

# REPORT

## **Boston Alternative Energy Facility**

### **Appendix 13.1 Water Framework Directive Compliance Assessment**

Client: Alternative Use Boston Projects Ltd

Reference: PB6934-RHD-01-ZZ-RP-N-2013\_A13.1

Status: 0.1/Final

Date: 17 June 2019



Project Related

HASKONINGDHV UK LTD.

Rightwell House  
Rightwell East  
Bretton  
Peterborough  
PE3 8DW  
Industry & Buildings  
VAT registration number: 792428892

+44 1733 334455 **T**  
+44 1733 262243 **F**  
email **E**  
royalhaskoningdhv.com **W**

Document title: Boston Alternative Energy Facility

Document short title: Boston Alternative Energy Facility – Appendix 13.1

Reference: PB6934-RHD-01-ZZ-RP-N-2013\_A13.1

Status: 0.1/Final

Date: 17 June 2019

Project name: Boston Alternative Energy Facility

Project number: PB6934-RHD-01-ZZ-RP-N-2013\_A13.1

Author(s): Helena Wicks, Natalie James, Carina Agnew

Drafted by: Helena Wicks, Natalie James, Carina  
Agnew

Checked by: Dr Ian Dennis

Date / initials: 12/06/2019 IAD

Approved by: Gary Bower

Date / initials: GB 17/06/2019

Classification

Project Related



## Disclaimer

*No part of these specifications/printed matter may be reproduced and/or published by print, photocopy, microfilm or by any other means, without the prior written permission of HaskoningDHV UK Ltd.; nor may they be used, without such permission, for any purposes other than that for which they were produced. HaskoningDHV UK Ltd. accepts no responsibility or liability for these specifications/printed matter to any party other than the persons by whom it was commissioned and as concluded under that Appointment. The integrated QHSE management system of HaskoningDHV UK Ltd. has been certified in accordance with ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.*

## Table of Contents

<b>A13</b>	<b>WFD Compliance Assessment</b>	<b>1</b>
A13.1	Background	1
A13.2	Project Description	4
A13.3	Assessment Method	5
A13.4	Stage 1: Screening Assessment	8
A13.5	Stage 2: Scoping Assessment	15
A13.6	Detailed Compliance Assessment (Stage 3)	28
A13.7	Summary of Assessment and Further Recommendations	44
A13.8	References	47

### Tables

Table A13.1 1	WFD Water Bodies Screened into the WFD Compliance Assessment	9
Table A13.1 2	Table of Potential Effects of the Proposed Facility on the Identified WFD River Water Bodies	16
Table A13.1 3	Scoping Table of Potential Effects of the Proposed Facility on the Witham WFD Transitional Water Body	20
Table A13.1 4	Scoping Table of Potential Effects of the Proposed Facility on the Wash Inner WFD Transitional Water Body	24
Table A13.1 5	WFD Compliance Assessment for the Witham (The Haven) (GB530503000100) Transitional Water Body	29
Table A13.1 6	WFD Compliance Assessment for the Wash Inner (GB530503311300) Transitional Water Body	40

### Figures

Figure A13.1-1	WFD Water Bodies Surface Water
Figure A13.1-2	WFD Water Bodies Ground Water

## Non-Technical Summary

This assessment aims to determine whether the construction, operation and decommissioning of the proposed Boston Alternative Energy Facility (the Facility) are compliant with the Directive of the European Parliament and of the Council 2000/60/EC establishing a framework for community action in the field of water policy (generally known as the Water Framework Directive (WFD)).

The Facility site is located south of Boston, Lincolnshire with the eastern site boundaries defined in part by a flood defence bank along The Haven (the tidal waterway of the River Witham between The Wash and the Grand Sluice in Boston). The Facility will consist of an energy recovery plant (which will deliver approximately 80 MWe of renewable energy to the national grid); and associated developments (AD).

The Scoping Stage of the WFD Compliance Assessment (Stage 2) considered all activities associated with the construction, operational and decommissioning phases of the Facility that potentially could impact on water bodies; and, concluded that there are a variety of potential mechanisms that could either cause deterioration in water body status or threaten the ability of the water body to meet its objectives. Stage 2 of the WFD compliance assessment has demonstrated that the Facility has the potential to cause deterioration in the status for some quality elements associated with the following WFD water bodies:

- Witham (GB530503000100) – Transitional Water Body
- Wash Inner (GB530503311300) – Transitional Water Body

A detailed assessment of the potential impacts of the Facility on the water bodies identified above was further undertaken as part of Stage 3 of the WFD Compliance Assessment. Based on Stage 3 of the WFD compliance assessment, the proposed Boston Alternative Energy Facility will have no local effects on the hydromorphological, physico-chemical and biological quality elements of the Witham (GB530503000100) transitional water body; and Wash Inner (GB530503311300) transitional water body. However, providing the mitigation measures identified are put in place, then the construction, operation and decommissioning of the Facility will have a negligible risk of causing direct deterioration in status of the water body or preventing GEP or GES being achieved in the aforementioned water bodies in the future. However, this will be further confirmed during the detailed design phase for the project.

## A13 WFD Compliance Assessment

### A13.1 Background

A13.1.1 This assessment aims to determine whether the construction, operation and decommissioning of the proposed Boston Alternative Energy Facility (the Facility) are compliant with the Directive of the European Parliament and of the Council 2000/60/EC establishing a framework for community action in the field of water policy (generally known as the Water Framework Directive (WFD)).

A13.1.2 The objectives of this compliance assessment are to:

- Identify water bodies that could potentially be affected by the Facility;
- Identify onshore activities that could affect these WFD water bodies;
- Assess the potential for the proposed activities to result in a deterioration in the status of WFD water bodies, or prevent status objectives being achieved in the future; and
- Determine the compliance of the proposed Facility with the requirements of the WFD.

A13.1.3 This report has been prepared to accompany the Preliminary Environmental Information Report (PEIR) for the project and is intended to be read in conjunction with **Chapters 11 Contaminated Land, Land Use and Hydrogeology, 13 Surface Water, Flood Risk and Drainage, 15 Marine Water and Sediment Quality, 16 Estuarine Processes and 17 Marine and Coastal Ecology.**

### The Water Framework Directive

#### Overview

A13.1.4 The WFD is transposed into national law by means of the Water Environment (WFD) (England and Wales) Regulations 2017. Unlike the EU Birds and Habitats Directives (EC Directive on the Conservation of Wild Birds (2009/147/EC) and EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC), respectively), which apply only to designated sites, the WFD applies to all bodies of water, including those that are man-made.

#### Surface waters

A13.1.5 There are two separate classifications for surface water bodies (including rivers, lakes, transitional and coastal waters); ecological and chemical. For a water

## Project Related

body to be in 'good' status, both ecological and chemical status must be at least 'good'.

A13.1.6 The ecological status of a surface water body is assessed according to the condition of biological elements (e.g. fish, benthic invertebrates and other aquatic flora), the condition of supporting physico-chemical elements (e.g. thermal conditions, salinity, and concentrations of oxygen, ammonia and nutrients), concentrations of specific pollutants (e.g. copper and other priority substances), and the condition of the hydromorphological quality elements (e.g. morphological or physical surface water body conditions and hydrological regime).

A13.1.7 Ecological status is recorded on the scale of high, good, moderate, poor or bad, with "High" denoting largely undisturbed conditions and the other classes representing increasing deviation from this natural condition; the target for all water bodies is Good Ecological Status (GES). The ecological status classification for the water body is determined from 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.

A13.1.8 Where the hydromorphology of a surface water body has been significantly altered for anthropogenic purposes, 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.

A13.1.9 Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the EC Environmental Quality Standards Directive (2008/105/EC). Chemical status is recorded as 'good' or 'fail'. The chemical status classification for the water body is determined by the worst scoring chemical.

A13.1.10 Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the EC Environmental Quality Standards Directive (2008/105/EC). Chemical status is recorded as 'good' or 'fail'. The chemical status classification for the water body is determined by the worst scoring chemical.

### Groundwater

A13.1.11 Groundwaters are assessed in a different way to surface waters. Instead of GES and GEP, groundwaters are classified as either Poor or Good in terms of quantity (groundwater levels, flow directions) and quality (pollutant concentrations and conductivity). The UK Technical Advisory Group on WFD (UKTAG) has provided

## Project Related

guidance on how groundwater quantity and quality is assessed (UKTAG 2012a and 2012b).

### Roles and responsibilities

A13.1.12 The Environment Agency is the competent authority for WFD implementation in England, and therefore must assess schemes to ensure that they are compliant with the requirements of the WFD. The Environment Agency also acts as a consultee to other regulators and bodies in relation to WFD compliance and therefore, for the proposed Facility, will advise the organisations involved in consenting the proposed project (scheme) on the requirements of the WFD.

A13.1.13 Whilst the Environment Agency acknowledges that assessing schemes for WFD compliance is best aligned with the steps of an Environmental Impact Assessment (EIA), they recommend that a separate WFD compliance assessment is undertaken by the applicant to ensure all aspects of WFD are clearly and overtly considered.

### Report structure

A13.1.14 As such this report aims to determine whether the proposed Facility is compliant with the requirements of the WFD and is divided into seven key sections:

- **Section A13.1** (this section) describes the purpose of this report;
- **Section A13.2** provides a brief overview of the proposed Facility;
- **Section A13.3** presents the WFD compliance assessment methodology that is used in the report;
- **Section A13.4** presents the results of the screening exercise undertaken for Stage 1 of the WFD compliance assessment;
- **Section A13.5** presents the results of the scoping exercise undertaken for Stage 2 of the WFD compliance assessment;
- **Section A13.6** presents the results of the detailed assessment undertaken for Stage 3 of the WFD compliance assessment; and
- **Section A13.7** presents a summary of mitigation, improvements and monitoring, which comprises Stage 4 of the WFD compliance assessment.

## Project Related

### A13.2 Project Description

A13.2.1 The proposed development site is located south of Boston, Lincolnshire (**Figure A13.2.1**). The eastern site boundaries are defined in part by a flood defence bank along The Haven (the tidal waterway of the River Witham between The Wash and the Grand Sluice in Boston).

A13.2.2 The proposed Facility will consist of an energy recovery plant (which will deliver approximately 80 MWe of renewable energy to the national grid); and associated developments (AD).

A13.2.3 A more detailed description of the proposed Facility is provided in **Chapter 5 Project Description** of the PEIR.

A13.2.4 The Facility will be designed to operate for an expected period of at least 25 years, after which ongoing operation will be reviewed and if it is not appropriate to continue operation the plant will be decommissioned. The wharf structure will replace a section of the current primary flood defence bank and will form a permanent structure that is not anticipated to be decommissioned.

A13.2.5 The key activities relevant to this WFD compliance assessment include:

- Relocation of approximately 400 m of existing flood defence on the right bank of The Haven to accommodate the construction of the wharf;
- Construction of the Facility;
- The specific activity associated with the construction of the wharf, which is likely to be sheet piled suspended deck feature (approximately 300 sheet piles);
- Earth works (excavation);
- Capital and maintenance dredging for the berth; and
- Increased vessel movement once the Facility is operational.

A13.2.6 The construction period for the whole development is anticipated to be between 36 to 42 months.

## Project Related

### A13.3 Assessment Method

#### Overall Approach

A13.3.1 There is no detailed published methodology for the assessment of plans or projects in relation to undertaking WFD compliance assessments across all types of water bodies. There are, however, several sets of guidance that have been developed to support these assessments in the different water body types, predominantly written by the Environment Agency. The following are considered to be the most relevant to the proposed project:

- Planning Inspectorate (2017) *Advice Note 18: The WFD*, which provides an overview of the WFD and provides an outline methodology for considering WFD as part of the Development Consent Order (DCO) process.
- Environment Agency (2016a) *WFD risk assessment: How to assess the risk of your activity*, which provides guidance for bodies planning to undertake activities that would require a flood risk activity permit.
- Environment Agency (2017) *Clearing the waters for all*, which outlines a detailed methodology for assessing impacts on transitional and coastal water bodies.
- Environment Agency (2016b) *Protecting and improving the water environment: WFD compliance of physical works in rivers* and associated supplementary guidance (Environment Agency 2016c), which provides more detailed guidance for assessing WFD compliance of various activities in river water bodies.

A13.3.2 For the purposes of this assessment, the broad methodologies outlined in the guidance documents listed above have been brought together to develop an assessment methodology that can be used for all types of water bodies. The assessment process therefore covers the following stages, which are described in more detail in the subsequent sections:

- Stage 1: Screening Assessment;
- Stage 2: Scoping Assessment; and
- Stage 3: Detailed Compliance Assessment.

#### Stage 1: Screening Assessment

A13.3.3 This stage consists of an initial screening exercise to identify relevant water bodies in the proposed onshore development area. Water bodies will be selected for inclusion in the early stages of the compliance assessment using the following criteria, with reference to the 2015 Anglian River Basin

## Project Related

Management Plan (RBMP) (as presented in the online Catchment Data Explorer; Environment Agency 2019):

- All surface and ground water bodies that could potentially impacted by the proposed project;
- Any surface water bodies that have direct connectivity (e.g. upstream and downstream) that could potentially be affected by the proposed project (typically within 1-2 km, depending upon the nature of the proposed works and the characteristics of each water body); and
- Any groundwater bodies that underlie the project.

### **Stage 2: Scoping Assessment**

A13.3.4 This stage identifies whether there is potential for deterioration in water body status or failure to comply with WFD objectives for any of the water bodies identified in Stage 1. This stage considers potential non-temporary impacts and impacts on critical or sensitive habitats for each water body and each activity. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there will be no impacts. If impacts are predicted, it will be necessary to undertake a detailed compliance assessment.

A13.3.5 The Stage 2 assessment considers the potential for each activity planned as part of the proposed project to affect each quality element in turn, based on a series of trigger questions for the quality elements that are applicable in each type of water body.

A13.3.6 The water body and activity under assessment will be progressed to the detailed compliance assessment (Stage 3) if the answer to one or more of the scoping questions is 'Yes', but only for those quality elements that could potentially be impacted. Conversely, if the answer to a scoping question is 'No' or enough information can be provided at this stage to scope the issue out, the quality element is scoped out of further assessment.

### **Stage 3: Detailed Compliance Assessment**

#### Overview

A13.3.7 The Stage 3 assessment determines whether any project activities that have been put forward from the Stage 2 scoping assessment will cause deterioration and whether this deterioration will have a significant non-temporary effect on the status of one or more WFD quality elements at water body level. For priority substances, the process requires the assessment to consider whether the activity is likely to cause the quality element to achieve good chemical status. If

## Project Related

it is established that an activity or project component is likely to affect status at water body level (that is, by causing deterioration in status or by preventing achievement of WFD objectives and the implementation of mitigation measures for HMWBs), or that an opportunity may exist to contribute to improving status at a water body level, potential measures to avoid the effect or achieve improvement must be investigated. This stage considers such measures and, where necessary, evaluates them in terms of cost and proportionality. Note that this stage is referred to as a WFD Impact Assessment in the Planning Inspectorate (2017) guidance.

### Determination of deterioration

A13.3.8 The Environment Agency has not issued guidance on how deterioration in the status of water bodies should be assessed. The assessment therefore draws upon the following guidance documents:

- The WFD (Standards and Classification) Directions (England and Wales (2017). This document provides the most up to date standards used to determine the ecological and chemical status of surface water bodies and quantitative and chemical status of groundwater.
- UKTAG (2011) Defining & Reporting on Groundwater Bodies. This document provides information on the approaches used to classify groundwater bodies.
- Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme (2009) WFD Expert Assessment of Flood Management Impacts. This document provides a framework for the assessment of changes to hydromorphology.
- UKTAG (2003) Guidance on Morphological Alterations and the Pressures and Impacts Analyses. This document provides additional information on hydromorphological pressures.
- Internal Environment Agency guidance on WFD deterioration and risk to the status objectives of river water bodies (Environment Agency 2016c). This document provides an assessment of the level of risk of deterioration in water body status associated with different activities, based upon activity type and risk screening thresholds.
- Water Framework Directive Assessment: Estuarine and Coastal Waters (Environment Agency, 2017). Guidance on assessing the impact of activities in estuarine (transitional) and coastal waters for the Water Framework Directive (WFD). The guidance is also called Clearing the Waters for All.

## Project Related

<https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

A13.3.9 The assessment considers the potential for between class, within class and temporary deterioration in water body status. Where deterioration is not predicted, the activity will also be considered against the water body objectives to ensure status objectives (i.e. GES or GEP) will not be prevented. This assessment is informed by the data and assessments provided in the appropriate technical chapters of the PEIR.

### Article 4.7

A13.3.10 In the unlikely event that no suitable measures can be identified to mitigate the potential adverse impacts of the proposed project, it may be necessary to undertake an Article 4.7 assessment (noting that the overall ethos of the proposed project is to prevent deterioration in water body status and avoid the need for an application for an exemption under Article 4.7 of the WFD). To determine the scope of this assessment, consultation with the Environment Agency would be required, and would include:

- An assessment of whether the proposed project can be classified as being of imperative overriding public interest and if the benefits to society resulting from the project outweigh the local benefits of WFD implementation;
- An assessment of whether all practicable steps to avoid adverse impacts have been taken. These steps are defined as those that are technically feasible, not disproportionately costly, and compatible with the overall requirements of the proposed project; and
- An assessment of whether the proposed project can be delivered by an alternative, environmentally better option. This option will need to be technically feasible and not disproportionately costly to be feasible.

## **A13.4 Stage 1: Screening Assessment**

A13.4.1 The water bodies that could potentially be affected by the proposed project have been identified using the method outlined in Section A13.4 and presented in Figure A13.1.1 and Figure A13.1.2.

13.1.1 The water bodies are described in **Table A13.1.1** which also considers the specific water bodies that will be taken forward to the scoping stage of the WFD compliance assessment (Stage 2) for the project, based on the criteria set out in **Section A13.4**. For these water bodies, additional information is provided in **Table A13.1.2** and **Table A13.1.3**.

Project Related

Table A13.1 1 WFD Water Bodies Screened into the WFD Compliance Assessment

Water body name and ID	Type	Overall Status (2016)	Description and Screening
Black Sluice IDB draining to the South Forty Foot Drain (GB205030051 515)	River	Moderate	<p>Heavily Modified Water Body at Moderate Ecological Potential and failing to achieve Good Chemical Status (2016). The water body is affected by pressures from sewage discharges, agricultural and rural land management and industrial discharges. These result in low dissolved oxygen concentrations, high concentrations of phosphate, aldrin, dieldrin, endrin, isodrin and tributyltin and high temperatures, which adversely affect fish populations.</p> <p><u>Target water body status and deadline:</u> 2027</p> <p><u>WFD protected areas within 2 km:</u> Nitrates Directive</p> <p><b>Screened into Stage 2:</b> <b>Yes</b>, screened into Stage 2 of the WFD compliance assessment because the Facility is within close proximity (1-2 km) and hydrologically connected to the water body.</p>
East & West Fen Drains (GB205030056 405)	River	Moderate	<p>Artificial Water Body at Moderate Ecological Potential and Good Chemical Status (2016). The water body is affected by pressures from agriculture and rural land management, which result in high temperatures, high concentrations of ammonia, low dissolved oxygen and reduced flows. These pressures adversely affect fish populations.</p> <p><b>Screened into Stage 2:</b> <b>No</b>, not screened into Stage 2 of the WFD compliance assessment because the water body is more than 5 km downstream of the Facility.</p>
Lower Witham (GB205030062 426)	River	Moderate	<p>Heavily Modified Water Body at Moderate Ecological Potential and Good Chemical Status (2016). The water body is affected by pressures from sewage discharge and agriculture and rural land</p>

Project Related

Water body name and ID	Type	Overall Status (2016)	Description and Screening
			<p>management, resulting in high concentrations of phosphate.</p> <p><u>Target water body status and deadline:</u> 2027</p> <p><u>WFD protected areas within 2 km:</u> Urban Waste Water Treatment Directive; and, Nitrates Directive</p> <p><b>Screened into Stage 2:</b> Yes, screened into Stage 2 of the WFD compliance assessment because the Facility is within close proximity (1-2 km) and hydrologically connected to the water body.</p>
Maud Foster and Fen Catchwater Drains (GB205030056 465)	River	Moderate	<p>Artificial Water Body at Moderate Ecological Potential and Good Chemical Status (2016). The water body is affected by pressures from sewage discharge and agriculture and rural land management, resulting in high concentrations of phosphate and poor dissolved oxygen.</p> <p><u>Target water body status and deadline:</u> 2027</p> <p><u>WFD protected areas within 2 km:</u> Nitrates Directive</p> <p><b>Screened into Stage 2:</b> Yes, screened into Stage 2 of the WFD compliance assessment because the Facility is within close proximity (1-2 km) and hydrologically connected to the water body.</p>
Witham (GB530503000 100)	Transitional	Bad	<p>Heavily Modified Water Body at Bad Ecological Potential and Good Chemical Status (2016). The water body is affected by pressures from agriculture and rural land management. These result in high concentrations of dissolved inorganic nitrogen, which adversely affect populations of angiosperms and phytoplankton.</p> <p><u>Target water body status and deadline:</u> 2027</p>

Project Related

Water body name and ID	Type	Overall Status (2016)	Description and Screening
			<p><u>Habitats present include:</u> Coastal Saltmarsh and mudflats. <u>WFD protected areas within 2 km:</u> The Wash &amp; North Norfolk Coast SAC; and, The Wash SPA.</p> <p><b>Screened into Stage 2:</b> <b>Yes</b>, screened into Stage 2 of the WFD compliance assessment because the Facility is within close proximity (1-2 km) and hydrologically connected to the water body.</p>
Wash Inner (GB530503311300)	Transitional	Moderate	<p>Not Designated Artificial or Heavily Modified at Moderate Ecological Status and Good Chemical Status (2016). The water body is affected by high concentrations of dissolved inorganic nitrogen.</p> <p><u>Target water body status and deadline:</u> 2027.</p> <p><u>Habitats present include:</u> Coastal Saltmarsh and mudflats. <u>WFD protected areas within 2 km:</u> The Wash &amp; North Norfolk Coast SAC; and, The Wash SPA.</p> <p><b>Screened into Stage 2:</b> <b>Yes</b>, screened into Stage 2 of the WFD compliance assessment because the Facility is within close proximity and hydrologically connected to the water body.</p>
Wash Outer (GB640523160000)	Coastal	Moderate	<p>Moderate Ecological Status and Good Chemical Status (2016). The water body is affected by pressures from agriculture and rural land management, which result in high concentrations of dissolved inorganic nitrogen and pressures on angiosperms.</p> <p><b>Screened into Stage 2:</b> <b>No</b>, not screened into Stage 2 of the WFD compliance assessment because the water body is more than 9 km downstream of the Facility and protected</p>

Project Related

Water body name and ID	Type	Overall Status (2016)	Description and Screening
			by the Wash Inner water body (i.e. which provides a buffer zone).
Witham Bain and Gravels (GB40503G00 0100)	Groundwater	Poor	Good Chemical Status but Poor Quantitative Status (2016). <b>Screened into Stage 2:</b> <b>No</b> , not screened into Stage 2 of the WFD compliance assessment because the groundwater body is more than 7 km from the Facility.
Steeping Great Eau Long Eau and Witham Spilsby Sandstone Unit (GB40501G40 1700)	Groundwater	Poor	Good Chemical Status but Poor Quantitative Status (2016). . <b>Screened into Stage 2:</b> <b>No</b> , not screened into Stage 2 of the WFD compliance assessment because the groundwater body is more than 17 km from the Facility.

Source: EA Catchment Data Explorer 2019

A13.4.2 See **Plates A13.1.1, A13.1.2 and A13.1.3** for additional details for WFD river water bodies screen into the Stage 2.

**Plate A13.1.1 Black Sluice IDB Draining to the South Forty Foot Drain (GB205030051515) - River Water Body** (Source: EA Catchment Data Explorer 2019)

Classification Item	2013	2014	2015	2016
▼ Overall Water Body	Moderate	Moderate	Moderate	Moderate
▼ Ecological	Good	Good	Moderate	Moderate
▶ Supporting elements (Surface Water)	-	-	Moderate	Moderate
▼ Biological quality elements	-	-	Poor	Poor
Fish	-	-	<u>Poor</u>	<u>Poor</u>
▼ Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
Hydrological Regime	Supports Good	Supports Good	Supports Good	Supports Good
▶ Physico-chemical quality elements	-	-	Moderate	Moderate
▶ Specific pollutants	High	High	High	High
▼ Chemical	Fail	Fail	Fail	Fail
▶ Priority substances	Good	Good	Good	Good
▶ Other Pollutants	Good	Fail	Fail	Fail
▶ Priority hazardous substances	Fail	Fail	Good	Fail

### Project Related

**Plate A13.1.2 Lower Witham (GB205030062426) – River Water Body** (Source: EA Catchment Data Explorer 2019)

Classification Item		2013	2014	2015	2016
▼	<b>Overall Water Body</b>	Moderate	Moderate	Moderate	Moderate
▼	<b>Ecological</b>	Moderate	Moderate	Moderate	Moderate
▶	Supporting elements (Surface Water)	-	-	Moderate	Moderate
▼	<b>Biological quality elements</b>	Good	Good	Good	Good
	Invertebrates	Good	Good	Good	Good
▼	<b>Hydromorphological Supporting Elements</b>	Supports Good	Supports Good	Supports Good	Supports Good
	Hydrological Regime	Supports Good	Supports Good	Supports Good	Supports Good
▶	Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate
▶	Specific pollutants	High	High	High	High
▼	<b>Chemical</b>	Good	Good	Good	Good
▶	Priority substances	Good	Good	Good	Good
▶	Other Pollutants	Good	Good	Good	Good
▶	Priority hazardous substances	Good	Good	Good	Good

**Plate A13.1.3 Maud Foster and Fen Catchwater Drains (GB205030056465) – River Water Body** (Source: EA Catchment Data Explorer 2019)

Classification Item		2013	2014	2015	2016
▼	<b>Overall Water Body</b>	Moderate	Moderate	Moderate	Moderate
▼	<b>Ecological</b>	Moderate	Moderate	Moderate	Moderate
▶	Supporting elements (Surface Water)	-	-	Good	Good
▼	<b>Biological quality elements</b>	Good	Good	Poor	Poor
	Fish	-	-	Poor	Poor
	Invertebrates	Good	Good	-	-
▶	<b>Hydromorphological Supporting Elements</b>	Supports Good	Supports Good	Supports Good	Supports Good
▶	Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate
▶	Specific pollutants	High	High	-	-
▼	<b>Chemical</b>	Good	Good	Good	Good
▶	Priority substances	Good	Good	Does not require assessment	Does not require assessment
▶	Other Pollutants	Does not require assessment			
▶	Priority hazardous substances	Good	Good	Does not require assessment	Does not require assessment

Project Related

A13.4.3 See **Plates A13.1.4** and **A13.1.5** for additional details for WFD transitional water bodies screened into the Stage 2.

Classification Item		2013	2014	2015	2016
▼	<b>Overall Water Body</b>	Moderate	Moderate	Moderate	Bad
▼	Ecological	Moderate	Moderate	Moderate	Bad
▶	Supporting elements (Surface Water)	Good	Good	Moderate	Moderate
▼	Biological quality elements	-	-	-	Bad
	Angiosperms	-	-	-	<u>Moderate</u>
	Phytoplankton	-	-	-	<u>Bad</u>
▼	Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
	Hydrological Regime	Supports Good	<u>Does Not Support Good</u>	Does Not Support Good	Does Not Support Good
▶	Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate
▶	Specific pollutants	High	High	-	-
▼	Chemical	Fail	Fail	Good	Good
▶	Priority substances	Good	Good	Does not require assessment	Does not require assessment
▶	Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment
▶	Priority hazardous substances	Fail	Fail	Does not require assessment	Does not require assessment

**Plate A13.1.4 Witham (GB205030062426) – Transitional Water Body** (Source: EA Catchment Data Explorer 2019)

Classification Item		2013	2014	2015	2016
▼	<b>Overall Water Body</b>	Moderate	Moderate	Moderate	Moderate
▼	Ecological	Moderate	Moderate	Moderate	Moderate
▼	Biological quality elements	Moderate	Moderate	Moderate	Good
	Angiosperms	-	Good	Good	Good
	Invertebrates	-	Good	Good	Good
	Macroalgae	Good	Good	Good	Good
	Phytoplankton	Moderate	Moderate	Moderate	Good
▼	Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
	Morphology	Supports Good	Supports Good	Supports Good	Supports Good
▶	Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate
▶	Specific pollutants	High	High	High	-
▼	Chemical	Fail	Fail	Good	Good
▶	Priority substances	Good	Good	Good	Does not require assessment
▶	Other Pollutants	Does not require assessment			
▶	Priority hazardous substances	Fail	Fail	Good	Good

APPENDIX 13.1

**Plate A12.1.5 Wash Inner (GB530503311300) – Transitional Water Body**

Project Related

## A13.5 Stage 2: Scoping Assessment

- A13.5.1 The aim of this section is to highlight the quality elements within each water body that could be impacted by the proposed works associated with the Facility, as identified in Stage 1 of the WFD compliance assessment (see **Table A13.1.1**). This assessment therefore determines the scope for the detailed compliance assessment which may be required for the project (i.e. Stage 3 WFD compliance, see **Section A13.3**).
- A13.5.2 This assessment considers the construction, operation and decommissioning phases of the Facility and highlights potential impact mechanisms based on water body type (in this case, river and transitional surface water bodies). The results of the scoping assessment are presented in **Plate A13.1.3** and **Plate A13.1.5**.
- A13.5.3 Please note unless otherwise stated, the potential impacts of the decommissioning phase will be similar to those associated with building the Facility.
- A13.5.4 For the transitional water bodies only, the scoping assessment includes key questions associated with the quality elements as detailed in the Water Framework Directive Assessment: Estuarine and Coastal Waters (Environment Agency, 2017).

Project Related

Table A13.1 2 Table of Potential Effects of the Proposed Facility on the Identified WFD River Water Bodies

Water body	Quality element	Potential effects on WFD parameters	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats?	Detailed assessment required?
Black Sluice IDB draining to the South Forty Foot Drain (GB205030051515)	<b>Hydromorphological</b>	<p>This water body is approximately 1.2 km upstream of the proposed works. As such, given the distance from the locus (origin of potential impact source), there will be no direct or indirect effects on the hydromorphological quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p> <p>In particular, the proposed works will not affect the volume, energy or distribution of flows in the water body; or change the width, depth, bank conditions, bed substrates and structure of the riparian zone in the water body; or create a permanent barrier to the downstream movement of water, sediment and fish in the water body.</p>	No	No	No
	<b>Physico-chemical</b>	<p>Given that the water body is approximately 1.2 km upstream of the proposed works and given the distance from the locus, there will be no direct or indirect effects on the physico-chemical quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p> <p>In particular, the proposed works will not change the temperature, pH, oxygenation, salinity or nutrient concentrations in the water body; or activity release dangerous chemicals into the water body.</p>	No	No	No
	<b>Biological</b>	<p>Given that the water body is approximately 1.2 km upstream of the proposed works; and given the distance from the locus, there will be no direct or indirect effects on the biological</p>	No	No	No

Project Related

Water body	Quality element	Potential effects on WFD parameters	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats?	Detailed assessment required?
		<p>quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p> <p>Furthermore, given there are no impacts predicted upon the hydromorphological and physico-chemical quality elements of this water body, the works will not directly lead to the loss or modification of habitats for aquatic plants, aquatic invertebrates or fish in the water body.</p>			
Lower Witham (GB205030062426)	<b>Hydromorphological</b>	<p>This water body is greater than 2 km upstream of the proposed works. As such, given the distance from the locus (origin of potential impact source), there will be no direct or indirect effects on the hydromorphological quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p> <p>In particular, the works will not affect the volume, energy or distribution of flows in the water body; or change the width, depth, bank conditions, bed substrates and structure of the riparian zone in the water body; or create a permanent barrier to the downstream movement of water, sediment and fish in the water body.</p>	<b>No</b>	<b>No</b>	<b>No</b>
	<b>Physico-chemical</b>	<p>Given that the water body is approximately 2 km upstream of the proposed works and given the distance from the locus, there will be no direct or indirect effects on the physico-chemical quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p>	<b>No</b>	<b>No</b>	<b>No</b>

Project Related

Water body	Quality element	Potential effects on WFD parameters	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats?	Detailed assessment required?
		In particular, the works will not change the temperature, pH, oxygenation, salinity or nutrient concentrations in the water body; or activity release dangerous chemicals into the water body.			
	<b>Biological</b>	<p>Given that the water body is approximately 2 km upstream of the proposed works; and given the distance from the locus, there will be no direct or indirect effects on the biological quality element of this water body resulting from the construction, operation or decommissioning of the Facility.</p> <p>Furthermore, given there are no impacts predicted upon the hydromorphological and physico-chemical quality elements of this water body, the works will not directly lead to the loss or modification of habitats for aquatic plants, aquatic invertebrates or fish in the water body.</p>	<b>No</b>	<b>No</b>	<b>No</b>
Maud Foster and Fen Catchwater Drains (GB20503005646 5)	<b>Hydromorphological</b>	<p>This water body is approximately 400 m upstream of the proposed works. Although within close proximity to the works, the water body starts upstream of a major sluice. As such, in response to the structure and artificial nature of the water body, the construction, operation or decommissioning of the Facility will not impact directly or indirectly the hydromorphological quality element of this water body.</p> <p>In particular, the works will not affect the volume, energy or distribution of flows in the water body; or change the width, depth, bank conditions, bed substrates and structure of the riparian zone in the water body; or create a permanent barrier</p>	<b>No</b>	<b>No</b>	<b>No</b>

Project Related

Water body	Quality element	Potential effects on WFD parameters	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats?	Detailed assessment required?
		to the downstream movement of water, sediment and fish in the water body.			
	<b>Physico-chemical</b>	<p>Although this water body is within close proximity to the proposed works, the location of the sluice and artificial nature of the water body will result in no direct or indirect effects on the physico-chemical of this water body associated with the construction, operation or decommissioning of the Facility.</p> <p>In particular, the works will not change the temperature, pH, oxygenation, salinity or nutrient concentrations in the water body; or activity release dangerous chemicals into the water body.</p>	<b>No</b>	<b>No</b>	<b>No</b>
	<b>Biological</b>	<p>Although this water body is within close proximity to the proposed works, the location of the sluice and artificial nature of the water body will result in no direct or indirect effects on the physico-chemical of this water body associated with the construction, operation or decommissioning of the Facility.</p> <p>Furthermore, given there are no impacts predicted upon the hydromorphological and physico-chemical quality elements of this water body, the works will not directly lead to the loss or modification of habitats for aquatic plants, aquatic invertebrates or fish in the water body.</p>	<b>No</b>	<b>No</b>	<b>No</b>

Project Related

Table A13.1 3 Scoping Table of Potential Effects of the Proposed Facility on the Witham WFD Transitional Water Body

Quality element and scoping questions	Potential effects on WFD parameters Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
<b>Witham (The Haven) (GB530503000100)</b>				
<b>Hydromorphological</b>				
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	<b>The Haven is not a high status water body (given that it is heavily modified).</b> It should be noted high status water bodies are indicators of largely undisturbed conditions and reflect natural background status or only minor distortion by anthropogenic influences.	No	No	No
Could significantly impact the hydromorphology of any water body	The key construction activities for the proposed scheme have the potential to directly change the morphological complexity (habitat); and, increase sediment and/or contaminant runoff into The Haven, which could overall change the morphological conditions of the WFD water body. Furthermore, the key operational activities such as maintenance dredging and the increase in annual vessel movements during operation of the scheme, may also have a similar impact on the morphological conditions of the WFD water body	Yes	Yes	Yes
Is in a water body that is heavily modified for the same use as your activity	Yes, the water body is heavily modified for navigation (shipping) with eastern site boundaries of the proposed scheme area defined in part by a flood defence.	Yes	Yes	Yes

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
<b>Physico-chemical (Water Quality)</b>				
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	The key construction and operational activities for the proposed scheme have the potential to affect the water quality conditions of the WFD water body due to increased sediment and/or contaminant runoff into The Haven, along with the potential for accidental leaks and spills. Key activities that could impact on water quality parameters for more than 14 days are the capital and maintenance dredging for the proposed scheme.	Yes	Yes	Yes
Is in a water body with a phytoplankton status of moderate, poor or bad	The key construction and operational activities for the proposed scheme will not impact on any parameters that could affect algal levels in the WFD water body.	No	No	No
Is in a water body with a history of harmful algae	The key construction and operational activities for the proposed scheme are not within a WFD water body with a history of harmful algae.	No	No	No
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	No chemicals are to be directly released as part of the key construction and operational activities for the proposed scheme (this does not include accidental spillages or incidents).	No	No	No
It disturbs sediment with contaminants above Cefas Action Level 1	The key construction and operational dredging activities for the proposed scheme have the potential to exceed the contaminants trigger level of Action Level 1 (see Chapter 15 Marine Sediment and Water Quality).	Yes	Yes	Yes

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
Biological (Habitats)				
0.5 km <sup>2</sup> or larger	The key construction and operational activities (not including vessel movements) for the proposed scheme will not be larger than 0.5k m <sup>2</sup> .	No	No	No
1% or more of the water body's area	The key construction and operational activities for the proposed scheme are approximately within 3.65% of the water body.	Yes	Yes	Yes
Within 500 m of any higher sensitivity habitat	The key construction and operational activities for the proposed scheme are not within any higher sensitive habitat.	No	No	No
1% or more of any lower sensitivity habitat	The key construction and operational activities for the proposed scheme have the potential to impact 1% or more of the saltmarsh and mudflats (Priority Habitat) of The Haven (see Chapter 17 Marine and Coastal Ecology).	Yes	Yes	Yes
Biological (Fish)				
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	The key construction and operational activities, in particular dredging and sheet piling could impact both fish migration and fish mortality.	Yes	Yes	Yes

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	The key construction and operational activities, in particular dredging, sheet piling and increased vessel movement could impact both fish migration and fish mortality.	Yes	Yes	Yes
Could cause entrainment or impingement of fish	The key construction and operational activities would not cause entrainment or impingement.	No	No	No
Invasive Species				
Introduce or spread Invasive non-native species (INNS)	The activities have the potential to release invasive species if the materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. Good practice measures will be employed to ensure all equipment is cleaned and checked before use.	No	No	No

Project Related

Table A13.1 4 Scoping Table of Potential Effects of the Proposed Facility on the Wash Inner WFD Transitional Water Body

Quality element and scoping questions	Potential effects on WFD parameters Key Construction & Operational Activities: Flood defence relocation, sheet piling, excavation, dredging (capital & maintenance), vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
<b>Wash Inner (GB530503311300)</b>				
<b>Hydromorphological</b>				
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	<b>The Wash Inner is not a high status water body. It should be noted</b> high status water bodies are indicators of largely undisturbed conditions and reflect natural background status or only minor distortion by anthropogenic influences.	No	No	No
Could significantly impact the hydromorphology of any water body	The key construction activities for the proposed scheme are unlikely to impact the hydromorphology of the water body in response to being more than 7 km downstream of the site. Any increased vessel movement will have a negligible impact on the hydromorphology of the water body.	No	No	No
Is in a water body that is heavily modified for the same use as your activity	The water body is not heavily modified for navigation (i.e. no dredging, sheet piling or other construction activities).	No	No	No
<b>Physico-chemical (Water Quality)</b>				

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key Construction & Operational Activities: Flood defence relocation, sheet piling, excavation, dredging (capital & maintenance), vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	The key construction and operational activities for the proposed scheme have the potential to affect the water quality conditions of the WFD water body due to increased sediment and/or contaminant runoff into The Haven, along with the potential for accidental leaks and spills. However, the only key activities that could impact on water quality parameters for more than 14 days are the capital and maintenance dredging for the proposed scheme.	No	Yes	Yes
Is in a water body with a phytoplankton status of moderate, poor or bad	The key construction and operational activities for the proposed scheme will not impact on any parameters that could affect algal levels in the WFD water body.	No	No	No
Is in a water body with a history of harmful algae	The key construction and operational activities for the proposed scheme are not within a WFD water body with a history of harmful algae.	No	No	No
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	No chemicals are to be directly released as part of the key construction and operational activities for the proposed scheme (this does not include accidental spillages or incidents).	No	No	No
It disturbs sediment with contaminants above Cefas Action Level 1	The key construction and operational activities for the proposed scheme associated with dredging at the site has the potential to exceed the contaminates trigger level of Action Level 1. This may then potentially impact on this downstream water body. (see <b>Chapter 15 Marine Water and Sediment Quality</b> ).	No	Yes	Yes
<b>Biological (Habitats)</b>				

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key Construction & Operational Activities: Flood defence relocation, sheet piling, excavation, dredging (capital & maintenance), vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
0.5 km <sup>2</sup> or larger	The key construction and operational activities (not including vessel movements) for the proposed scheme are not within the water body.	No	No	No
1% or more of the water body's area	The key construction and operational activities (not including vessel movements) for the proposed scheme are not within the water body. Any increased vessel movement will have a negligible impact on the habitat of the Wash Inner water body.	No	No	No
Within 500 m of any higher sensitivity habitat	The key construction and operational activities (not including vessel movements) for the proposed scheme are not within the water body. Any increased vessel movement will have a negligible impact on the habitat of the Wash Inner water body.	No	No	No
1% or more of any lower sensitivity habitat	The key construction and operational activities (not including vessel movements) for the proposed scheme are not within the water body. Any increased vessel movement will have a negligible impact on the habitat of the Wash Inner water body. However, construction and operational activities associated with dredging may impact the habitats of the Wash Inner water body (e.g. in response to potential sediment plume).	No	Yes	Yes
<b>Biological (Fish)</b>				
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	The key construction and operational activities (not including vessel movements) for the proposed scheme are not within the water body. Any increased vessel movement in the Wash Inner water body will have a negligible impact on the fish migration or mortality.	No	No	No

Project Related

Quality element and scoping questions	Potential effects on WFD parameters Key Construction & Operational Activities: Flood defence relocation, sheet piling, excavation, dredging (capital & maintenance), vessel movements	Potential for impacts on WFD mitigation measures?	Potential for impacts on critical habitats (protected areas)?	Detailed assessment required?
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Construction and operational activities associated with dredging (and increased vessel movement) may impact fish migration and fish mortality of the Wash Inner water body (e.g. in response to potential downstream sediment plume).	No	Yes	Yes
Could cause entrainment or impingement of fish	The key construction and operational activities would not cause entrainment or impingement.	No	No	No
<b>Invasive Species</b>				
Introduce or spread INNS	The activities have the potential to release invasive species if the materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. Good practice measures will be employed to ensure all equipment is cleaned and checked before use.	No	No	No

## Project Related

### Summary

A13.5.5 **Table A13.1.3** and **Table A13.1.4** have considered all activities associated with the construction, operational and decommissioning phases of the Facility that potentially could impact on water bodies; and, concluded that there are a variety of potential mechanisms that could either cause deterioration in water body status or threaten the ability of the water body to meet its objectives.

A13.5.6 Stage 2 of the WFD compliance assessment has demonstrated that the proposed project has the potential to cause deterioration in the status for some quality elements associated with the following WFD water bodies:

- Witham (GB530503000100) – Transitional Water Body
- Hydromorphological, physico-chemical and biological quality elements
- Wash Inner (GB530503311300) – Transitional Water Body
- Physico-chemical and biological quality elements only

A13.5.7 A detailed assessment of the potential impacts of the Facility on the water bodies identified above should be undertaken as part of Stage 3 of the WFD Compliance Assessment. This is provided in **Section A13.6** of this report.

### **A13.6 Detailed Compliance Assessment (Stage 3)**

A13.6.1 To determine which activities are of relevance to the WFD compliance assessment, the biological, hydromorphological and physico-chemical quality elements in the water bodies identified during Stage 2 as having the potential to be impacted by the proposed scheme have been considered. The potential impacts on the identified water bodies are presented in **Table A13.1.5** and **Table A13.1.6**.

Project Related

Table A13.1 5 WFD Compliance Assessment for the Witham (The Haven) (GB530503000100) Transitional Water Body

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
Witham (The Haven) (GB530503000100)	Hydromorphological	<p><b>Construction:</b></p> <p>There is potential for the direct release of fine and coarse sediment (including contaminants) during the key construction activities for the wharf of the Facility, in particular the relocation of the existing flood defence; excavations; sheet piling; and, capital dredging. This will vary the local morphological conditions with regards to the width; depth; and, bed topography (quantity, structure and substrate) of The Haven. In addition, although unlikely, there is potential for the indirect release of fine sediment and/or contaminants through in-wash (sediment run-off) from floodplain working areas on the development site further impacting upon the morphological conditions. In particular, the potential release of fine sediments in the water body could result in localised increases in turbidity which could increase sediment deposition and changes in bed topography of The Haven. These changes in morphological conditions could impact upon the habitats or hydromorphological elements of the water body (e.g. smother existing bed habitats); and overall reduce the morphological complexity of The Haven.</p> <p>However, given the construction works will be localised and within designated work areas, the potential release of sediment (fine and coarse) and/or contaminants is expected to be localised; and, temporary in nature, with all measures made to avoid unnecessary releases (as stated in the below mitigation). Furthermore, the fine sediment concentrations in The Haven are likely to be relatively high, given that it is primarily a depositional environment where tidal</p>	<p><b>No</b></p> <p>It is unlikely that any adverse impacts would occur in response to the proposed scheme, <b>although this will be further confirmed during the detailed design phase for the project.</b></p>	<p>This project is unlikely to directly or indirectly conflict with the objectives of the Habitats Directive or other EU Legislation. <b>However, this will be further confirmed during the detailed design phase for the project</b> (Please see the PEIR)</p>

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>current velocities are too weak to re-suspend completely the mud that settles out, as stated in Chapter 16 Estuarine Process. In fact, suspended sediment concentrations measured during the baseline studies for the Boston Barrier project (Newton, 2017) showed background concentrations of 75 – 750 mg/l, with the highest concentrations being recorded nearest the bed. Deposits of fine sediment were also observed to be very mobile during site visits with many areas subject to reworking. Therefore, fine sediment is unlikely to be released in sufficiently high volumes to affect the very dynamic sediment regime; the structure; and, substrate of the channel bed and overall morphological conditions of The Haven immediately upstream and downstream of the development site (further detailed below regarding sediment plumes).</p> <p>A localised, low concentration plume of suspended sediment will most likely be created from the works, which would be dispersed by tidal currents (and waves) away from the site, either up-estuary on the flood tide or down-estuary on the ebb tide. However, due to the small volume of sediment released (due to the fact that dredging would be mostly undertaken by excavator / backhoe methods from land, which tend to have minimal losses of material into the water column); and the fine size of the particles (silt and clay), it is likely to be rapidly dispersed, resulting in very low suspended sediment concentrations. These suspended sediment concentrations would be within the range of natural variability (i.e. 75 mg/l to 750 mg/l) (Newton, 2017); and, would be indistinguishable from background levels. Whilst the samples collected during the Boston Barrier baseline study were not collected within the footprint of the proposed</p>		

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>dredge area for the scheme, it is anticipated that sediment quality is likely to be of similar nature and reflect generalised sediment conditions in The Haven (estuary) given that there are no specific pollution or alternative sources that could give rise to variances. This same conclusion was also stated in Chapter 16 Estuarine Processes. As a result, the sediments in the construction dredge area are likely to exhibit only marginally elevated levels of metals.</p> <p>The capital dredge and foot print of the berthing area is approximately 32,850 m<sup>2</sup> which equates to only 3.65% of the water body (0.9 km<sup>2</sup>, see <b>Table A13.1.1</b>). This small change or loss in channel (habitat) complexity is unlikely to impact this water body in response to being heavily modified with a predominately uniform channel size and shape.</p> <p>In addition to the above, a detailed Method Statement (MS) and Environmental Action Plan (EAP) will be implemented for this project which takes into consideration the following mitigation to prevent the release of sediment and/or contaminants into the water body during construction; and will be adhered to by the Contractor:</p> <ul style="list-style-type: none"> <li>• Dredging to be carried out from the land side and at low tide as much as possible.</li> <li>• Disposal of capital dredged sediment to be on land rather than at sea (and drained prior to lifting on land).</li> <li>• The area of channel habitat (mudflat and saltmarsh) affected will strictly be restricted to what is necessary for the construction of the wharf (and berth).</li> <li>• Additionally, the dimensions of the quay wall and wharf to be set to minimise the volume of capital dredging required, in order to</li> </ul>		

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>minimise impacts on the channel habitat; and, also allow a safe clearance between a berthed vessel and others passing through the channel.</p> <ul style="list-style-type: none"> <li>• Deployment of silt curtains both upstream and downstream of the development site.</li> <li>• Capital dredging works to be minimised according to best practice.</li> <li>• Minimise unnecessary sediment run-off from the development site during construction by intercepting surface drainage and, if necessary, employing silt traps (e.g. Sedimats) adjacent to the banks of The Haven within the designated work areas.</li> <li>• Dampen areas of dryness to reduce the risk of windblown dust particles entering the water body.</li> <li>• All concreting works to use concrete with an anti-washout additive.</li> <li>• Heras screens with debris netting to be erected to prevent errant concrete from entering The Haven with the designated work areas.</li> <li>• Monitor the channel bed and banks of The Haven through regular bathymetric and habitat surveys.</li> </ul> <p>Overall for the construction phase, based on the above, there will be negligible impacts on the hydromorphological quality elements of the Witham water body. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GEP in this water body. Impacts prior to mitigation are considered unlikely.</p>		

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p><b>Operation:</b></p> <p>There is potential that maintenance dredging may impact upon the long term morphological conditions with regards to the width; depth; and, bed topography (quantity, structure and substrate) of The Haven. However, similar to construction, any potential impacts would be very localised with sediments unlikely to be released in sufficiently high volumes to affect the very dynamic sediment regime; or, the existing background turbidity and contaminant levels of The Haven. It should be noted that 28,000 tonnes of maintenance dredging is currently carried out by the Port of Boston in The Haven, however, this mainly occurs further downstream of the Facility at the approaches to the 'S' bend in The Haven at Hobhole. Therefore, any maintenance dredging (which is proposed to be from land) associated with the proposed scheme, and associated sedimentation, would fall within the operations currently undertaken. Furthermore, it is proposed that dredging would be carried out on from land. Thus, it is not expected for the sedimentation to be significantly higher than the baseline.</p> <p>Furthermore, The Haven is heavily modified with a predominately uniform channel size and shape (i.e. limited channel complexity) with any potential erosion of the bed and banks having negligible impacts on the morphological condition of The Haven. The tidal prism and flow regime and velocities are also unlikely to be significantly affected by the long term operation of the proposed scheme. However, similar mitigation stated for construction should be implemented for maintenance dredging, in particular monitoring of</p>		

Project Related

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
		<p>the morphological conditions at the site before and after maintenance dredging.</p> <p>Overall, the operation phase, will results in negligible impacts on the hydromorphological quality elements of the Witham water body. Furthermore, there will be negligible risk of causing deterioration or the prevention of achieving GEP in this water body. Impacts prior to mitigation are considered unlikely.</p>		
	<b>Physico-chemical</b>	<p><b>Construction:</b></p> <p>Based on the construction phase information and mitigation measures for the hydromorphological quality element of the water body, this will contribute to negligible impacts on all physico-chemical quality elements, in particular the release of fine and coarse sediment (including contaminates) during the key construction activities for the proposed scheme. Regarding the potential accidental release of lubricants and fuel oils from construction machinery, CIRIA`s Environment Good Practice on Site, 3rd Edition; and Construction Industry Publication (CIP) Construction Environmental Manual will be implemented by the Contractor. Furthermore, the following will be implemented and detailed in the MS and EAP:</p> <ul style="list-style-type: none"> <li>• Storage of material onsite will be kept to a minimum.</li> <li>• Compound and fuel storage kept a minimum of 15 m away from the watercourse.</li> <li>• Re-fuelling of plant to be undertaken in compound and in a suitably bunded area with spill kits available in site.</li> </ul>	<p><b>No</b></p> <p>It is unlikely that any adverse impacts would occur in response to the proposed scheme, <b>although this will be further confirmed during the detailed design phase for the project.</b></p>	<p>This project is unlikely to directly or indirectly conflict with the objectives of the Habitats Directive or other EU Legislation. <b>However, this will be further confirmed during the detailed design phase for the project</b></p> <p>(Please see the PEIR)</p>

Project Related

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
		<ul style="list-style-type: none"> <li>Biodegradable oil to be used in construction plant and drip trays to be used on all static construction plant/machinery.</li> </ul> <p>Overall for the construction phase, based on the above, there will be negligible impacts on the physico-chemical quality elements of the Witham water body. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GEP in this water body. Impacts prior to mitigation are considered likely.</p> <p><b>Operation:</b> Based on the operational phase information and mitigation measures for the hydromorphological quality element of the water body, these will inherently contribute to negligible impacts on the physico-chemical quality elements of the Witham water body during the operational phase for the proposed scheme. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GEP in this water body. Impacts prior to mitigation are considered likely.</p>		
	<b>Biological</b>	<p><b>Construction:</b> Based on the above impacts for the hydromorphological and physico-chemical elements, there is the potential for a cascading impact upon the biological elements of the water body, for example by smothering existing bed habitats and reducing light penetration through increased sediment deposition, which could affect key aquatic habitats and intertidal soft sediments like sand and mud (and associated benthic invertebrates and fish communities).</p>	<p><b>No</b> It is unlikely that any adverse impacts would occur in response to the proposed scheme, <b>although this will be further confirmed</b></p>	<p>This project is unlikely to directly or indirectly conflict with the objectives of the Habitats Directive or other EU Legislation. <b>However, this will be further confirmed</b></p>

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>The increased suspended sediments in the water column, as discussed above, have the potential to deposit and smother the benthic communities, whilst also releasing contaminants in the sediment. The disturbed sediment resulting from capital dredging is very likely to deposit within The Haven, and not be carried down into The Wash. However, there is the potential for the very fine sediment to be dispersed by tidal currents (and waves) away from the site, either up-estuary on the flood tide or down-estuary on the ebb tide out to The Wash (also see Chapter 16 Estuarine Processes).</p> <p>Given the low release rate of sediment from the dredging and the very low suspended sediment concentrations in the dredge plume (as stated), it is expected for the deposited sediment layer within The Haven will be less than one millimetre, which is considered to be within the range of natural deposition on the habitats in this area (mudflats and saltmarshes). The fish species found in The Haven are likely to be able to tolerate conditions of elevated suspended sediment concentrations and highly turbid conditions, as demonstrated by their presence and abundance in one of the most turbid estuaries in Europe, the Humber Estuary (Uncles et al. 2002).</p> <p>However, to further reduce potential impacts of suspended sediments on the biological quality element of the water body, the following mitigation measures have been identified and will be adhered to during the construction phase, to further minimise and avoid/prevent the scale of any deterioration in water body status:</p> <ul style="list-style-type: none"> <li>Implementing the same mitigation measures detailed for the hydromorphological and physico-chemical elements quality elements of the water body.</li> </ul>	<p><b>during the detailed design phase for the project.</b></p>	<p><b>during the detailed design phase for the project.</b></p> <p>(Please see the PEIR)</p>

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<ul style="list-style-type: none"> <li>Brief the contractor properly to ensure they reduce the amount of activity on the intertidal area, e.g. only walk/drive on it if absolutely necessary; and bog mats for the mobile plant implemented if required.</li> </ul> <p>It is proposed that approximately 150,000 m<sup>3</sup> of material will be removed by capital dredging, allowing development of a 400 m long and 40 m wide wharf, as a worst case scenario. This estimate has assumed a material removal depth of approximately 6 m. Part of this will be dredging of silty material from the intertidal mudflats, and part of it is within the intertidal saltmarsh. The habitat that will be lost is considered to be of district conservation importance. Additionally, the area of habitat that will be impacted is similar in nature to the adjacent habitats and, therefore, is not considered unique in the context of The Haven. However, the changes in saltmarsh and mudflat dynamics should be monitored as part of the channel conditioning monitoring, and if required further mitigation implemented (e.g. compensatory habitat).</p> <p>There is also potential for impacts of construction noise such as sheet piling upon fish. The fish species at greatest risk from the underwater noise generated by the construction activities are migratory species (European eel, smelt, river lamprey, sea trout); and species with highest sensitivity to noise (herring, sprat, cod and whiting). Herring, sprat, cod and whiting all are considered to have sensitivity to both pressure and particle motion (Popper, et al., 2014). However, it should be noted that these species are fairly mobile, which may reduce their risk for impact, in addition to the timing of the</p>		

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>piling which can be modified to occur outside of key migratory and spawning seasons of the aforementioned fish.</p> <p>At this stage, the impacts of both construction noise and vibration are unlikely to impact fish in response to the below:</p> <p>Consideration of silent piling technologies and or noise buffer curtains.</p> <p>Piling to be undertaken during low tide only.</p> <p>Piling works to consider the in-river working embargo period 15th October – May 15th (if possible) to minimise risks to migrating fish, although depending on the nature of works, some in-river or river estuary foreshore work could be undertaken in agreement with the Environment Agency.</p> <p>No restriction in movement in The Haven for migratory fish (i.e. so fish can escape the extent of the noise impacts).</p> <p>Shipping to be kept to a minimum, as necessary.</p> <p>Silver eels typically migrate at night and during heavy rainfall. Consequently, migratory movements have been correlated with environmental factors that result in increased discharge (rainfall, flood events, dam openings). As such, no piling to be undertaken at night or immediately following a heavy rainfall event.</p> <p>Although there is potential for elvers to be migrating upstream between February and April/May, similar to adult eels, elvers also predominantly migrate at night (when piling activity would not be occurring).</p> <p>European eel has a physostomous swim bladder (connection with the stomach), although is on the verge of becoming physoclistous, in which the duct is caught in the very act of enlargement into a</p>		

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>separate chamber and has an extremely long distance between the swimbladder and the ear. This overall results in European eel being more tolerable to noise thresholds compared to other fish species and fall under the classification of hearing generalists (medium hearing sensitivity). In addition, European eels are prone to infestation with the swimbladder parasite, <i>Anguillicoloides (Anguillicola) crassus</i>, which can cause thickening of the swimbladder walls influence the sensitivity of eels to sound. Salmonids are unlikely to detect sounds originating in air, but that they are sensitive to substrate borne sounds. However, compared with carp and cod, the hearing of the salmon is very poor, and more like that of the perch and plaice (medium to low hearing sensitivity). The Haven is most likely a transient corridor for all fish including migratory and non migratory fish, such as cod and whiting, and unlikely to be present for an extended amount of time (in response to lack of habitat complexity).</p> <p>Overall for the construction phase, based on the above, there will be negligible impacts on the biological quality elements of the Witham water body. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GEP in this water body. The likelihood of impacts before mitigation is likely.</p> <p><b>Operation:</b></p> <p>Based on the above information and mitigation measures for the construction phase of the biological quality element of the water body, these will inherently contribute to negligible impacts on the biological quality elements of the Witham water body during the</p>		

Project Related

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
		operational phase (i.e. maintenance dredging and increased vessel movements) for the proposed scheme. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GEP in this water body. Impacts prior to mitigation are considered likely.		

Table A13.1 6 WFD Compliance Assessment for the Wash Inner (GB530503311300) Transitional Water Body

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
Wash Inner (GB530503311300)	Physico-chemical	<p><b>Construction:</b></p> <p>There is potential for the direct release of fine and coarse sediment (including contaminants) during the key construction activities for the proposed scheme, in particular the relocation of the existing flood defence, excavations, sheet piling and capital dredging. The potential release of fine sediments in the water body could result in localised increases in turbidity which could increase sediment deposition downstream of the development site into the Wash Inner water body. This could impact upon the habitats of the water body (e.g. smother existing bed habitats); and overall reduce the habitat complexity of Wash Inner water body.</p> <p>As stated previously, a localised, low concentration plume of suspended sediment would be created from the key construction activities, which would be dispersed by tidal currents (and waves)</p>	<p><b>No</b></p> <p>It is unlikely that any adverse impacts would occur in response to the proposed scheme, <b>although this will be further confirmed during the detailed design phase for the project.</b></p>	<p>This project is unlikely to directly or indirectly conflict with the objectives of the Habitats Directive or other EU Legislation. <b>However, this will be further confirmed during the detailed design phase for the project.</b></p> <p>(Please see the PEIR)</p>

Project Related

Water body	Quality element	<b>Potential impacts (Construction and Operation)</b> <b>Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging</b> <b>Key operational activities: maintenance dredging, vessel movements</b>	<b>Further assessment required under Article 4.7 (i.e. WFD non-compliant)?</b>	<b>Potential for impacts on critical habitats under the EU Habitats Directive?</b>
		<p>away from the site, either up-estuary on the flood tide or down-estuary on the ebb tide. However, due to the small volume of sediment released (due to the fact that dredging would be mostly undertaken by excavator / backhoe methods on land, which tend to have minimal losses of material into the water column); and the fine size of the particles (silt and clay), it is likely to be rapidly dispersed, resulting in very low suspended sediment concentrations (less than tens of mg/l). These suspended sediment concentrations would be within the range of natural variability (75 mg/l to 750 mg/l) (Newton, 2017); would be indistinguishable from background levels; and overall mostly be considerably diluted/dispersed prior to entering the Wash Inner water body.</p> <p>As such for the construction phase, based on the above information and mitigation measures to be implemented for the works, there will be negligible impacts on the physico-chemical quality elements of the Wash Inner water body. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GES in this water body. Impacts prior to mitigation are considered unlikely.</p> <p><b>Operation:</b></p> <p>Based on the above information and mitigation measures to be implemented for the works, these will inherently contribute to negligible impacts on the physico-chemical quality elements of the Wash Inner water body during the operational phase (i.e. maintenance dredging and increased vessel movements) for the proposed scheme. Furthermore, there will be negligible risk of causing deterioration in</p>		

Project Related

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
		water body status or the prevention of achieving GES in this water body. Impacts prior to mitigation are considered unlikely.		
	<b>Biological</b>	<p><b>Construction:</b></p> <p>As stated above, suspended sediment concentrations in response to the key activities would be within the range of natural variability (75 mg/l to 750 mg/l) (Newton, 2017); would be indistinguishable from background levels; and overall mostly be considerably diluted/dispersed prior to entering the Wash Inner water body. As such, it is unlikely the habitats of the Wash Inner water body would be affected through smothering; or fish migration and fish health be jeopardised.</p> <p>As such for the construction phase, based on the above information and mitigation measures to be implemented for the works, there will be negligible impacts on the biological quality elements of the Wash Inner water body. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GES in this water body. Impacts prior to mitigation are considered unlikely.</p> <p><b>Operation:</b></p> <p>Based on the above information and mitigation measures to be implemented for the works, these will inherently contribute to negligible impacts on the biological quality elements of the Wash Inner water body during the operational phase (i.e. maintenance dredging and increased vessel movements) for the proposed scheme. Furthermore, there will be negligible risk of causing deterioration in water body status or the prevention of achieving GES in this water body. Impacts</p>	<p><b>No</b></p> <p>It is unlikely that any adverse impacts would occur in response to the proposed scheme, <b>although this will be further confirmed during the detailed design phase for the project.</b></p>	<p>This project is unlikely to directly or indirectly conflict with the objectives of the Habitats Directive or other EU Legislation. <b>However, this will be further confirmed during the detailed design phase for the project.</b></p> <p>(Please see the PEIR)</p>

Project Related

Water body	Quality element	Potential impacts (Construction and Operation) Key construction activities: flood defence relocation, sheet piling, excavation, capital dredging Key operational activities: maintenance dredging, vessel movements	Further assessment required under Article 4.7 (i.e. WFD non-compliant)?	Potential for impacts on critical habitats under the EU Habitats Directive?
		prior to mitigation are considered unlikely.		

## A13.7 Summary of Assessment and Further Recommendations

### Impacts of the scheme on WFD compliance

A13.7.1 Based on this WFD compliance assessment, the proposed Boston Alternative Energy Facility will have no local effects on the hydromorphological, physico-chemical and biological quality elements of the Witham (GB530503000100) transitional water body; and Wash Inner (GB530503311300) transitional water body. The construction, operation and decommissioning of the proposed scheme will have a negligible risk of causing direct deterioration in status of the water body or preventing GEP or GES being achieved in the aforementioned water bodies in the future providing the identified mitigation measures are put in place. However, this will be further confirmed during the detailed design phase for the project.

### Mitigation measures

A13.7.2 In order to prevent deterioration in the status of the water bodies highlighted in **Section A13.5** and ensure that the proposed scheme is compliant with WFD, the following mitigation measures are recommended:

- Dredging to be carried out from the land side and at low tide as much as possible.
- Dispose of capital dredged sediment on land rather than at sea (and drained prior to being placed on land).
- The area of channel habitat (mudflat and saltmarsh) affected will be strictly restricted to what is necessary for the construction of the wharf.
- Additionally, the dimensions of the quay wall and wharf have been set to minimise the volume of capital dredging required, to minimise impacts on the channel habitat; and, also allow a safe clearance between a berthed vessel and others passing through the channel.
- Deployment of silt curtains both upstream and downstream of the development site.
- Capital dredging works to be minimised according to best practice.
- Minimise unnecessary sediment run-off from the development site during construction by intercepting surface drainage and, if necessary, employing silt traps (e.g. Sedimats) adjacent to the banks of The Haven within the designated work areas.

### Project Related

- Dampen areas of dryness to reduce the risk of windblown dust particles entering the water body.
- All concreting works to use concrete with an anti-washout additive.
- Heras screens with debris netting to be erected to prevent errant concrete from entering The Haven with the designated work areas.
- Regarding the potential accidental release of lubricants and fuel oils from construction machinery:
  - CIRIA's Environment Good Practice on Site, 3rd Edition; and Construction Industry Publication (CIP) Construction Environmental Manual will be implemented by the Contractor. Furthermore, the following will be implemented and detailed in the MS and EAP:
    - Storage of material onsite will be kept to a minimum.
    - Compound and fuel storage to be kept 15 m away from The Haven.
    - Re-fuelling of plant to be undertaken in compound and in a suitably bunded area with spill kits available in site.
    - Bio degradable oil to be used in construction plant and drip trays to be used on all static construction plant/machinery.
- Brief the contractor properly to ensure they reduce the amount of activity on the intertidal area, e.g. only walk/drive on it if absolutely necessary; and bog mats for the mobile plant implemented if required.
- Consideration of environmentally silent piling technologies, such as Giken Silent (Press) Piling equipment; and or noise buffer curtains.
- Piling to be undertaken during low tide only.
- Piling works to consider the in-river working embargo period 15th October – May 15th (if possible) to minimise risks to migrating fish, although depending on the nature of works, some in-river or river estuary foreshore work could be undertaken in agreement with the Environment Agency.
- No restriction in movement in The Haven for migratory fish (i.e. so fish can escape the extent of the noise impacts).
- Shipping to be kept to a minimum, as necessary.

### Monitoring

13.1.2 In order to prevent deterioration in the status of the water bodies highlighted in **Section A13.5** and ensure that the proposed scheme is compliant with WFD, the following monitoring measures are recommended:

- Monitor the channel bed and banks of The Haven through regular bathymetric and habitat surveys.

### Project Related

- Monitor the morphological conditions upstream and downstream of the development site before and after maintenance dredging.

Project Related

### A13.8 References

The WFD (Standards and Classification) Directions (England and Wales (2017).  
[http://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d\\_20151623\\_en\\_auto.pdf](http://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d_20151623_en_auto.pdf)

Water Framework Directive Assessment: Estuarine and Coastal Waters (Environment Agency, 2017). <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

Planning Inspectorate (2017) Advice Note 18: The Water Framework Directive  
[https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice\\_note\\_18.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf)

Environment Agency (2016a) *WFD risk assessment*:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/522426/LIT\\_10445.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf)

Environment Agency (2016). Protecting and improving the water environment – Water Framework Directive compliance of physical works in rivers. Doc No. 488\_10.

Internal Environment Agency guidance on WFD deterioration and risk to the status objectives of river water bodies (Environment Agency 2016c).

UKTAG (2011) Defining & Reporting on Groundwater Bodies:  
<https://www.wfduk.org/resources%20/defining-and-reporting-groundwater-bodies>

Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme (2009) WFD Expert Assessment of Flood Management Impacts. R&D Technical Report FD2609/TR.

Newton, T. (2017). Boston Barrier Project 2017: Water quality and sediment quality report (Environment Agency).

Popper, A. et al. (2014). Sound Exposure Guidelines for Fishes and Sea Turtles, Springer.

Uncles, R.J., Stephens, J.A and Smith, R.E (2002). The dependence of estuarine turbidity on tidal intrusion length, tidal range and residence time. *Continental Shelf Research* 22(11-13):1835-1856.

UKTAG (2003) Guidance on Morphological Alterations and the Pressures and Impacts Analyses:

[https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Morphological%20alterations%20and%20the%20pressures%20and%200impact%20analyses\\_Draft\\_251103.pdf](https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Morphological%20alterations%20and%20the%20pressures%20and%200impact%20analyses_Draft_251103.pdf)

UKTAG (2012a) Paper 11b(i) Groundwater Chemical Classification:  
<https://www.wfduk.org/resources%20/paper-11bi-groundwater-chemical-classification-march-2012>

Project Related

UKTAG (2012b) Paper 11b(ii) Groundwater Quantitative Classification:  
<https://www.wfduk.org/resources%20/paper-11bii-groundwater-quantitative-classification-march-2012>