25 The River Basin District Management Plan (RBMP) (Defra & EA, 2016) is a strategic document that sets out the objectives that have been set for implementation of the WFD at a regional (River Basin District (RBD)) level. The purpose of a RBMP is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.

13.2.26 The second RBMP for the Anglian RBD was finalised by Defra and the Environment Agency in December 2015 and published in February 2016. This document sets out the current state of the water environment according to WFD parameters, pressures affecting the water environment, environmental objectives for protecting and improving the waters, programme of measures to improve the water environment and deliver WFD objectives, actions needed to achieve the objectives, progress since the first RBMP was published in 2009, and also informs decisions on land-use planning because water and land resources are closely linked.

Lincolnshire Flood Risk and Drainage Management Framework

13.2.27 Lincolnshire County Council, in partnership with local district councils and the Environment Agency, created the Lincolnshire Flood Risk and Drainage Management Partnership Framework in 2010 as part of its role as Lead Local Flood Authority (LLFA) (Lincolnshire County Council, 2010). The partnership implements the recommendations of the Flood and Water Management Act 2010 (HMSO, 2010) aimed at ensuring that the local communities and infrastructure of Lincolnshire are better protected from flood risk and improving the resilience of all aspects of planning and service provision in the future. It includes a unique strategy group chaired by the Environment Agency to ensure the strategic direction of the Environment Agency's flood and coastal risk management role is integrated with that of the LLFA.

13.2.28 The Lincolnshire Flood Risk and Drainage Management Partnership is led by

Lincolnshire County Council (as the LLFA) and supported by the Environment Agency, District Councils, Anglian Water and the Internal Drainage Boards (IDBs). The partnership coordinates countywide functions, empowering the Risk Management Authorities to deliver flood risk management and drainage solutions at a local level.

Local Planning Policy

13.2.29 NPS EN-1 (DECC, 2011a) recognises that local development plan documents may be both important and relevant to decision making, however, in the event of conflict with an NPS, it is expected that the latter will prevail. The following policies will be considered during the EIA process:

South-East Lincolnshire Local Plan 2011 – 2036 (adopted 8th March 2019)

13.2.30 The South-East Lincolnshire Local Plan 2011 – 2036 was adopted in March 2019 (South-East Lincolnshire Joint Strategic Planning Committee (the Joint Committee), 2019). The Joint Committee is a partnership of Boston Borough, South Holland District and Lincolnshire County Councils who have worked together to create a single Local Plan for South-East Lincolnshire. Before this Local Plan was adopted, the Development Plan for South-East Lincolnshire consisted of the 'saved policies' of the Boston Borough Local Plan and the South Holland District Local Plan and the adopted policies of the Minerals and Waste Plan.

- **Policy 2: Development Management** – this is a general policy that relates to sustainable development considerations are met. Reference is made specifically to sustainable drainage and flood risk and the impact or enhancement for areas of natural habitats.
- **Policy 3: Design of New Development** – this policy relates to the creation of distinctive places through the use of high quality and inclusive design and layout and, where appropriate. Design which is inappropriate to the local area, or which fails to maximise opportunities for improving the character and quality of an area, will not be acceptable. The mitigation of flood risk through flood-resistant and flood-resilient design and sustainable drainage systems (SuDS) and the incorporation of existing hedgerows and trees and the provision of appropriate new landscaping to enhance biodiversity, green infrastructure, flood risk mitigation and urban cooling are specifically referenced.
- **Policy 4: Approach to Flood Risk** - much of the land within the Local Plan area is at significant risk of flooding and this will increase with climate change. The Plan provides a robust response to this issue and at the same

time facilitates appropriate development to continue in a way that is resilient to the potential consequences of flooding.

- **Policy 28: The Natural Environment** – this policy relates to protecting, enhancing and managing natural assets.
- **Policy 30: Pollution** – development proposals will not be permitted where, taking account of any proposed mitigation measures, they would lead to unacceptable adverse impacts on humans and the environment, including surface and groundwater quality.
- **Policy 31: Climate Change and Renewable and Low Carbon Energy** – all development proposals will be required to demonstrate that the consequences of current climate change has been addressed, minimised and mitigated. This includes the adoption of the sequential approach and Exception Test to flood risk and the incorporation of flood-mitigation measures in design and construction and the protection of the quality, quantity and availability of water resources. This policy also relates to renewable energy facilities.

Black Sluice Internal Drainage Board Policy Statement

13.2.31 The Black Sluice Internal Drainage Board (IDB) is responsible for meeting the national policy aims and objectives in the Black Sluice Internal Drainage District (IDD), as stated in the National Flood and Coastal Erosion Risk Management Strategy for England 2011 (the National Strategy) (EA, 2011). The National Strategy's overall aim is to ensure that the risk of flooding and coastal erosion is properly managed in a co-ordinated way by a variety of organisations to manage decision-making and action at an appropriate level.

13.2.32 The strategy sets out five objectives in pursuance of the overall aims as follows:

- Understand the risks of flooding and coastal erosion, working together to put in place long-term sustainable plans to manage these risks;
- To avoid inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks;
- Build, maintain and improve flood and coastal erosion management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society as well as achieving wider environmental benefits.
- Increase public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient; and

- Improving the detection, forecasting and issue of warnings of flooding, co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

13.2.33 The IDB makes decisions regarding flood risk within the District, taking into account the assets in place considering their design standard and life, Environment Agency and Lead Local Flood Authority flood risk strategies, plans and maps and other information such as the history of flooding and land use impacts. They are responsible for 755 km of watercourses, 4 km of raised embankments and 34 pumping stations (63 pumps) within the Black Sluice IDD. They carry out their responsibilities by:

- Building, maintaining and improving flood and coastal erosion risk management systems;
- Regulating activities – avoiding inappropriate development and land management;
- Effective communication and transparency; and
- Carrying out conservation duties and consideration of specific environmental measures, e.g. when carrying out work (maintenance or improvements) they aim to avoid unnecessary or long-term damage to agricultural interests or to natural habitats and species, monitor gains or losses of biodiversity and take opportunities to carry out enhancement work where possible.

Assessment Guidance

13.2.34 The assessment methodology used in this chapter follows the methodology set out in **Chapter 6 Approach to EIA**. Where appropriate, reference has been made to established methods for undertaking environmental impact assessments for water and flood risk receptors presented in guidance from the Department of Transport (2015), Department for Communities and Local Government (2014) and Highways Agency (2008).

13.2.35 Unique assessment approaches are taken for the WFD and FRA, please refer to **Appendix 13.1** and **Appendix 13.2**.

13.3 Consultation

13.3.1 Consultation undertaken throughout the pre-application phase has informed the approach taken and the information provided in this Chapter. A summary of the comments received from the Planning Inspectorate within the Environmental Scoping Opinion (The Planning Inspectorate, 2018) of particular relevance to

surface water and flood risk is provided in **Table 13.2.** This also summarises the outcomes of a meeting held with the Environment Agency on 13th December 2018.

Table 13.2 Consultation and Responses

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
The Planning Inspectorate Scoping Opinion (July 2018)	The Inspectorate notes that groundwater levels stated within the Scoping Report are derived from existing information from the Boston Biomass plc (note: this facility is operated by Biomass UK No 3 Limited) plant. The ES should explain the extent to which this data is relevant to the receiving environment for the Proposed Development. The Scoping Report states that the British Geological Survey (BGS) flood risk information indicates that the site is not located within an area with potential ground water flooding. To aid the reader the ES should include the BGS groundwater flood risk map. The ES should include a ground water risk assessment to assess the potential effects that accidental spills of pollutants may have on the groundwater. Furthermore, if de-watering is required during the construction phase of the Proposed Development, the environmental effects of de-watering should be assessed and presented within the ES.	**Chapter 11 Contaminated Land, Land use and Hydrogeology**
The Planning Inspectorate Scoping Opinion (July 2018)	The Applicant proposes to scope out an assessment of significant environmental effects to The Wash Inner WFD water body on the basis that the distance from the Proposed Development and the embedded mitigation measures will avert a likely significant effect. However, the Scoping Report does not include sufficient information about the embedded mitigation to enable the Inspectorate to scope this matter out of the ES. Therefore, any likely significant environmental effects on The Wash must be assessed in the ES, with appropriate cross reference to the ecological assessment(s) taking into account the nature conservation designations associated with this feature (The Wash Special Protection Area (SPA), SSSI and Ramsar and The Wash and North Norfolk Coast Special Area of Conservation (SAC)).	**Chapter 13 Surface Water, Flood Risk and Drainage Strategy** (and **Appendix 13.1: WFD Compliance Assessment**), **Chapter 17 Marine and Coastal Ecology , Chapter 16 Estuarine Processes**

13.4 Assessment Methodology

Impact Assessment Methodology

Overall approach

13.4.1 This section sets out the overall approach to the assessment and highlights the main potential impacts on surface water, flood risk and drainage receptors.

Separate, more detailed, methodologies for the WFD compliance assessment and FRA can be found in **Appendix 13.1** and **Appendix 13.2**, respectively.

13.4.2 Two key groups of impacts have been identified for the purpose of defining impact significance:

- Surface waters: these are potential effects on the physical (including hydrology and geomorphology), biological or chemical character of surface waters, potentially impacting on secondary receptors such as wetlands or abstractions, and WFD water body status.
- Drainage and flood risk: these are the potential impacts of the project on site drainage, conveyance and surface water flooding.

13.4.3 Whilst there are clear links between the two impact groups, the assessment of receptor sensitivity and magnitude of effect may differ. Definitions of receptor sensitivity and value and impact magnitude and significance are provided in the paragraphs below. These definitions have been developed with reference to guidance provided by the Department of Transport (2015) and Highways Agency (2008).

13.4.4 Our proposed approach follows the four-level classification of receptor sensitivity and value and impact magnitude recommended by the Department of Transport (2015) (i.e. high, medium, low, negligible) rather than the five-level system recommended in Highways Agency (2008) (very high, high, medium, low, negligible) to ensure that it is consistent with the approach adopted in the other chapters of the EIA. However, the Highways Agency (2008) guidance has been fully consulted and used to inform the definition of each key assessment term where appropriate.

Sensitivity

13.4.5 Receptor sensitivity has been defined with reference to the adaptability, tolerance, recoverability and value of individual receptors. **Table 13.3** provides the criteria for appraisal of the value and sensitivity for identified water resources and flood risk receptors based on professional judgement.

Table 13.3 Definitions of Sensitivity for Water Resources and Flood Risk Receptors

Sensitivity	Definition
High	Receptor has very limited capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources*

Sensitivity	Definition
	• Controlled waters with an unmodified, naturally diverse hydrological regime, a naturally diverse geomorphology with no barriers to the operation of natural processes, and good water quality. • Supports habitats or species that are highly sensitive to changes in surface hydrology, geomorphology or water quality. *Flood risk* • Highly Vulnerable Land Use, as defined by NPPF NPPG on Flood Risk and Coastal Change (Department for Communities and Local Government (DCLG) 2014). • Land with more than 100 residential properties (after Design Manual for Roads and Bridges, Highways Agency, 2008).
Medium	Receptor has limited capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with hydrology that sustains natural variations, geomorphology that sustains natural processes, and water quality that is not contaminated to the extent that habitat quality is constrained. • Supports or contributes to habitats or species that are sensitive to changes in surface hydrology, geomorphology and/or water quality. *Flood risk* • More Vulnerable Land Use, as defined by NPPF NPPG on Flood Risk and Coastal Change (DCLG, 2014). • Land with between 1 and 100 residential properties or more than 10 industrial premises (after Highways Agency, 2008).
Low	Receptor has moderate capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with hydrology that supports limited natural variations, geomorphology that supports limited natural processes and water quality that may constrain some ecological communities. • Supports or contributes to habitats that are not sensitive to changes in surface hydrology, geomorphology or water quality. *Flood risk* • Less Vulnerable Land Use, as defined by NPPF NPPG on Flood Risk and Coastal Change (DCLG, 2014). • Land with 10 or fewer industrial properties (after Highways Agency, 2008).
Negligible	Receptor is generally tolerant of changes to hydrology, geomorphology, and water quality or flood risk.

Sensitivity	Definition
	Water resources • Controlled waters with hydrology that does not support natural variations, geomorphology that does not support natural processes and water quality that constrains ecological communities. • Aquatic or water-dependent habitats and/or species are tolerant to changes in hydrology, geomorphology or water quality. *Flood risk* • Water Compatible Land Use, as defined by NPPF NPPG on Flood Risk and Coastal Change (DCLG, 2014). • Land with limited constraints and a low probability of flooding of residential and industrial properties (after Highways Agency, 2008).

Value

13.4.6 It should be noted that high value and high sensitivity are not necessarily linked with respect to a particular impact. A receptor could be of high value but have a low sensitivity to an effect. It is therefore important not to inflate the significance of an impact due to the value of the receptor. Instead, the value can be used as a modifier for the sensitivity assigned to the receptor. Definitions for the value of surface waters are provided in **Table 13.4**.

Table 13.4 Definitions of Value Levels for Water Resources and Flood Risk Receptors

Value	Definition
High	Receptor has a high quality and rarity, and is an internationally or nationally important resource with very limited potential for offsetting, compensation or substitution. *Water resources* • Supports or contributes to designated habitats or species of international or national importance (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), and Site of Special Scientific Interest (SSSI)). • Licensed potable abstractions (surface water). *Flood risk* • Nationally significant infrastructure. • Internationally or nationally designated planning policy areas.
Medium	Receptor has a medium quality and rarity, and is a regionally important resource with limited potential for offsetting, compensation or substitution. *Water resources*

Value	Definition
	• Supports or contributes to habitats or species of UK regional value (Site of Nature Conservation Interest (SNCI), Regionally Important Geological Site (RIGS)). • Licensed non-potable abstractions and unlicensed potable abstractions (surface water). *Flood risk* • Locally significant infrastructure. • Local planning policy designated sites.
Low	Receptor has a low quality and rarity, and is a locally important resource with some potential for offsetting, compensation or substitution. *Water resources* • Supports or contributes to habitats or species of local value (e.g. Local Nature Reserve (LNR)). • Unlicensed non-potable abstractions (surface water). *Flood risk* • Drainage that does not discharge to Critical Drainage Areas.
Negligible	Receptor has a very low quality and rarity, and is not considered to be an important resource. *Water resources* • Does not support or contribute to habitats or species of particular importance. • No abstractions (surface water). *Flood risk* • No significant infrastructure.

Magnitude

13.4.7 Receptor magnitude has been defined with consideration to the spatial extent, duration, frequency and severity of the effect. Impact magnitude is defined in **Table 13.5Error! Reference source not found.**.

Table 13.5 Definitions of Impact Magnitude for Water Resources and Flood Risk Receptors

Value	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the receptor's character or distinctiveness. *Water resources*

Value	Definition
	• Permanent changes to geomorphology and/or hydrology that prevent natural processes operating. • Permanent and/or wide scale effects on water quality or availability. • Permanent loss or long-term (>5 years) degradation of a water supply source (surface water) resulting in prosecution. • Permanent or wide scale degradation of habitat quality. • Deterioration in water body status or prevention of future achieving status objectives. *Flood risk* • Permanent or major change to existing flood risk. • Reduction in on-site flood risk by raising ground level in conjunction with provision of compensation storage. • Increase in off-site flood risk due to raising ground levels without provision of compensation storage. • Failure to meet either sequential or exception test (if applicable).
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the receptor's character or distinctiveness. *Water resources* • Medium-term (1-5 years) effects on water quality or availability. • Medium-term (1-5 years) degradation of a water supply source (surface water), possibly resulting in prosecution. • Habitat change over the medium-term (1-5 years). *Flood risk* • Medium-term (1-5 years) or moderate change to existing flood risk. • Possible failure of sequential or exception test (if applicable). • Reduction in off-site flood risk within the local area due to the provision of a managed drainage system.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the receptor's character or distinctiveness. *Water resources* • Short-term (<1 year) or local effects on water quality or availability. • Short-term (<1 year) degradation of a water supply source (surface water). • Habitat change over the short-term. *Flood risk* • Short-term (<1 year), temporary or minor change to existing flood risk. • Localised increase in on-site or off-site flood risk due to increase in impermeable area.

Value	Definition
	• Passing of sequential and exception test.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the receptor's character or distinctiveness. *Water resources* • Intermittent impact on local water quality or availability. • Intermittent or no degradation of a water supply source (surface water). • Very slight local changes to habitat that have no observable impact on dependent receptors. *Flood risk* • Intermittent or very minor change to existing flood risk. • Highly localised increase in on-site or off-site flood risk due to increase in impermeable area.

Impact significance

13.4.8 The potential significance of an impact is a function of the sensitivity and value of the receptor and the magnitude of the effect. It should be noted that value and sensitivity are not necessarily linked with respect to a particular impact. A receptor could be of high value but have a low sensitivity to an effect. The value is therefore used as a modifier for the sensitivity assigned to the receptor.

13.4.9 Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool. Note that impacts may be adverse or beneficial. Effects that result in major or moderate impacts are considered to be 'significant' in EIA terms. Adverse significant impacts may require mitigation; beneficial significant impacts could contribute to the case in favour of the project.

Cumulative Impact Assessment

13.4.10 Cumulative impacts are discussed where the project has the potential to overlap with similar effects arising from other projects alongside the proposed scheme. Plans and projects which should be included in the Cumulative Impact Assessment (CIA), according to the Planning Inspectorate Advice Note 17, include:

- Projects that are under construction;
- Permitted applications, not yet implemented;
- Submitted applications not yet determined;
- Projects on the Planning Inspectorate's Programme of Projects;
- Development identified in relevant Development Plans;
- Sites identified in other policy documents as development reasonably likely to come forward.

Transboundary Impact Assessment

13.4.11 There are no transboundary impacts with regards to surfaced water, flood risk and drainage because the Application Site is not sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out of this assessment and will not be considered further in this assessment.

13.5 Scope

Study Area

13.5.1 The Study Area for surface water resources and flood risk has been defined on the basis of surface hydrological catchments. Catchments have been included in the Study Area if they contain components of the proposed development or are hydrologically connected to (i.e. upstream or downstream) these catchments. The Environment Agency's WFD river water body catchments are based on surface hydrological catchments and have therefore been used to delineate the boundaries of the Study Area and define surface water receptors (**Figure 13.1**).

Data Sources

13.5.2 The assessment was undertaken with reference to several sources, as detailed in **Table 13.6.**

Table 13.6 Key Information Sources

Data Source	Reference
Environment Agency's Flood Map for Planning	https://flood-map-for-planning.service.gov.uk/
Environment Agency's Product 4 data	Environment Agency, Flood Risk Information. Reference: CCN/2018/101492. Dated: 11/10/2018
Environment Agency's Product 8 data	Environment Agency, Flood Risk Information. Reference: CCN/2018/101492. Dated: 11/10/2018

Data Source	Reference
Environment Agency's Risk of Flooding from Surface Water	https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (Accessed 29/11/2018)
Environment Agency's Risk of Flooding from Rivers and Sea	https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (Accessed 29/11/2018)
Environment Agency's Risk of Flooding from Reservoirs	https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (Accessed 29/11/2018)
Environment Agency's Catchment Data Explorer for WFD River Basin Districts Management Catchments, Operational Catchments and WFD water bodies;	https://environment.data.gov.uk/catchment-planning/ (Accessed 25/10/2018)
Internal Drainage Board (IDB) data regarding classification of drains within the Black Sluice Internal Drainage Board	https://www.blacksluiceidb.gov.uk/about/map-of-district/ (Accessed 25/10/2018)
Anglian River Basin District River Basin Management Plan	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718327/Anglian_RBD_Part_1_river_basin_management_plan.pdf (Accessed 13/12/2018)
Lincolnshire Flood Risk and Drainage Management Partnership Framework	https://www.lincolnshire.gov.uk/residents/environment-and-planning/flood-risk-management/flood-risk-management-partnership/103046.article (Accessed 13/12/2018)
South-East Lincolnshire Local Plan 2011 - 2036	http://www.southeastlincslocalplan.org/adopted-plan/ (Accessed 30/05/19)
Natural England Designated Sites website for information on SACs, SPAs, and SSSIs.	https://designatedsites.naturalengland.org.uk/ (Accessed 19/10/2018)

Assumptions and Limitations

13.5.3 This assessment is based on a range of publicly available information and data. Although it is considered that the individual datasets provided are robust, there is a level of uncertainty associated with their use in this impact assessment rather than their original intended purpose (e.g. WFD status metrics used as a proxy for the broader characteristics of a surface watercourse).

13.6 Existing Environment

13.6.1 This section covers the freshwater water bodies and does not consider

groundwater or estuarine water bodies. Estuarine water and sediment quality are discussed in **Chapter 15 Marine Water and Sediment Quality**. Estuarine processes are discussed in **Chapter 16 Estuarine Processes**. Further information on the designated sites is provided in **Chapter 17 Marine and Coastal Ecology**. **Chapter 11 Contaminated Land, Land Use and Hydrogeology** describes contaminated land, land use and hydrogeology.

Surface water drainage

13.6.2 The eastern extent of the Facility directly adjoins the tidal River Witham. The tidal extent of the River Witham is known as The Haven, which starts from the Grand Sluice, to the mouth of The Wash. The River Witham rises south of Grantham, passes through Lincoln and drains into The Wash via The Haven approximately 7k m downstream of the proposed development site (**Figure 13.1**). The downstream reaches of the river, where it meets the sea, includes a wide range of intertidal features including intertidal mudflats, saltmarshes and sand and shingle banks and beaches.

13.6.3 In addition, there is an extensive network of drainage systems within the vicinity of the Application Site (Black Sluice IDB, 2018).

13.6.4 Although the Application Site falls within an IDD which is administered by the Black Sluice IDB, the watercourses located within the boundary of the Facility are not directly managed or maintained by the Black Sluice IDB, although they are located within the IDB's Catchment 6: Wyberton Marsh and are directly connected to the IDB drainage network (**Figure 13.1**). The catchment has a total area of 1,981 ha.

13.6.5 The watercourses drain into the Wyberton Towns Drain (Drain Number 19, 20 and 32) to the south and the Bittern Way Drain (Drain Number 25; itself a tributary of the Wyberton Towns Drain) to the west. The Wyberton Towns Drain flows south and eastwards until it discharges into The Haven through Wyberton Marsh pumping station (a three-pump station with a maximum capacity of 2,803 l/s and a maximum design water level of 0.00 m AOD).

13.6.6 The watercourses located within the Application Site are largely open channel / ditches. The Bittern Way Drain, Wyberton Towns Drain and other exposed surface watercourses flow in very straight, narrow, artificial channels with largely unreinforced earth banks.

13.6.7 Although there are two offline ponds marked on OS mapping of the site, the northernmost (adjacent to The Haven) is no longer present. The southern pond

is an artificial feature with extensive vegetation growth that is used as a surface water attenuation pond for the industrial estate.

Water quality

13.6.8 WFD classification data from the Environment Agency's Catchment Data Explorer (2016) indicate that water quality in the surface drainage network is below the required standards. Surface waters are affected by pressures from sewage discharges, agricultural and rural land management and industrial discharges. These pressures combine to result in low dissolved oxygen concentrations, high concentrations of phosphate, aldrin, dieldrin, endrin, isodrin and tributyltin and high temperatures. Water quality is sufficiently poor to adversely impact upon fish populations.

Flood risk

13.6.9 Environment Agency flood zone maps (EA Flood Map for Planning, undated) indicate that the Application Site is located in Flood Zone 3; however, the Environment Agency has confirmed this reflects tidal flood risk rather than fluvial flood risk. The Application Site currently benefits from the presence of primary defences with an effective crest level of 6.1 m AOD which provide a 1 in 150-year standard of protection. Areas of the Application Site also benefit from a secondary flood defence, known as the Sea Bank or 'Roman Bank', with a crest level of approximately 5.2 m AOD.

13.6.10 Surface water flood risk on the Application Site is primarily very low, with small areas of increased surface water flood risk, across the Application Site, associated with existing drains / watercourses and localised low-lying points. The Application Site is largely agricultural although there may be some highway drainage associated with Nursery Road along the western boundary of the Application Site.

13.6.11 The risk of flooding from sewers is considered to be low. The Application Site is not located in an area at risk of flooding from canals or reservoirs.

13.6.12 Therefore, the primary source of flooding that may affect the Application Site is from tidal flooding with a minimal risk of surface water flooding.

13.6.13 The FRA, **Appendix 13.2** provides a detailed description of the baseline flood risk of the Study Area.

13.7 Potential Impacts

Embedded Mitigation

13.7.1 Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. As part of the project design, several embedded mitigation measures have been proposed to reduce potential impacts on surface water, flood risk and drainage strategy. These measures are considered standard industry practice for this type of the development.

13.7.2 **Table 13.7** below outlines the key embedded mitigation relevant for this assessment. Where embedded mitigation measures have been developed into the design of the Facility with specific regard to surface water and flood risk, these are described below. Any further mitigation measures suggested within this chapter are therefore considered to be additional to this embedded mitigation.

Table 13.7 Embedded Mitigation Measures for Water Resources and Flood Risk

Parameter	Mitigation Measures Embedded into the Project Design
Sediment Management	A Construction Method Statement (CMS) will be developed for the construction activities and will adhere to construction industry good practice guidance as detailed in the Environment Agency's Pollution Prevention Guidance (PPG) notes (including PPG01, PPG05, PPG08 and PPG21)[1] (EA, 2007) and CIRIA's 'Control of water pollution from construction sites: Guidance for consultants and contractors (C532)' (CIRIA, 2001). Specific measures to control sediment supply that will be captured within the CMS include: Temporary works areas (e.g. mobilisation and storage areas) within the development area will comprise hardstanding of permeable gravel aggregate underlain by geotextile, or other suitable material to a minimum of 50% of the total area to minimise the area of open ground. Subsoil exposure will be minimised and strips of undisturbed vegetation will be retained on the edge of the working area where possible (e.g. buffer zones along the drainage ditches). On-site retention of sediment will be maximised by routing all drainage through the site drainage system. The drainage system will include silt fences at the foot of soil storage areas to intercept sediment runoff at source. Where practicable, runoff will be routed into swales, which incorporate check dams to further intercept sediment and/or attenuation ponds which incorporate sediment forebays. Suitable filters will be used to remove sediment from any water discharged into the surface drainage network;

[1] *The PPGs are revoked as regulatory guidance in England, but still provide a useful guide for best practice measures.*

Parameter	Mitigation Measures Embedded into the Project Design
	Additional silt fences will be included in parts of the working area that are in proximity to surface drainage channels. Soil and sediment accumulation on road surfaces will be minimised as far as reasonably practicable by washing the wheels of vehicles leaving site and, where required, clearance of the road surface. Traffic movement would be restricted to minimise the potential for surface disturbance.
Site Drainage	Specific measures to manage site drainage that will be captured within the CMS and associated plans include: Changes in surface water runoff as a result of the increase in impermeable area from the development will be attenuated and discharged at a controlled rate, in consultation with the Lead Local Flood Authority (LLFA), Black Sluice IDB and Environment Agency. The controlled runoff rate will be equivalent to the greenfield runoff rate. A Surface Water and Drainage Plan (SWDP) will be developed and implemented to minimise water within the construction areas and ensure ongoing drainage of surrounding land. This will comprise a sealed surface water drainage system where water enters the excavations during construction from surface runoff or groundwater seepage and is then pumped via settling tanks, sediment basins or mobile treatment facilities to remove sediment, before being discharged into local ditches or drains via temporary interceptor drains in order to prevent increases in fine sediment supply to the watercourses.
Pollution Prevention	Specific measures relating to pollution prevention that will be captured within the CMS include: Concrete and cement mixing and washing areas will be situated at least 10 m away from the nearest watercourse. These will incorporate settlement and recirculation systems to allow water to be re-used. All washing out of equipment will be undertaken in a contained area, and all water will be collected for off-site disposal. All fuels, oils, lubricants and other chemicals will be stored in an impermeable bund with at least 110% of the stored capacity. Damaged containers will be removed from site. All refuelling will take place in a dedicated impermeable area, using a bunded bowser. The refuelling and fuel storage area will be located at least 10 m from the nearest watercourse. Biodegradable oils will be used where possible. Spill kits will be available on site at all times. Sand bags or stop logs will also be available for deployment on the outlets from the site drainage system in case of emergency spillages. Foul drainage (e.g. from construction welfare facilities) will be collected through a mains connection to an existing mains sewer (if a suitable connection is

Parameter	Mitigation Measures Embedded into the Project Design
	available), or collected in a septic tank located within the development boundary and transported off site for disposal at a licensed facility. The specific approach to dealing with foul drainage will be determined during detailed design with consideration of the availability of mains connections and the number of working hours for site attendees.
Post Construction Surface Water Drainage	Post construction surface water drainage requirements will be presented in the final SWDP and will be designed to meet the requirements of the National Planning Policy Framework (NPPF) and National Policy Statement (NPS) EN-1, with runoff limited, where feasible, through the use of infiltration techniques which can be accommodated within the area of development. The drainage strategy will be developed according to the principles of the sustainable drainage system (SuDS) discharge hierarchy. Generally, the aim will be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable: i) into the ground (infiltration); ii) to a surface water body; iii) to a surface water sewer, highway drain or another drainage system; or iv) to a combined sewer.

Worst Case

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

13.7.4 Full details of the range of development options being considered are provided within **Chapter 5 Project Description**. For the purpose of this 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 13.8**, it is not considered to have a material bearing on the outcome of this assessment.

13.7.5 The realistic WCS identified for this section, as detailed in **Table 13.8**, are also applied to the CIA. When the WCS for the project in isolation does not result in the worst case for cumulative impacts, this is addressed within the cumulative impacts section of this chapter.

Table 13.8 Worst Case Assumptions

Impact	Parameter
Construction	
Area of construction-stage development with potential to impact upon water receptors	Construction footprint: 23.4 hectares Total construction duration 42 months Length of watercourse / drains affected by the works (within the works area): 2.66 km 0.4% of the Wyberton Marsh drainage catchment affected by the works

Impact	Parameter
Operation	
Area of permanent development with potential to impact upon water receptors	25 years operational lifespan (unless extended) Total operational footprint 234,050 m^2 Length of watercourse / drain habitat lost to development: 2.66 km
Decommissioning	
Decommissioning activities	For the purposes of a worst case scenario, an assumption has been made that the decommissioning activities and duration will be similar to those experienced during the construction phase of work.

Potential Impacts during Construction

13.7.6 Four potential impacts on water resources and flood risk receptors resulting from the construction stage have been identified:

- Direct impact on drainage system;
- Increased sediment supply;
- Accidental release of contaminants; and
- Changes to surface water runoff and flood risk.

13.7.7 It should be noted that impacts associated with groundwater or abstractions is covered in **Chapter 11 Contaminated Land, Land Use and Hydrogeology**.

Impact 1: Direct impact on drainage systems

13.7.8 There are no IDB drains that would be directly impacted by the Facility. However, there are some minor ordinary watercourses that are not maintained by the IDB within the Wyberton Marsh catchment that are adjacent to or within the red line boundary of the Facility, and it is anticipated that, as a worst case scenario, all watercourses falling within the redline boundary will be directly impacted and filled in. This would lead to the direct loss of all geomorphological and hydrological feaures associated with these watercourses, and any habitats that they support.

13.7.9 The watercourses are fed by surface runoff and do not bring in flows from outside the footprint of the Facility. All runoff will be managed by a new site drainage system, and therefore the hydrology of the area will not be adversely affected.

13.7.10 A new watercourse 250 m in length was cut alongside the extension of Bittern Way to the Biomass UK No. 3 Limited site road as part of the drainage strategy for the Biomass UK No. 3 Limited site. In addition, a new pond to provide attenuation and storage volume for surface water runoff from the industrial estate was created as well as underground storage capacity for Biomass UK No. 3 Ltd.

These drainage features have been created to deal with flow from both the power station site and the Facility's Application Site, and will not be directly affected by the proposed development.

Magnitude of impact

13.7.11 The direct impact on the drainage system as a result of the construction is expected to have a negligible magnitude of effect on the surface water drainage network as a whole due to the artificial nature of those water bodies directly affected, and the embedded mitigation measures that will be implemented during construction to prevent changes to runoff rates and the supply of sediment and contaminants to the remainder of the surface drainage network.

Sensitivity and value of receptor

13.7.12 The drains that will be directly affected by the construction of the Facility are small ordinary watercourses. They are artificial and have relatively poor water quality, therefore the sensitivity and value of these drains are assessed to be **low**.

Significance of effect

13.7.13 The significance of the direct effect of the construction on the drains within the Application Site is expected to be **negligible**, as a result of the **low** sensitivity of the drains and the **negligible** magnitude of effect.

Mitigation measures

13.7.14 No additional measures to those embedded into the design of the construction activities are required due to the **negligible** magnitude of effect expected during the construction works.

Residual impacts

13.7.15 The residual impact resulting from the direct disturbance of drains is therefore predicted to remain as a **negligible** effect during the construction phase of the Facility.

Impact 2: Increased Sediment Supply

13.7.16 Construction activities for the Facility will involve earthworks and creation of areas of bare ground by removing surface vegetation cover. Site preparation, ground excavations and other construction activities which have the potential to increase sediment supply will take place across the Application Site. These construction activities could result in an increase in the supply of fine sediment (e.g. clays, silts and fine sands) to surface water bodies through surface runoff and the erosion of exposed soils.

13.7.17 Increased sediment supply could increase the turbidity in the water column and encouraging enhanced deposition of fine sediment within the watercourses that receive drainage from the site (noting that although the drains within the footprint of the Facility will be infilled, the larger watercourses which they currently connect to will remain undisturbed). Furthermore, increased sediment loads could potentially smother existing bed habitats, reduce light penetration and reduce dissolved oxygen concentration, adversely affecting biota (e.g. macrophytes, aquatic invertebrates and fish) and adversely affecting the quality of aquatic habitats.

13.7.18 However, the development will include a range of embedded mitigation measures to reduce the potential for an increase in the supply of fine sediment, including minimising the area of open ground at any one time, implementation of buffer zones adjacent to watercourses, storing and reinstating topsoil in line with guidance and using hardstanding in mobilisation areas. This means that the exposed working area which has the potential to supply sediment will be restricted as far as practicable.

Magnitude of impact

13.7.19 An area of approximately 23.4 hectares would be disturbed by construction activities. This means there is a direct route for any sediment generated from construction activities to easily enter the surface drainage system through surface runoff without natural attenuation. It should also be noted that the watercourses are directly connected to the River Witham. However, the total area of disturbed ground accounts for only 0.4% of the Wyberton Marsh drainage catchment. The potential for release of sediment from the construction site to the identified drains from construction is expected to have a negligible magnitude of effect due to the embedded mitigation measures and the small proportion of the catchment affected by construction activities.

Sensitivity and value of receptor

13.7.20 The construction of the Facility is within the Wyberton Marsh catchment and will directly and indirectly affect the drains within this catchment. The drains within the vicinity of the site have relatively poor water quality and therefore the sensitivity and value of these drains are considered to be **low**.

Significance of effect

13.7.21 The significance of the effect of construction on the IDB drains from the potential of release of sediment from the site is expected to be **negligible**, as a result of a **low** sensitivity and **negligible** magnitude of effect.

Mitigation measures

13.7.22 The sediment management measures embedded into the design of the working activities are considered to represent a comprehensive suite of best practice measures that are in line with construction best practice. Furthermore, the pre-mitigation impact is considered to have a **negligible** magnitude of impact. No further mitigation measures are therefore recommended at this stage.

Residual impacts

13.7.23 Due to the extent of the embedded mitigation measures, the magnitude of impact prior to further mitigation is considered to be **negligible**, and no further mitigation is proposed. The residual impact resulting from the release of sediment during construction is therefore predicted to reduce to a **negligible** effect within the IDB drains.

Impact 3: Accidental Release of Contaminants

13.7.24 There is the potential for the accidental release of lubricants, fuels and oils from construction machinery through spillage, leakage and in-wash from vehicle storage areas after rainfall and direct release from construction machinery working adjacent to the IDB drains. There is also the potential for accidental release of foul waters (from welfare facilities) and construction materials (including concrete) into the surface waters during construction.

13.7.25 If a significant leakage or spillage occurs, there is the potential for adverse impacts upon water quality if contaminants enter the surface drainage network. The IDB drains identified within the Study Area are directly connected to the River Witham. These water quality impacts have the potential to adversely affect ecology (particularly fish and macroinvertebrates; see **Chapter 12 Terrestrial Ecology** and **Chapter 17 Marine and Coastal Ecology**) if pollutant concentrations are sufficiently high.

13.7.26 Construction activities which disturb the ground (including excavation and piling) could potentially introduce contaminants into the underlying groundwater bodies (particularly shallow aquifers). These potential impacts to groundwater bodies are discussed in **Chapter 11 Contaminated Land, Land Use and Hydrogeology**.

13.7.27 The scale of the potential impact upon a surface catchment is likely to be proportional to the area of each catchment that would be affected during construction (i.e. the total footprint of construction activities).

Magnitude of impact

13.7.28 An area of approximately 23.4 hectares would be disturbed by construction activities. This accounts for approximately 0.4% of the total surface drainage catchment of the Wyberton Marsh catchment. Although this is a small proportion of the total catchment, activities will take place adjacent to or over the drains. This means there is a direct route for any contaminants to easily enter the surface drainage system through surface runoff. Despite this, the potential for release of contaminants to the identified IDB drains from construction is expected to have a **negligible** magnitude of effect.

Sensitivity of receptor

13.7.29 The construction works of the Facility will directly and indirectly affect the IDB drains within the Wyberton Marsh catchment, therefore there is the potential for the accidental release of contaminants to impact on the drains. The drains within the vicinity of the site have poor water quality and therefore the sensitivity and value of these drains are considered to be **low**.

Significance of effect

13.7.30 The significance of the effect of construction on the IDB drains from the potential of release of contaminants is expected to be **minor adverse**, as a result of a **low** sensitivity and **negligible** magnitude.

Mitigation Measures

13.7.31 The embedded measures to minimise impacts to surface water resources will help to mitigate the accidental release of contaminants by preventing the immediate discharge of contaminated water from the construction site into the surface drainage network. Furthermore, the pre-mitigation impact is considered to have a **negligible** magnitude of impact. No further mitigation measures are therefore recommended at this stage.

Residual Impacts

13.7.32 Following implementation of these additional mitigation measures, the potential for impacts associated with the release of contaminants to the identified surface water bodies will be reduced to a **negligible** magnitude. The residual impact resulting from the release of contaminants during construction is therefore predicted to reduce to a **negligible** effect within the Wyberton Marsh catchment.

Impact 4: Changes to Surface Water Runoff and Flood Risk

13.7.33 The initial site preparations and construction activities associated with the project

area have the potential to alter surface water flows and drainage patterns by:

- Altering existing flow paths and changing the distribution of surface drainage across the development site;
- Reducing infiltration and increasing surface runoff as a result of soil compaction by construction vehicles; and
- Increasing the proportion of impermeable surfaces in a catchment and therefore reducing infiltration. The development of surface infrastructure also has the potential to change surface flows and infiltration rates as a result of changes to land use (i.e. by increasing the proportion of impermeable surfaces in a drainage catchment) and altering site runoff characteristics.

13.7.34 The construction of the Facility therefore has the potential to increase surface water runoff, which could adversely affect the hydrology and geomorphology of the surface drainage network as the Application Site is currently largely undeveloped and the majority of the Application Site is permeable. The Facility will increase the impermeable area of the Application Site. The impact of climate change (increased rainfall intensity and duration) also has the potential to increase the volume of surface water runoff from the Application Site.

Magnitude of impact

13.7.35 The project will include embedded mitigation measures to control surface runoff during the construction phase, including the creation of a construction stage drainage system (**Table 13.9**). These measures will help to control the release of surface waters from construction activities and prevent changes to surface runoff and flood risk. The magnitude of impact is therefore expected to be **negligible**.

Sensitivity of receptor

13.7.36 Any changes to flood risk are likely to be confined to the Wyberton Marsh drainage catchment, which contains more than ten commercial and industrial units. The receptor has therefore been assigned a **medium** sensitivity.

Significance of effect

13.7.37 The **negligible** magnitude of impact and the **medium** sensitivity of the receptors would result in an impact of **minor adverse** significance.

Mitigation Measures

13.7.38 Surface water from the Application Site shall be managed through the use of an existing attenuation pond located to the south of the Application Site before discharging via surface water ditches at a controlled rate into the IDB drain

adjacent to the Application Site.

Residual Impacts

13.7.39 Following implementation of these additional mitigation measures, the potential for impacts associated with increased surface water flood risk will be reduced to a **negligible** magnitude.

Potential Impacts during Operation

13.7.40 Two potential impacts on water resources and flood risk receptors resulting from the operational stage have been identified:

- Changes to surface water runoff and flood risk; and
- Supply of fine sediment and other contaminants.

Impact 5: Changes to surface water runoff and flood risk

13.7.41 The permanent above-ground infrastructure will result in permanent changes to land use and the drainage system. The change in use from existing greenfield agricultural land use is likely to create a permanent increase in impermeable area. The increase in impermeable area has the potential to create a permanent increase in surface water flood risk associated with the existing watercourses / ditches and IDB drains, however the impact from operational activities is expected to have a **low** magnitude of effect.

Magnitude of impact

13.7.42 The project will include a sealed surface water drainage system during the operational stage of the development. The water collected will predominantly be used to supply the lightweight aggregates facility which has a significant water demand, with only a minimal amount being discharged under an environmental permit. These measures will help to control the release of surface waters from the permanent development and prevent changes to surface runoff and flood risk. The magnitude of impact is therefore expected to be **negligible**.

Sensitivity of receptor

13.7.43 Any changes to flood risk are likely to be confined to the Wyberton Marsh drainage catchment, which contains more than ten commercial and industrial units. The receptor has therefore been assigned a **medium** sensitivity.

Significance of effect

13.7.44 The **negligible** magnitude of impact and the **medium** sensitivity of the receptors would result in an impact of **minor adverse** significance.

Mitigation Measures

13.7.45 Surface water from the Application Site shall be managed through the use of a sealed surface water drainage system and water used in the lightweight aggregates facility. Only a small amount will be discharged via surface water ditches at a controlled rate into the IDB drain adjacent to the Application Site.

Residual Impacts

13.7.46 Following implementation of these additional mitigation measures, the potential for impacts associated with increased surface water flood risk will be reduced to a **negligible** magnitude.

Impact 6: Supply of Fine Sediment and Other Contaminants

13.7.47 The operation of the Facility, could result in the supply of fine sediment, fuels, oils and lubricants from the road network and other impermeable surfaces within the Application Site. This could potentially affect the geomorphology and water quality in the surface drainage network that receives runoff from the site, and consequently impact upon aquatic ecology.

13.7.48 In addition, silt obtained from the Port of Boston will be stored on land pending use as binder in the lightweight aggregate (LWA) plant. A free draining area will be constructed for freshly landed silt piles with integrated drains with automatic pumps which will take all run off water to process water collection tanks using pumps. This will be re-used within the LWA process for formulation mixing prior to palletisation and minimise any fresh water required for the process.

13.7.49 Foul drainage at the Application Site will be collected through a mains connection to the existing local authority sewer system which serves the industrial estate on the northern boundary. Surface water from impervious areas will also be collected in a sealed surface drainage system and used in the lightweight aggregate facility.

Magnitude of impact

13.7.50 An area of approximately 23.4 hectares will be affected by the Facility. This accounts for approximately 0.4% of the total Wyberton Marsh drainage catchment. The potential for release of contaminants to the identified IDB drains from operational activities is expected to have a **negligible** magnitude of effect.

Sensitivity of receptor

13.7.51 The drains within the vicinity of the Application Site have relatively poor water quality and therefore the sensitivity and value of these drains are considered to be **low**.

Significance of effect

13.7.52 The significance of the effect of operational activities on the IDB drains from the potential of release of contaminants is expected to be **negligible**, as a result of a **low** sensitivity and **negligible** magnitude.

Mitigation Measures

13.7.53 The **negligible** impact on this receptor means that there is no requirement to introduce any additional mitigation measures.

Residual Impacts

13.7.54 The residual effect on the surface water body catchments from runoff of sediments and other contaminants during the operation of the Facility will remain as **negligible**.

Potential Impacts during Decommissioning

13.7.55 For the purposes of the EIA, an assumption has been made that the Facility will have an operational lifetime of 25 years. Although it is common for such developments to be operational for a longer period.

13.7.56 A decision will be made as to whether the operating life of the Facility will be extended, which would involve upgrading and re-permitting in line with the current legislative requirements at that time.

13.7.57 At the end of the Facility's working life, it would be decommissioned and removed and the site reinstated to an agreed condition. No decision has been made regarding the final decommissioning policy for the Facility, as it is recognised that industry best practice, rules and legislation change over time. Whilst the details regarding the decommissioning of the project 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.

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

13.8 Cumulative Impacts

13.8.1 **Table 13.9** below presents the construction and operational impacts considered above, and an assessment of whether these have the potential to act cumulatively with other projects.

Table 13.9 Potential Cumulative Impacts

Impact	Potential for cumulative impact	Data confidence	Rationale
Direct impact on drainage system during construction	No	Medium	The only drainage system that has the potential to be impacted is that directly covered by the Application Site. This does not overlap with any other projects and cannot act cumulatively.
Increased sediment supply during construction	No	Medium	Embedded mitigation measures are in place to ensure that the anticipated impact of sediment supply on the Application Site is negligible. Therefore, additional sediment from another project will not act cumulatively.
Accidental release of contaminants during construction	No	Medium	Embedded mitigation is in place to ensure that the construction of the Facility will not lead to the release of contaminants or contaminated water into surface or groundwater bodies. Therefore, there is no potential to act cumulatively with other projects.
Changes to surface water runoff and flood risk during construction	No	Medium	Due to embedded mitigation measures including a drainage strategy, the impacts to surface water runoff and flood risk is anticipated to be negligible and therefore will not act cumulatively with other projects.
Changes to surface water runoff and flood risk during operation	No	Medium	Although the project will lead to an increase in impermeable surfaces within the Facility, this will be mitigated by a drainage strategy including a sealed drainage system. Therefore, it will not have potential to act cumulatively with other projects.
Supply of fine sediment and other contaminants during operation	No	Medium	There is predicted to be a negligible impact of fine sediment and other contaminants during operation due to embedded mitigation in the form of a drainage strategy. Therefore, there is no potential for cumulative impacts.

13.8.2 All projects considered within the CIA are listed in **Table 13.10** below along with an explanation for why they have been scoped out, and why.

Table 13.10 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	No	No mechanism for cumulative impacts as all impacts predicted to be negligible.
Triton Knoll Offshore Wind Farm	DCO consented	2008 - ongoing	Onshore cable corridor and Construction compound at Langrick 9.7 km from the Application Site	Environmental Statement	Complete / high	No	No mechanism for cumulative impacts as all impacts predicted to be negligible. Any residual impacts on surface water and flood risk would be highly localised and would not therefore act cumulatively with this project.
Viking Link Interconnector B/17/0340	Application approved	2014 - 2023	Bicker Fen substation 14.4 km from the Application Site	Environmental Statement	Incomplete	No	No mechanism for cumulative impacts as all impacts predicted to be negligible. Any residual impacts on surface water and flood risk would be highly localised and

Project	Status	Development period	Distance from the Facility (km)	Project definition	Project data status	Included in CIA	Rationale
							would not therefore act cumulatively with this project.
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	No mechanism for cumulative impacts as all impacts predicted to be negligible. Any residual impacts on surface water and flood risk would be highly localised and would not therefore act cumulatively with this project.
The Quadrant Mixed-use development of 502 dwellings and commercial/ leisure uses B/14/0165	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	No	No mechanism for cumulative impacts as all impacts predicted to be negligible.
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	No mechanism for cumulative impacts as all impacts predicted to be negligible.

13.9 Transboundary Impacts

13.9.1 There are no transboundary impacts that need to be considered as part of this development.

13.10 Inter-Relationships with Other Topics

13.10.1 This chapter has inter-relationships with **Chapter 11 Contaminated Land, Land Use and Hydrogeology**, **Chapter 12 Terrestrial Ecology**, **Chapter 15 Marine Water and Sediment Quality** and **Chapter 17 Marine and Coastal Ecology**. **Table 13.11** details the topic inter-relationship in this chapter.

Table 13.11 Chapter Topic Inter-Relationships

Topic and description	Related Chapter	Where addressed in this Chapter
Impacts upon groundwater quality	Chapter 11	**Section 13.7**, Impacts 3 and 6
Impacts on ecology resulting from impacts to surface waters	Chapter 12, Chapter 15	**Section 13.7**, Impacts 1, 2, 3 and 6
Impacts on marine water quality resulting from contamination of fresh waters	Chapter 17	**Section 13.7**, Impacts 2, 3 and 6

13.11 Interactions

13.11.1 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 13.12**, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 13.12 Interaction Between Impacts

Potential interaction between impacts				
Construction				
	1 Direct impact on drainage system	2 Increased sediment supply	3 Accidental release of contaminants	4 Changes to surface water runoff and flood risk
1 Direct impact on drainage system	-	Yes	Yes	Yes
2 Increased sediment supply	Yes	-	Yes	Yes

3 Accidental release of contaminants	Yes	Yes	-	No
4 Changes to surface water runoff and flood risk	Yes	Yes	No	-
Operation				
	5 Changes to surface water runoff and flood risk		6 Supply of fine sediment and other contaminants	
5 Changes to surface water runoff and flood risk	-		No	
6 Supply of fine sediment and other contaminants	No		-	
Decommissioning				
It is anticipated that the decommissioning impacts will be similar in nature to those of construction.				

13.12 Summary

13.12.1 Following the characterisation of the existing environment, and an assessment of the potential impacts of the Boston Alternative Energy Facility on surface water and flood risk; it has been concluded that there will be no significant impacts associated with the construction, operation or decommissioning of the Facility with the implementation of embedded and additional mitigation measures. Due to the negligible significance of impacts, there is considered to be no potential for cumulative impacts with other projects within 15 km. A summary of impacts is shown in **Table 13.3** below.

Table 13.13 Impact Summary

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Construction						
Impact 1: Direct disturbance of surface watercourses	IDB drains	Low	Negligible	Negligible	Embedded mitigation measures only	Negligible
Impact 2: Increased sediment supply	IDB drains	Low	Negligible	Negligible	Embedded mitigation measures only	Negligible
Impact 3: Accidental release of contaminants	IDB drains	Low	Negligible	Negligible	Embedded mitigation measures only	Negligible
Impact 4: Changes to surface water runoff and flood risk	IDB drains	Low	Low	Minor adverse	An existing attenuation pond will be used before discharging via surface water ditches at a controlled rate into the IDB drain adjacent to the Site.	Negligible
Operation						
Impact 5: Changes to surface water runoff and flood risk	IDB drains	Low	Low	Minor adverse	An existing attenuation pond will be used before discharging via surface water ditches at a controlled rate into the IDB drain adjacent to the Site.	Negligible
Impact 6: Supply of fine	IDB drains	Low	Negligible	Negligible	Embedded mitigation	Negligible

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
sediment and other contaminants					measures only	
Decommissioning						
It is anticipated that impacts on surface water and flood risk receptors resulting from decommissioning stage activities will be similar in nature to those resulting from construction stage activities.						

13.13 References

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