



# A17/3 - Environmental Statement: Non-Technical Summary

We are the Environment Agency. We protect and improve the environment.

Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can't do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.

Published by:

Environment Agency  
Horizon House, Deanery Road,  
Bristol BS1 5AH  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

Further copies of this report are available  
from our publications catalogue:  
[www.gov.uk/government/publications](http://www.gov.uk/government/publications)

or our National Customer Contact Centre:  
T: 03708 506506

Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk).

© Environment Agency 2014

All rights reserved. This document may be  
reproduced with prior permission of the  
Environment Agency.

Quality Assurance

<i>Project name</i>	<i>Boston Barrier Tidal Project</i>
<i>Project 1B1S reference</i>	<i>IMAN001472</i>
<i>Date</i>	<i>12 August 2016</i>
<i>Version number</i>	<i>1</i>
<i>Author</i>	<i>NC; GH; TS</i>

Approvals

<i>Name</i>	<i>Title</i>	<i>Date</i>	<i>Version</i>
<i>NC</i>	<i>EIA Project Manager</i>	<i>12/08/2016</i>	<i>1</i>
<i>EL</i>	<i>EIA Project Director</i>	<i>12/08/2016</i>	<i>1</i>

EIA Quality Mark



This Environmental Statement, and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development, was undertaken in line with the EIA Quality Mark Commitments.

The EIA Quality Mark is a voluntary scheme, operated by the Institute of Environmental Management and Assessment (IEMA), through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

- EIA Management
- EIA Team Capabilities
- EIA Regulatory Compliance
- EIA Context & Influence
- EIA Content
- EIA Presentation
- Improving EIA practice

To find out more about the EIA Quality Mark please visit:  
[www.iema.net/qmark](http://www.iema.net/qmark)

This page has been left intentionally blank.

# Contents

<b>Chapter</b>	<b>Title</b>	<b>Page</b>
<b>1</b>	<b>Introduction and background</b>	<b>1</b>
	1.1 Overview _____	1
	1.2 Approach to obtaining consent for the Project _____	2
	1.3 Availability of the Environmental Statement _____	3
<b>2</b>	<b>Description of the Boston Barrier Tidal Project</b>	<b>5</b>
	2.1 Overview _____	5
	2.2 Barrier structure _____	6
	2.3 Barrier control building _____	7
	2.4 Wet dock entrance gate and related works _____	7
	2.5 Right bank flood defences _____	7
	2.6 Left bank flood defences _____	8
	2.7 Enabling works _____	10
	2.8 Landscaping and lighting _____	12
	2.9 Water level management _____	12
	2.10 Construction programme and compounds _____	12
<b>3</b>	<b>Consideration of alternatives</b>	<b>15</b>
<b>4</b>	<b>Consultation</b>	<b>23</b>
<b>5</b>	<b>Environmental Impact Assessment process</b>	<b>25</b>
	5.1 EIA process _____	25
<b>6</b>	<b>Existing environment</b>	<b>27</b>
	6.1 Wider surrounding environmental conditions _____	27
	6.2 Local environmental conditions _____	29
<b>7</b>	<b>Significant environmental effects and proposed mitigation measures</b>	<b>33</b>
	7.1 Cultural heritage _____	33
	7.2 Landscape and visual amenity _____	34
	7.3 Land use _____	35
	7.4 Noise and vibration _____	36
	7.5 Ecology and nature conservation _____	39
	7.6 Surface water _____	40
	7.7 Estuarine processes and geomorphology _____	41
	7.8 Contaminated land and ground conditions _____	41
	7.9 Waste and resources _____	42
	7.10 Navigational impact _____	42
	7.11 Road traffic and transport _____	45
	7.12 Air quality _____	47

**Boston Barrier Tidal Project**  
A17/3 – Environmental Statement: Non-Technical Summary

7.13	Community	47
8	Cumulative assessment	49
9	Conclusion	51

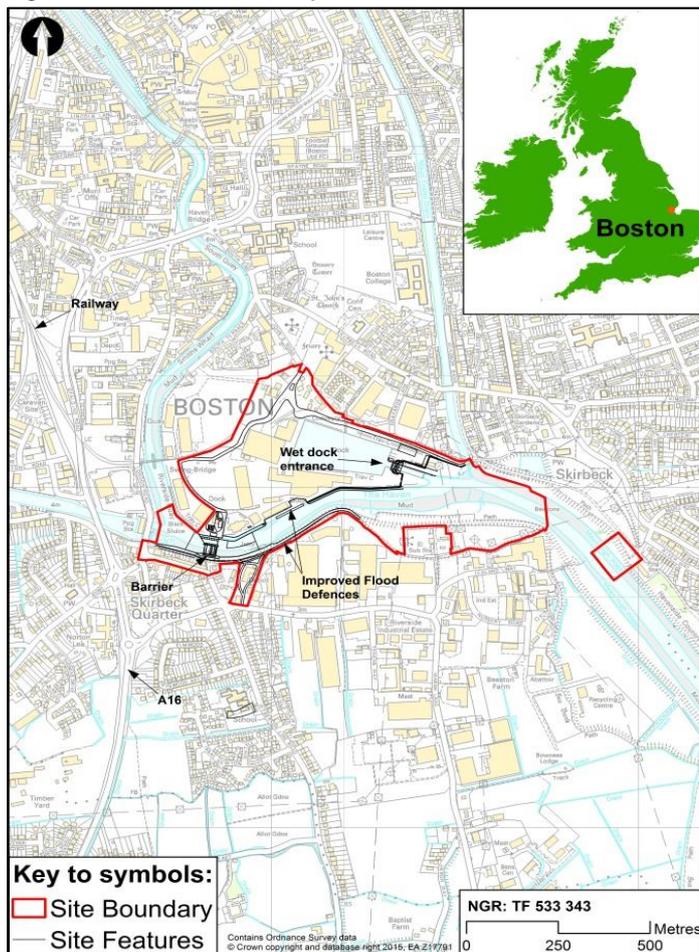
# 1 Introduction and background

## 1.1 Overview

1.1.1 The Environment Agency intends to manage the risk of flooding from the tidal River Witham (known as ‘the Haven’ in this location) in Boston, Lincolnshire. To achieve this, the Environment Agency proposes to build a tidal barrier, which can be raised and lowered, within the Haven and associated flood defences along sections of both the right (south of the river) and left bank (north of the river). The tidal river presents a potential flood risk to Boston, particularly during tidal surges, such as those which occurred in December 2010 and 2013.

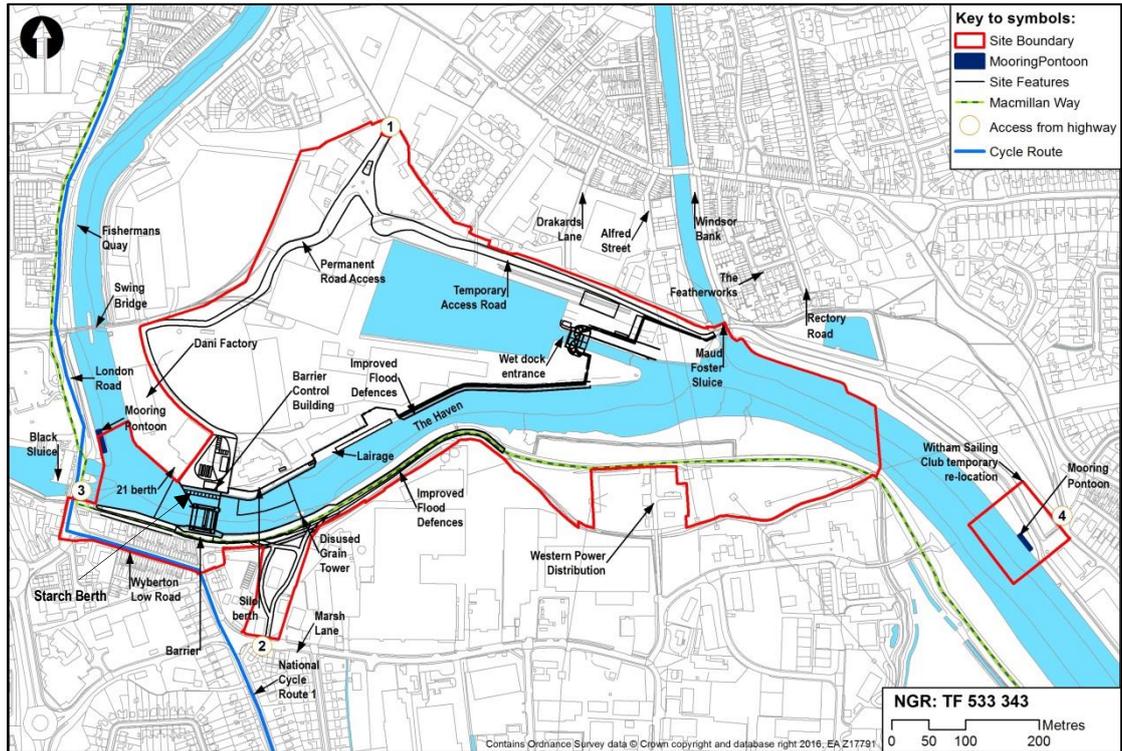
1.1.2 The locations of the proposed tidal barrier and associated works are shown in Figure 1.1 and Figure 1.2.

Figure 1.1: Location of Project



Source: Mott MacDonald 2016

Figure 1.2: Project elements and nearby features



Source: Mott MacDonald 2016

1.1.3 The tidal barrier and associated works ('the Project') would offer protection against an 'extreme' tidal flood event. An 'extreme' tidal flood event is considered to be a 1 in 300 (0.33%) chance of a tidal flood event happening in one year over a 100-year time period.

1.1.4 The Project is considered the best option to address the risk of flooding from the Haven in Boston from a technical, environmental and value for money perspective. Consultation was carried out with the local communities in Boston, relevant statutory organisations and other key local stakeholders that have an interest in the area to inform the selection of the most appropriate option.

**1.2 Approach to obtaining consent for the Project**

1.2.1 Permission is required for the construction, operation and maintenance of the Project. As the Project is located within the navigational system along the Haven, the Environment Agency is making an application to the Secretary of State for Environment, Food and Rural Affairs for an

Order under the Transport and Works Act, 1992 and an associated request for a deemed planning permission under the Town and Country Planning Act 1990.

- 1.2.2 In addition to the above:
- A separate application for a Listed Building Consent is being made to Boston Borough Council in relation to works proposed within the vicinity of the Maud Foster Sluice, a Grade II listed building; and
  - A separate application for a Marine Licence under the Marine and Coastal Access Act 2009 will be submitted to the Marine Management Organisation for works in the marine environment.

1.2.3 As part of the Transport and Works Act Order application, and to support the Listed Building Consent and Marine Licence, an Environmental Impact Assessment (EIA) has been carried out. The EIA for the Project has identified and assessed the likely significant effects on the environment. It has considered both positive and adverse impacts and has identified measures to reduce and manage any significant adverse impacts while enhancing positive impacts. Results of the EIA are reported in detail in an Environmental Statement (ES).

1.2.4 The EIA for the Project has followed the relevant EIA regulations and best practice guidance. This document is a Non-Technical Summary (NTS) that summarises the main findings of the Boston Barrier Tidal Project ES. The NTS is a stand-alone document provided to support the ES.

**1.3 Availability of the Environmental Statement**

1.3.1 The ES will be available for review at the following locations (Table 1.1):

Table 1.1: Locations to view a hard copy of the ES

Location	Address	Opening Hours
Boston Barrier Community Hub	Boston Barrier Community Hub, Riverside Industrial Estate, Marsh Lane, Boston, PE21 7PJ	Wednesday 12:00 – 19:00
Environment Agency - Peterborough	Environment Agency, Goldhay Way, Orton Goldhay, Peterborough, Cambridgeshire, PE2 5ZR	Monday to Friday, excluding all bank holidays 09:00 – 16:30 Viewing by appointment on 020 847 47371
Boston Borough Council	Municipal Buildings,	Monday to Thursday 08:45 - 17:15

**Boston Barrier Tidal Project**

A17/3 – Environmental Statement: Non-Technical Summary

Location	Address	Opening Hours
	West Street, Boston, Lincolnshire, PE21 8QR	Friday 08:45 – 16:45

## 2 Description of the Boston Barrier Tidal Project

### 2.1 Overview

- 2.1.1 The Project involves the construction of a new tidal barrier, to the south of central Boston, Lincolnshire (Figure 1.1). The Project would be constructed within the Haven, between Black Sluice and Maud Foster Sluice (Figure 1.2). The works would take place within this section of the Haven as well as along the left bank to the Maud Foster Sluice and towards the Western Power Distribution substation on the right bank. The total area within which works could be undertaken (including land and water) is approximately 34ha.
- 2.1.2 The barrier gate would be operated under the following conditions:
- Tidal flooding events (5.3mAOD or greater);
  - Operational maintenance (monthly, yearly and 5-yearly);
  - To train staff on or to test the barrier operation; and
  - For construction or maintenance works in or beside the Haven.
- 2.1.3 The Project components include:
- Barrier structure;
  - Barrier control building;
  - Wet Dock Entrance (WDE) widening and installation of a gate;
  - Control building for the wet dock entrance gate;
  - Sheet piled flood walls on the right bank, upstream and downstream of the river;
  - Sheet piled and concrete flood wall on the left bank, including vehicle access gates;
  - Demolition of the wooden quay and steel sheet piled structure on the right bank;
  - Demolition of one grain tower and construction of two new towers and a single extended aerial conveyor to be installed on the left bank in the Port of Boston (PoB) Estate;
  - Demolition of the buoy shed on the PoB Estate;
  - Extension of the existing loading platform on the PoB Estate;
  - Capital dredging;
  - Maintenance works to the existing PoB access road;
  - Diversion of 3 no. 11kv electricity cable;
  - Scour protection;
  - Permanent security fencing on the right bank surrounding the barrier structure;
  - Landscaping and lighting; and
  - Temporary slipway, mooring pontoon, storage and welfare facilities for the Witham Sailing Club and recreational river users.
- 2.1.4 Project components are described in the sections below. A full description of all components can be found in the ES (Volume 1); Chapter 2.

**2.2 Barrier structure**

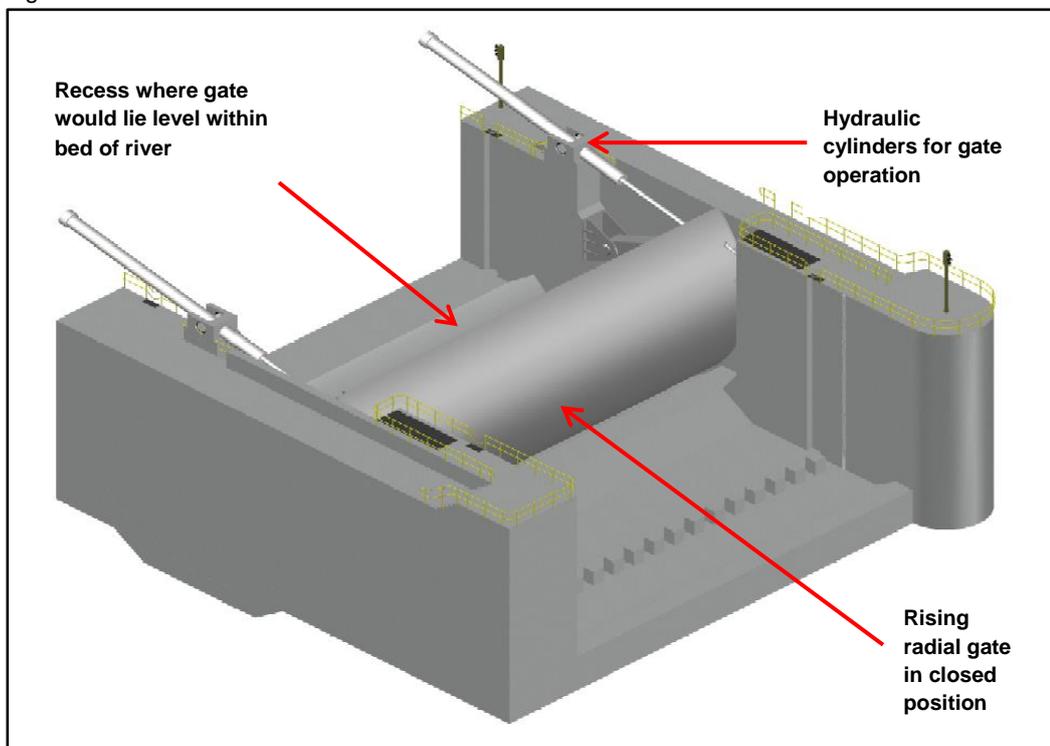
2.2.1 The tidal barrier is the main aspect of the Project. It comprises a U-shaped structure which provides a 25m navigable channel and is 35m in length, with a gate approximately 10m high. The tidal barrier would be located in the Haven adjacent to the Starch Berth within the PoB Estate on the left bank and adjacent to residential properties along Wyberton Low Road on the right bank.

2.2.2 The tidal barrier would house a gate which would be raised during ‘extreme’ tidal conditions. When the gate is raised the top of the barrier would be approximately 5m above mean (average) high water. Typically the tidal gate would sit flat against the river bed of the Haven (see Figure 2.1).

2.2.3 A 1.8m high security fence would be provided on the right bank around the barrier to restrict access.

2.2.4 The gate would be raised/lowered from a control building (see Section 2.3).

Figure 2.1: Tidal barrier structure



Source: Mott MacDonald 2016

**2.3 Barrier control building**

2.3.1 To meet the Environment Agency’s operational requirements, a two-storey control building with associated car parking and HGV layby area would be constructed on the PoB Estate, close to the tidal barrier (see Figure 1.2). The site is currently occupied by a structure, Pub’s buoy repair shed, which would be demolished.

**2.4 Wet dock entrance gate and related works**

2.4.1 The wet dock provides berths for vessels at the PoB site (see Figure 1.2). A single gate would be installed at the location of the existing lock gates in the Wet Dock Entrance (WDE) to provide continuity of the line of defence to the Maud Foster Sluice. In addition, the width of the WDE channel would be widened from 15.3m to 18m to allow for broader vessels to enter the Wet Dock to moor up rather than use the Haven riverside quays.

2.4.2 A small building, with associated parking, would be constructed adjacent to the WDE to control the new gate.

**2.5 Right bank flood defences**

2.5.1 A flood wall is proposed on the right bank, between the Boston Public Footpath No.14 (Macmillan Way) and the Haven. The flood wall would extend approximately 430m downstream towards the Western Power Distribution substation (see Figure 1.2, and Figure 2.2).

Figure 2.2: Visualisation showing the proposed right bank flood wall downstream of the tidal barrier viewed from the left bank



Source: Mott MacDonald 2016

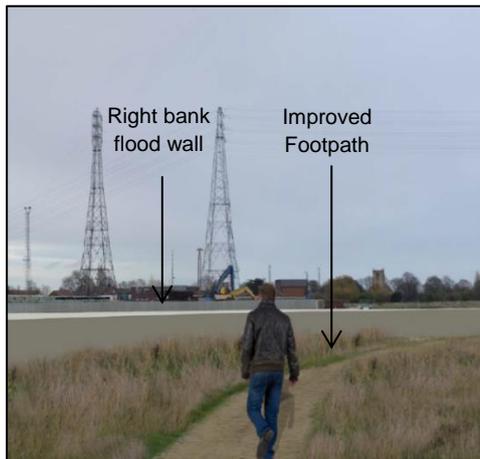
## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

2.5.2 The flood wall downstream of the tidal barrier to the Western Power Distribution substation would be approximately 1.2m above the footpath (see Figure 2.3). Steps have been taken to reduce the impact of the proposed flood walls through design improvements, and thus the proposed façade could be ornamented with riverside scenes, pending agreement with Boston Borough Council.

2.5.3 As part of the Project the Boston Public Footpath No.14 (Macmillan Way) would be improved (see Figure 2.4) and would be accessible for persons with restricted mobility. There would also be provision for vehicular access to allow maintenance of the barrier and flood defence during operation.

Figure 2.3: Visualisation of right bank flood wall and footpath looking east on right bank



Source: Mott MacDonald 2016

Figure 2.4: Visualisation of footpath looking west on right bank



Source: Mott MacDonald 2016

## 2.6 Left bank flood defences

2.6.1 The left bank flood wall has two distinct elements; a flood risk management structure (flood wall) and sheet piling (retaining wall) installed in front of the existing PoB quay wall to improve stability of the quayside. The proposed flood wall (see Figure 1.2, Figure 2.5 and Figure 2.6) on the left bank begins at the tidal barrier and then follows (approximately) the line of the existing quay wall until it reaches the WDE. It then continues, deviating away from the existing quay wall, until tying into Maud Foster Sluice (Grade II listed), approximately 830m from the tidal barrier (see Figure 1.2).

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Figure 2.5: Visualisation showing the proposed left bank (flood wall and retaining wall) downstream of the tidal barrier



Source: Mott MacDonald 2016

Figure 2.6: Visualisation of the left bank (flood wall and retaining wall) viewed from downstream of the proposed tidal barrier location from the right bank



Source: Mott MacDonald 2016

#### 2.6.2

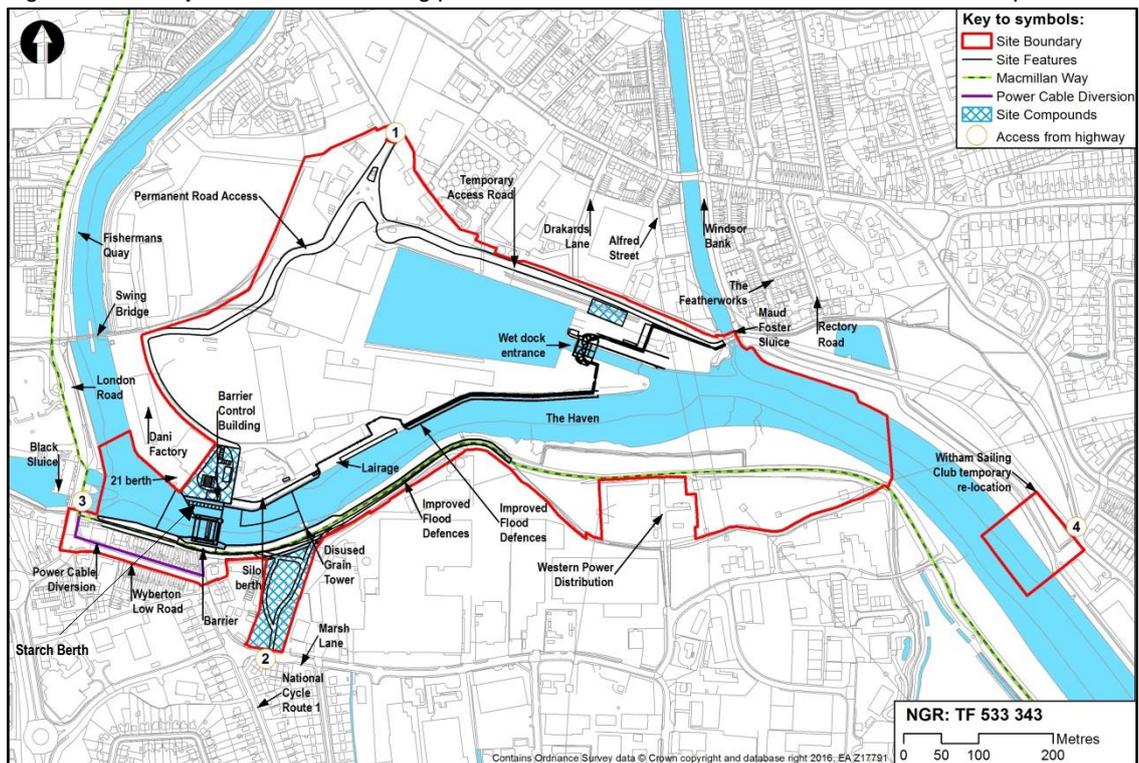
The flood wall ranges in height from 1.5 to 2.4m above ground level (see Figure 2.6). Access gates would be provided within the flood wall to allow access to the PoB quayside.

## 2.7 Enabling works

### Overview

2.7.1 To deliver the works there would be a need to divert three underground 11kV power cables from the right bank embankment along Wyberton Low Road (see Figure 2.7), undertake localised dredging of the channel bed to clear away material, improve access roads for construction within PoB and demolish a disused grain tower on the right bank.

Figure 2.7: Project elements including power cable diversion route and construction site compounds



Source: Mott MacDonald 2016

### Facilities for Witham Sailing Club and other recreational users

- During construction temporary facilities would be provided for Witham Sailing Club and other small boat users would be constructed approximately 1.5km downstream (see Figure 2.7) of the proposed barrier structure. The following would be provided:
  - Construction of a temporary slipway to allow members of the Witham Sailing Club safe access to the river during construction of the barrier;

- A single clubhouse with welfare facilities (anticipated to be a porta cabin type structure);
- A safety boat storage container (anticipated to be a porta cabin type structure);
- A fenced compound with storage for 4 dinghies; and
- Parking facilities.
- A permanent mooring pontoon upstream (adjacent to Black Sluice) and a temporary mooring pontoon downstream (1.5km downstream of the barrier) would be provided for recreational users who are unable to navigate the tidal barrier location during construction (see Figure 2.7).

### **Relocation of fishing fleet**

- Subject to agreement with the PoB, which has been provided in principle, the fishing fleet would be provided with an alternative mooring location for the duration of the construction of the barrier. It is envisaged that Lairage Quay (see Figure 2.7) would be available to the fishing fleet for the duration of the construction of the barrier.

### **Dredging requirement**

- The Environment Agency would carry out capital dredging to facilitate the construction of the Project. Approximately 38,300m<sup>3</sup> of material (worst case scenario) would be removed across four phases.
- Phase 1 and 2 would be undertaken as part of the enabling works and comprise 31,000m<sup>3</sup>. Phase 3 and 4 are undertaken towards the end of the construction phase and comprise 7,300m<sup>3</sup> (see Section 2.10 for indicative construction programme).
- The Project would not change the current maintenance dredging regime carried out by the PoB.

### **Works to PoB access roads**

- The internal PoB roads required for construction access would be improved to provide the required turning circles, safety aids and sight lines for the additional construction traffic.

### **Scour protection works**

- Temporary scour protection would be installed following the first dredging phase to reduce the potential for erosion during construction.
- The temporary scour protection used during construction would be relocated and reused as permanent scour protection for the barrier structure after the completion of the barrier works.

### **Wooden quay structure (disused hoist) and grain tower**

- A disused hoist on the right bank would be deconstructed and removed potentially via barge. Material would be recycled where possible.
- The existing grain tower conveyor (operated by Frontier) along the left bank of the PoB Estate would be permanently relocated further downstream (approximately 100m). Two

new towers would be erected to enable a single extended aerial conveyor to be installed from Frontier building to the quay.

### **Extending loading platform**

- The load relieving platform is intended to reinforce the quay side to support the additional loading expected while moored boats transfer goods to and from land. During the next design phase consideration would be given to extending the existing loading platform on the PoB Estate.

## **2.8 Landscaping and lighting**

### **Hard and soft landscaping**

- 2.8.1 Hard and soft landscaping would be provided along the right bank landscaping to retain its semi-natural character.

### **Lighting**

- 2.8.2 External permanent lighting would be installed at key locations within the Project area, including control buildings, the barrier structure and WDE gate.

## **2.9 Water level management**

- 2.9.1 The Boston Combined Strategy proposed that water level management (WLM) would be implemented alongside the tidal barrier in order to provide safer passage for pleasure craft onto the South Forty Foot, the first stage of the Fens Waterways Link.

- 2.9.2 However, in January 2015, the Executive Committee of the County Council and the Environment Agency Boston Barrier Project Board confirmed removal of WLM from the scope of the Project. In making the decision, the Environment Agency, Lincolnshire County Council and Boston Borough Council confirmed that it remains the vision to provide WLM at a later date through a standalone project and consenting process. The Project has been designed not to compromise the introduction of WLM in the future.

## **2.10 Construction programme and compounds**

- 2.10.1 Construction of the Project is planned to start in late 2017 and be completed by December 2019. Table 2.1 provides the indicative sequence of construction activities.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Table 2.1: Indicative sequence of construction activities

Construction works activity	Indicative programme and duration	
Enabling works	Pre November 2017	10 weeks
Enabling dredging works Phase 1 and Phase 2	November 2017 - January 2018	9-12 weeks
Establishment of site	January 2018 – March 2018	6-8 Weeks
Wet Dock closure	January 2018 – September 2018	9 Months
Wet Dock opening	End September 2018	-
Left bank quayside works. Tie into Wet Dock and barrier structure	October 2018 - November 2019	13 Months
Installation of temporary scour protection along by-pass channel	September 2018 – October 2018	3-4 Weeks
Place cofferdam	October 2018 – December 2018	3 Months
Right bank works	April 2018 – Dec 2019	21 Months
Construction of barrier structure	January 2019 – July 2019	7 Months
Barrier completion: removal of the cofferdam/testing and commissioning	August 2019 – November 2019	-
Dredging Phase 3	November 2019	2-3 weeks
Installation of permanent scour protection	September 2019 – October 2019	6-8 Weeks
Dredging Phase 4	November/Early December 2019	1-2 Weeks
Project completion	December 2019	

Source: Mott MacDonald 2016

2.10.2 Construction works would generally take place between the hours of 07:30 and 18:30, Monday to Friday. Key potential exceptions to this timing include capital dredging works and works to construct WDE. Works to the WDE would be done on a 24 hour per day, 7 days a week (24/7) basis which is in line with the current operational hours for the PoB Estate.

2.10.3 There are three proposed construction compounds, one located on right bank of the Haven and two located on the left (see Figure 2.7).

## Boston Barrier Tidal Project

A17/3 – Environmental Statement: Non-Technical Summary

This page has been left intentionally blank.

## 3 Consideration of alternatives

- 3.1.1 The proposals for the Boston Barrier Project were developed following a detailed assessment process, both as part of the development of the Boston Combined Strategy and the subsequent development of the Project following the identification of a preferred strategic option as part of that Strategy.
- 3.1.2 As outlined within the Boston Combined Strategy, seven strategic options were individually appraised in terms of technical, environmental and economic opportunities created. The seven options, including beneficial and adverse effects and costs relative to the other options, are provided in Table 3.1.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Table 3.1: Strategic options for Boston including key beneficial and adverse effects and costs relative to the other options

Protection standard	Option	Description	Key Beneficial Effects	Key Adverse Effects	Cost (relative to the other options)
Do Nothing	Do Nothing	With the Do Nothing Option no works are undertaken and all existing maintenance and operation of structures would stop. This is the baseline against which other options are considered	None	Increase in magnitude and frequency of flooding. Loss of land based infrastructure, high grade agricultural land and reduction in historic character. Would not provide any future opportunities for investment and employment. Would not make provision for recreation and infrastructure improvements.	No cost as no works proposed
Do minimum	Option I - Maintain defences and western waterway.	Pro-active maintenance of flood risk management assets and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain.	Least environmentally intrusive flood risk management option in the short term Provision of new recreational facilities. Improved access to wider waterway network	Option is not sustainable against climate change. Provides little opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Significant land acquisition required. Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston. Disturbance of North Forty Foot Drain which is a designated site.	Fourth most expensive (same cost as Option II and Option IV)
Do minimum	Option II - Maintain defences, new barrage and navigation link	Pro-active maintenance of FRM assets, a partial exclusion barrage to control the tidal range within Boston, and a new lock through, or adjacent to, Black Sluice.	Least environmentally intrusive flood risk management option in the short term. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.	Option is not sustainable against climate change. Limited opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. A barrage to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.	Fourth most expensive (same cost as Option I and Option IV)
Sustain Standard of Protection	Option III - Maintain defences and	Sustain the current standard of protection (1 in 50 years) into the future by raising the levels of	Provides a contribution to reduction in frequency and severity of flood risk within Boston. Provisions of future investment opportunities due to management of flood risk however, this would	Provides little opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Adverse effects on heritage, landscape and biodiversity	Third most expensive

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Protection standard	Option	Description	Key Beneficial Effects	Key Adverse Effects	Cost (relative to the other options)
	western waterway	existing FRM assets to cater for the effect of climate change and a create a new channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain.	<p>be limited to the short term.</p> <p>Minimises environmental intrusion in the short term.</p> <p>Provision of new recreational facilities.</p> <p>Improved access to wider waterway network.</p>	<p>with higher defences, although mitigation possible in places.</p> <p>Significant land acquisition required.</p> <p>Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston.</p> <p>Disturbance of North Forty Foot Drain which is a designated site.</p>	
Sustain Standard of Protection	Option IV - Maintain defences, new barrage and navigation link	Sustain the current standard of protection (1 in 50 years) by raising the levels of existing FRM assets to cater for the effect of climate change, and create a new partial exclusion barrage to control the tidal range within Boston and a new lock through or adjacent to Black Sluice.	<p>Provides a contribution to reduction in frequency and severity of flood risk within Boston.</p> <p>Provisions of future investment opportunities due to management of flood risk however, this would be limited to the short term.</p> <p>Minimises environmental intrusion in the short term.</p> <p>Encourages long term investment opportunities.</p> <p>Approach would provide an important recreational resource.</p> <p>Would allow safe navigation of The Haven and wider waterway network.</p>	<p>Provides limited opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land.</p> <p>Adverse effects on heritage, landscape and biodiversity, although mitigation possible in places.</p> <p>A barrage to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</p>	Second most expensive
Increase Standard of Protection (1 in 300)	Option V - Flood barrier and western waterway.	Provide a flood tide barrier (advancing the line of defence) to increase the standard of protection to a minimum of 1 in 300 years and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain to the west of the town centre.	<p>Provides a significant contribution to reduction in frequency and severity of flood risk within Boston.</p> <p>Provides long term security of existing and future investments.</p> <p>Encourages long term investment opportunities.</p> <p>Provision of new recreational facilities.</p> <p>Improved access to wider waterway network.</p>	<p>Barrier may have some adverse effects on heritage or landscape, although mitigation possible through design.</p> <p>Significant land acquisition required.</p> <p>Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston.</p> <p>Disturbance of North Forty Foot Drain which is a designated site.</p>	Most expensive option
Increase Standard of Protection	Option VI – Multi-	Provide a flood tide barrier (advancing the line	Provides a significant contribution to reduction in frequency and severity of flood risk within	The barrier may have adverse effects on the landscape character and historic character of the study area,	Fourth most expensive (same

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Protection standard	Option	Description	Key Beneficial Effects	Key Adverse Effects	Cost (relative to the other options)
Protection (1 in 300)	purpose barrier and navigation link	of defence) to increase the standard of protection to a minimum of 1 in 300 years, combined with a partial exclusion barrage to control the tidal range within Boston, and a new lock through or adjacent to Black Sluice.	<p>Boston.</p> <p>Provides long term security of existing and future investments.</p> <p>Encourages long term investment opportunities.</p> <p>Approach would provide an important recreational resource.</p> <p>Would allow safe navigation of The Haven and wider waterway network.</p>	<p>although mitigation through good design is possible.</p> <p>A barrier to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</p>	cost as Option I and Option II)

Source: Mott MacDonald 2016 based on information from the Boston Combined Strategy 2008

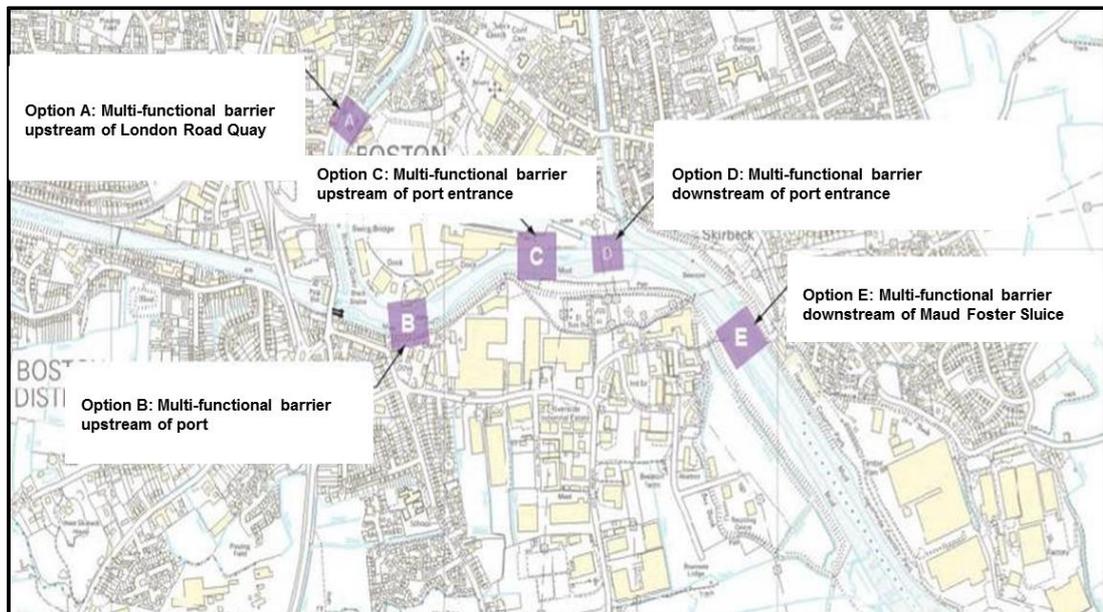
3.1.3 The preferred BCS strategic option was Option VI, namely a multi-functional barrier and navigation link. This option demonstrated the highest cost benefit ratio while achieving the required standard of protection which would reduce the severity of flood risk in Boston and encourage long term investment opportunities. Although potential environmental impacts were identified, it was considered that these could be mitigated.

**Boston Project Appraisal Report (PAR)**

3.1.4 Following the identification of the preferred strategic option, the Environment Agency appraised nine potential locations for the proposed barrier. Four of these options were discounted by the Environment Agency due to being costs being prohibitive or requiring additional work that was not actually required to deliver the Project objectives.

3.1.5 Five options were shortlisted for further detailed assessment. The five locations taken forward are shown on Figure 3.1.

Figure 3.1: Location of the five shortlist options



Source: Project Appraisal Report 2013

3.1.6 Following selection of the five shortlisted location options, a Public Open Forum was held in Boston in January 2010 to canvass the views of the local community. Members of the public indicated an overall preference for options further downstream, as they perceived that this

would keep flood water furthest away from their homes. In fact, all options would provide the same level of protection from flood risk.

- 3.1.7 A key stakeholder workshop was then held on 4 March 2010 and wider consultation was also undertaken. The consultation resulted in options A and D being removed from the short list following identification of their unacceptability to key stakeholders and statutory consultees.
- Option A was considered not to meet the navigation objectives of the Project, namely the provision of a safe navigation link between the Lower Witham and South Forty Foot Drain.
  - Option D was identified as having significant impacts on the operations of the PoB during and after construction.
- 3.1.8 Option E gave rise to similar concerns as Option D in terms of the effects it would have on the day to day business operations of the PoB. However, feedback received from the local community demonstrated a strong preference for Option E due to the perceived (but nonetheless misplaced) view that this would offer improved flood protection over other options. In view of this feedback, Option E was not discounted at this stage but instead it was taken forward for further appraisal alongside Options B and C.

#### **Cost Benefit Analysis of B, C and E Options**

- 3.1.9 A cost benefit appraisal was undertaken in respect of Options B, C, and E. All three options would provide the same flood risk benefits and therefore the appraisal focused on which option offered the most cost effective means of delivering those benefits.
- 3.1.10 Option B was identified as the most cost effective solution and was also identified as the option that minimised impacts on key stakeholders and facilitated the accommodation of the required mitigation measures. The appraisal took into account extensive consultation in reaching its conclusion.
- 3.1.11 The appraisal confirmed that Option E should be discounted on the same grounds as Option D, namely that it would give rise to significant impacts on the day to day business operations of the PoB. Further engagement with local residents was undertaken in order to address their misplaced perception that the location of the barrier affected their residual flood risk.
- 3.1.12 Option C, being further upstream, did not give rise to the same level of impact on the operations of PoB. However, it would have reduced quay space within the Port, thereby reducing or removing the availability of moorings that could otherwise have been made available to relocate smaller fishing vessels comprised of the Boston fishing fleet who currently operate from an existing quay located upstream from the proposed barrier. The construction of the barrier at the location identified as Option C and its regular operation to regulate water levels, as part of WLM as was originally proposed, would have obstructed their

sailing routes and preclude opportunities to relocate them downstream of the barrier. A viable alternative relocation location was not identified in the Haven. As a result, Option C would have resulted in significant impacts to the Boston fishing fleet.

3.1.13 In contrast, it was identified that Option B would enable the Boston fishing fleet to be relocated immediately downstream of the Barrier and upstream of commercial port operations in the PoB. Option B was therefore selected as the preferred option for delivery of the Project.

3.1.14 As outlined in Section 2.9, WLM was subsequently removed from the scope of the Project and it is no longer necessary to relocate the Boston fishing fleet downstream of the barrier. However, aspirations remain to utilise the barrier to deliver WLM in the future. Accordingly, scheme options which were not progressed on the grounds that they would not facilitate WLM would preclude the delivery of WLM in the future. Accordingly, the removal of WLM has not changed the Agency's preferred option for delivering the Project.

## Boston Barrier Tidal Project

A17/3 – Environmental Statement: Non-Technical Summary

This page has been left intentionally blank.

## 4 Consultation

4.1.1 Throughout the development of the Project design and during the EIA process, regular consultation with both key stakeholders and the wider community has been undertaken. Table 4.1 provides a summary of the key organisations consulted.

Table 4.1: List of organisations involved in the consultation process

Organisation
Anglian Water Services Ltd.
Black Sluice Internal Drainage Board
Boston and District Fishermen’s Association
Boston Borough Council
British Waterways
Canal and Rivers Trust
Crown Estate
Department of Environment, Food and Rural Affairs
Eastern Inshore Fisheries and Conservation Authority (EIFCA)
Harbour Master
Heritage Trust for Lincolnshire
Historic England
Lincolnshire County Council
Lincolnshire Rivers Trust
Lincolnshire Wildlife Trust
Marine Management Organisation
Maritime and Coastguard Agency
Natural England
Port of Boston
Sports England
The Inland Waterways Association
The Royal Society for the Protection of Birds (RSPB)
Trinity House
Western Power Distribution
Witham Fourth Internal Drainage Board
Witham Sailing Club

Source: Mott MacDonald 2016

4.1.2 The main purpose of the consultations was to understand the views and opinions of the statutory consultees and interested parties on the Project and to discuss what they consider to be key issues and priorities.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 4.1.3 The Environment Agency would continue its engagement programme and maintain working partnerships with stakeholders to address community concerns and suggestions throughout the next design and construction phases.

# 5 Environmental Impact Assessment process

## 5.1 EIA process

- 5.1.1 The EIA process enables the early identification of potential environmental impacts while the project is still in the design phase, and enables those impacts to be avoided where possible through alternative design or construction methodologies. The EIA process has the following four principal stages:
- Screening – determines the need for an EIA and level of environmental assessment required.
  - Scoping – identifies all potential environmental issues and those likely to result in significant impacts, therefore requiring further assessment. The Boston Barrier Tidal Project obtained a ‘Scoping Opinion’<sup>1</sup> from the Secretary of State to confirm what should be assessed further.
  - Impact assessment – a detailed assessment of all impacts considered significant from the construction and operation of the project are predicted, assessed and reported within the ES.
  - Implementation – the final stage of the EIA is the monitoring of committed mitigation which in the case of this Project is documented within Environmental Action Plan (EAP) to reduce the impacts identified in the ES. The EAP includes mitigation measures and the required management plans which are to be agreed with Boston Borough Council prior to the start of construction.

---

<sup>1</sup> A Scoping Opinion is the authority’s (in this case the Secretary of State) formal view on what issues an Environmental Statement should contain.

## Boston Barrier Tidal Project

A17/3 – Environmental Statement: Non-Technical Summary

This page has been left intentionally blank.

## 6 Existing environment

### 6.1 Wider surrounding environmental conditions

- 6.1.1 The Project is located to the south of Boston town, approximately 1.4km from the centre. Boston is an historic market town with an important maritime history. It is set in the low-lying, flat landscape of the Lincolnshire fens and has a rich history with a number of listed buildings and archaeological sites (for example see Figure 6.1).

Figure 6.1: Maud Foster Sluice (Grade II listed building)



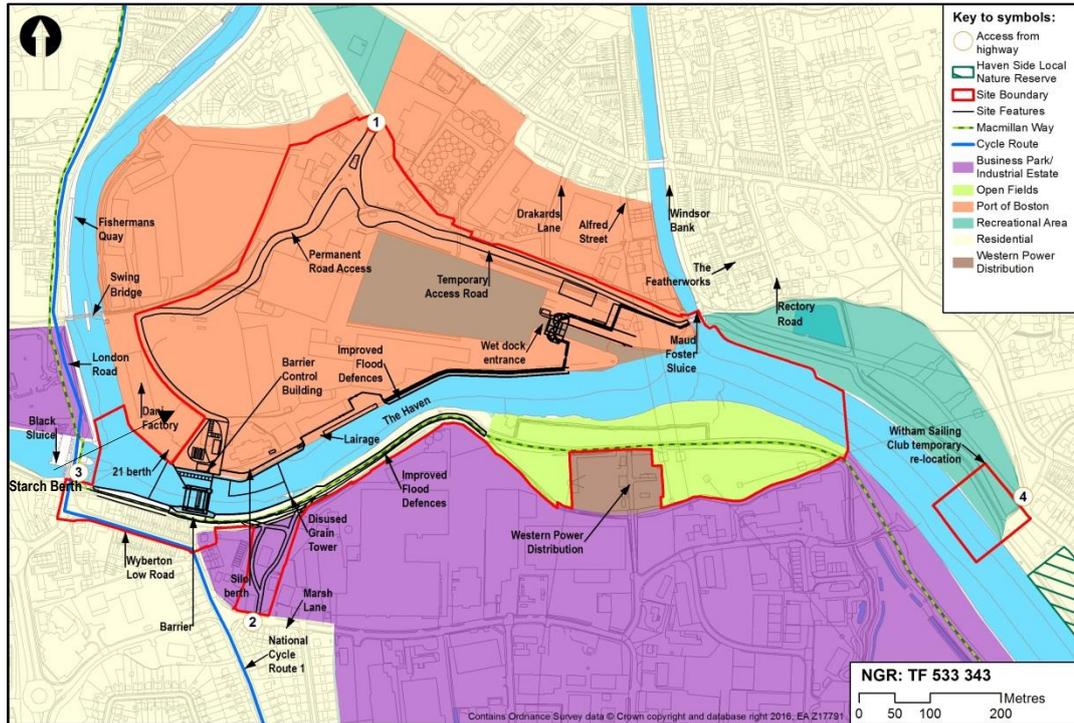
Source: Mott MacDonald 2016

- 6.1.2 The area surrounding the Project comprises a mix of residential, commercial and industrial use (see Figure 6.2).

# Boston Barrier Tidal Project

## A17/3 – Environmental Statement: Non-Technical Summary

Figure 6.2: Indicative land classifications surrounding the site



Source: Mott MacDonald 2016

- 6.1.3 Residential areas are located to the south on Wyberton Low Road and Marsh Lane (see Figure 6.2), and to the northeast on Rectory Road and Alfred Street. There are also residential areas to the south-west and north-east of the Project area.
- 6.1.4 Industrial developments are located on both sides of the Haven with the PoB (see Figure 6.3) to the north and the Western Power Distribution site to the south-east. A large-scale commercial development, Riverside Industrial Estate, is located directly south of the Project area on the right bank.

Figure 6.3: View of PoB Estate taken from right bank



Source: Mott MacDonald 2016

- 6.1.5 The Havenside Local Nature Reserve is located approximately 0.3km downstream of the main Project site and 0.06km from the WSC area on the left bank and there are nine non-statutory designated sites within 2km of the Project. The closest (SFFD Local Wildlife Site) is approximately 0.3km upstream of the Project on the right bank.

## 6.2 Local environmental conditions

- 6.2.1 The Project area itself is predominantly industrial in nature. The PoB Estate is a privately owned enterprise that occupies the majority of land on the left bank within the works area. Figure 6.4 shows the access to the PoB Estate from St Johns Road. This land is used by the port in its day to day activities. Buildings not utilised for PoB operations are leased out to local businesses for commercial and industrial activities.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

Figure 6.4: View of access road to PoB Estate



Source: Mott MacDonald 2016

6.2.2 On the right bank, there are a number of residential properties along Wyberton Low Road within the Project area (see Figure 6.2 and Figure 6.6).

6.2.3 The Haven runs through the Project area and is characterised as a typical flat urban river (see Figure 6.5), with tidal mudflats exposed at low tide. The banks of the river are sparsely vegetated, with amenity grassland on the flood embankments and scattered shrubs. The key habitats associated with the Haven are: riverine, mudflats, saltmarsh, saline lagoons and reedbeds.

Figure 6.5: Typical view of river through Project area



Source: Mott MacDonald 2016

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 6.2.4 The Boston Public Footpath No.14 (Macmillan Way) follows the right embankment. This footpath follows the top of the embankment, downstream of Black Sluice to the mouth of The Wash then turns south west towards Stamford.
- 6.2.5 The route of National Cycle Route 1 provides a long distance connection between Dover and the Shetland Islands, but more locally to this development provides a connection for cyclists along Marsh Lane, Wyberton Low Road and London Road (see Figure 6.6).

Figure 6.6: View of Wyberton Low Road – part of the National Cycle Route 1



Source: Mott MacDonald 2016

## Boston Barrier Tidal Project

A17/3 – Environmental Statement: Non-Technical Summary

This page has been left intentionally blank.

## 7 Significant environmental effects and proposed mitigation measures

7.1.1 This chapter summarises the findings of the ES (see the ES (Volume 1)). It documents the significant environmental effects likely to be associated with the construction and operation phases of the Project and the mitigation required to reduce the identified effects.

### 7.1 Cultural heritage

7.1.1 During construction, dredging and excavation activities within the Haven may result in the permanent removal or destruction of archaeological features that may be buried within the tidal mudflats, which is considered to be an adverse significant effect. Prior to construction archaeological investigations would be agreed in discussion with the Lincolnshire County Archaeology Services and Lincolnshire Heritage. This would detail all archaeological surveys to be undertaken pre- and during construction. If archaeological remains are found, steps would be taken to make the discoveries available to the local community.

7.1.2 Construction activities would result in a temporary adverse significant effect on the setting of both St Nicholas Church (Grade II\*) and the Skirbeck Conservation Area (see Figure 7.1 for the current view) within the landscape. The construction activities would also potentially reduce the quiet character of St Nicholas Church and its churchyard.

Figure 7.1: Skirbeck Conservation Area from the right bank of the Haven



Source: Mott MacDonald 2016

7.1.3 To maintain the setting of St Nicholas Church and the Skirbeck Conservation Area, the new flood defence on the right bank would be placed directly into the embankment. This results in the flood defence only being visible where it emerges from the embankment rather than being placed in front of the embankment which would have resulted in the flood defence forming the river bank. This would keep the majority of the existing grass embankment and would reduce the industrial appearance of the flood defence. Works on the left bank, including the temporary works associated with the Witham Sailing Club, has been assessed and would not have a significant adverse effect on the setting.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 7.1.4 To reduce the effect of the left bank flood wall on the setting of the Maud Foster Sluice (Grade II listed), in-design mitigation has been incorporated, and the flood wall tapers down where it joins the sluice. With this in-design mitigation, the impact is not considered significant.
- 7.1.5 Once in operation, the Project would have a permanent beneficial significant effect as the historic features and structures within Boston would benefit from improved flood protection. It would also encourage opportunities for investment in the historic buildings due to reduced flood risk, and reduce spending related to flood damage repairs.

## 7.2 Landscape and visual amenity

- 7.2.1 The construction activities would be visible from a number of locations surrounding the Project area. There would be clear views of the works from the upper back windows of properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, and from the Boston Public Footpath No.14 (Macmillan Way) (see Figure 7.2) and the river (boat users). The construction works would negatively affect the existing view of the river from these locations, resulting in a temporary adverse significant effect.

Figure 7.2: Proposed view for users of Boston Public Footpath No.14 (Macmillan Way)



Source: Mott MacDonald 2016

- 7.2.2 The presence of construction works and associated plant and machinery would potentially alter the landscape character within the Project area, resulting in a temporary adverse significant effect.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 7.2.3 Any visual changes during the construction period would be localised and temporary. The Project would adopt industry best practices and the landscape scheme which would be agreed with Boston Borough Council, such as controlling excessive artificial lighting, and retaining trees and vegetation, where possible.
- 7.2.4 Once the tidal barrier has been constructed, there are no significant impacts anticipated on landscape. However, the tidal barrier support structures, above water level, and the flood walls would be visible from the first floor of residential properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, and from the southern sections of London Road. This would result in a negative change to their current views, which is considered to be a permanent adverse significant effect.
- 7.2.5 The view of the tidal barrier (elements above the water level) and the flood walls would be most noticeable for users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank and for river users. It is anticipated that this would result in a permanent change in the views for these people, which is considered to be an adverse significant effect.
- 7.2.6 To mitigate the operational effects, the tidal barrier would have a grey/black colour scheme and therefore, it should blend with the tall buildings, cranes and other structures required for the operation of PoB. In addition, lighting would be localised, new street furniture (benches) and art work could be included following consultation with Boston Borough Council, and saline resistant wild flowers would be planted. Following the implementation of the mitigation measures, the residual effect is considered to be significant adverse for users of Boston Public Footpath No.14 (Macmillan Way), river users and residential properties on Wyberton Low Road.

## 7.3 Land use

- 7.3.1 During the construction phase, there would be a temporary diversion of the existing Boston Public Footpath No.14 (Macmillan Way) for the entire construction period which is not considered as a significant effect as an alternative route would be provided. The footpath would be re-instated following construction and would be improved making it more attractive for walkers and accessible for persons of restricted mobility.
- 7.3.2 Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kv electrical cables to reduce disruption to users of the National Cycle Network Route 1. However, restrictions may be applied for the safety of the cyclists but it is not anticipated to result in a significant effect.
- 7.3.3 There would be a change in land use within the PoB's site area due to construction activities, including site compounds, demolition of the Buoy Shed, increase in width of the WDE, storage of dredge material, and construction of the tidal barrier, flood walls and sheet piling (retaining

wall for the quayside). These would result in a small of loss of land within the PoB Estate which is not considered to be a significant effect.

- 7.3.4 The existing grain tower conveyor (operated by Frontier) along the left bank of the PoB Estate would be permanently relocated further downstream (approximately 100m). Two new towers would be erected to enable a single extended aerial conveyor to be installed from the Frontier building to the quay. The provision of the two new towers and extended aerial conveyor are assessed to result in a beneficial effect.
- 7.3.5 As a result of the Project, there would be a permanent change in land use within PoB's site area due to the control buildings required for the tidal barrier and WDE gates. In addition, when the tidal barrier and flood gates within the flood wall are closed during extreme tidal events it would result in a temporary restriction in the use by the PoB Estate and their commercial operators, in front/riverward of the flood defence. These are not considered adverse significant effects.

## 7.4 Noise and vibration

- 7.4.1 Construction works would primarily take place between the hours of 07:30 and 18:30, Monday to Friday. Any noisy work undertaken outside of normal working hours (i.e. 07:30 and 18:30, Monday to Friday) would be controlled through a noise and vibration management plan, details of which would be agreed with Boston Borough Council prior to the start of construction.
- 7.4.2 Threshold levels are considered to result in significant adverse effect where a construction activity takes longer than a month and the total noise level (pre-construction noise plus construction noise) at a sensitive receptor exceeds 65dB  $L_{Aeq}^2$  during the day-time, 55dB  $L_{Aeq}$  during the evening and 45dB  $L_{Aeq}$  at night.
- 7.4.3 Phase 1 dredging works are predicted to last for up to 4 weeks. Worst case predicted noise levels resulting during Phase 1 works are anticipated to result in a temporary adverse significant effect during the day, evening and night time at Wyberton Low Road (69 dB  $L_{Aeq}$ ) and a temporary significant adverse effect during the evening and night time for the following receptors closest to the works:
- Marsh Lane – 53 dB  $L_{Aeq}$ ;
  - Victoria House – 50 dB  $L_{Aeq}$ ; and
  - London Road – 52 dB  $L_{Aeq}$ .
- 7.4.4 Phase 2 dredging works are predicted to last for up to 8 weeks. Worst case predicted noise levels resulting during Phase 2 works are anticipated to result in a temporary adverse

---

<sup>2</sup>  $L_{Aeq}$  is the value of the A-weighted sound pressure level that represents the average noise level.

- significant effect during the evening and night time for the following receptors closest to the works:
- Wyberton Low Road – 56 dB  $L_{Aeq}$ ;
  - Marsh Lane – 53 dB  $L_{Aeq}$ ;
  - Victoria House – 51 dB  $L_{Aeq}$ ;
  - The Featherworks – 59 dB  $L_{Aeq}$ ;
  - Windsor Bank – 57 dB  $L_{Aeq}$ ;
  - Alfred Street – 52 dB  $L_{Aeq}$ ;
  - Skirbeck Road – 49 dB  $L_{Aeq}$ ; and
  - London Road – 46 dB  $L_{Aeq}$ .
- 7.4.5 Due to the duration of Phase 3 and 4 dredging works, being less than 1 month, it is not anticipated that these works would result in a significant effect.
- 7.4.6 The construction of the WDE has the potential to result in a temporary significant adverse effect at residential properties on the left bank. Worst case noise levels are expected to be 63 dB  $L_{Aeq}$  for The Featherworks, 50 dB  $L_{Aeq}$  for Windsor Bank, 51 dB  $L_{Aeq}$  for Alfred Street and 48 dB  $L_{Aeq}$  for Skirbeck Road, which exceeds the night time threshold level.
- 7.4.7 The strategy for sheet piling from the Environment Agency is that works would take place during the day time only and not during the evening or night time. Therefore, there would be no significant effects related to piling during the evening and night time period.
- 7.4.8 Noise levels from the left bank piling works required for the construction of the barrier and flood wall is not anticipated to exceed the noise threshold levels.
- 7.4.9 In terms of absolute noise levels (worst case) sheet piling on the right bank required for the construction of the barrier and flood wall would result in noise levels of 75 dB  $L_{Aeq}$  at residential properties along Wyberton Low Road. The predicted noise levels on the right bank would exceed the daytime noise threshold. However, in addition to total noise level, in defining significance British Standard 5228 advises that durations of work in excess of 1 month are necessary. The progress of sheet piling is estimated to move 10m per day during the construction works. Therefore, it is unlikely that noise sensitive receptors would be exposed to significant impacts for extended periods of time thus not resulting in significant adverse effects.
- 7.4.10 There is the potential for temporary significant noise effects along Wyberton Low Road due to the diversion of electrical cables as part of the enabling works. Worst-case noise levels along Wyberton Low Road are predicted to reach 95 dB  $L_{Aeq}$  which exceeds the noise threshold levels.
- 7.4.11 Table 7.1 shows the predicted worse-case noise levels as a result of construction traffic.

Table 7.1: Summary of predicted construction noise impacts from construction traffic

Location	Predicted existing noise level, $L_{Aeq,16h}$	Predicted worst case noise levels during construction $L_{Aeq,16h}$	Predicted worst case change $L_{Aeq,16h}$
Wyberton Low Road	44.3	79.1	34.8
Wyberton Low Road and Marsh Lane	44.3	68.8	24.5
Marsh Lane and Marsh Avenue	44.3	66.6	22.3
Wyberton West Road and London Road	44.3	61.9	17.6
Bath Gardens	50.3	55.4	5.1
Tower Gardens	50.3	54.9	4.6
Alfred Street	49.3	66.4	17.1

Source: Mott MacDonald 2016

- 7.4.12 Impacts due to road traffic are predicted when there is an increase by 5dB or more from the predicted baseline. Based on the predicted noise levels given in Table 7.1 there is the potential for significant temporary effects from construction traffic noise at all front-line<sup>3</sup> receptors assessed with the exception of Tower Gardens based on the worst case predicted noise levels change. However, this traffic would not be experienced through-out the construction phase as is highlighted in Figure 7.3 in Section 7.11.
- 7.4.13 The potential construction noise impacts are to be managed and reduced to non-significant by implementing measures such as erection of noise barriers, appropriate equipment selection, traffic management, appropriate scheduling of works and effective and timely stakeholder consultation. These measures aim to reduce noise, wherever possible, to a level that is closer to levels normally heard by people in the Project area and therefore would be less noticeable. These measures would be implemented through the noise and vibration management plan.
- 7.4.14 The operation of the tidal barrier is not predicted to result in an increase in noise levels.
- 7.4.15 Increased vibration levels are expected to be perceptible as a result of piling and the diversion of the electricity cables. Prior warning and explanation would be provided to the properties likely to be affected and as the works would be temporary it is not expected to disturb the residents and therefore, not significant.
- 7.4.16 Technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts. In addition,

---

<sup>3</sup> Residential properties nearest the road

the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow.

7.4.17 There is no indication of significant effects in terms of potential cosmetic (such as paint works and plastering) or structural damage in residential buildings. However, as a precautionary measure the Environment Agency is committed to undertaking pre-construction structural condition surveys of properties along Wyberton Low Road and implement protective measures where necessary.

7.4.18 The operation of the tidal barrier is not predicted to result in an increase in vibration.

## **7.5 Ecology and nature conservation**

7.5.1 During construction, fish populations may be temporarily affected by the narrowing of the Haven, and an increase in local noise and vibration from construction activities, which would result in a temporary adverse significant effect.

7.5.2 During construction mitigation measures to reduce the impact on fish would be implemented through the ecological management plan which would be agreed with Boston Borough Council. These would include: training of construction staff by an ecologist, minimising noise and vibration, minimising sediment release, dredging to be undertaken during cooler months, and dredging to avoid smelt spawning season (generally mid-February to end of March). Works would be done in line with Environment Agency best practice such as pollution control, and refuge areas would be provided. In addition, fish movements would be monitored to check for changes in numbers and migration patterns. The above would reduce the potential impacts to non-significant.

7.5.3 Technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts on fish populations. In addition, the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow. Where this is not possible, soft start piling procedures would be utilised.

7.5.4 Piling activities would avoid fish migratory periods, where possible, where piling is required during these times “downtime” periods would be provided between piling days to allow times for fish recovery and provision of windows of opportunities for undisturbed migration. The actual periods of downtime would be determined during the next design phase when the precise piling methods are known and would be documented in the ecological management plan.

7.5.5 The above measures are anticipated to reduce the potential impact on fish to non-significant.

- 7.5.6 No other animals or plant life (land or marine) are expected to experience significant adverse effects from the construction works. However good practice measures would be provided in the ecological management plan to ensure that these effects remain non-significant and include measures, such as biosecurity measures to avoid, or failing which, prevent the spread of invasive species, training, pollution prevention, reducing dust, noise and lighting, hand searches of suitable habitat prior to vegetation clearance and vegetation clearance to avoid bird nesting season.
- 7.5.7 The operation of the tidal barrier is not expected to negatively affect animals or plant life. However, general measures such as the timing of maintenance during operation to avoid migration seasons and fish monitoring would be implemented.
- 7.5.8 As an enhancement measure and as part of the landscaping works to restore the right bank post-construction, Boston Horsetail could be established in areas which surveys deem to be suitable for potential growth. Boston Horsetail is native to the local area, is a protected species, and has been in decline in recent years. Therefore, the re-introduction of this to the area is considered an improvement on existing conditions and is beneficial.

## 7.6 Surface water

- 7.6.1 The potential surface water impacts considered within the assessment were:
- An increase in turbidity due to dredging;
  - Mobilisation of sediment bound contaminants;
  - Pollution incident/oil spillage; and
  - Pollution from silt laden runoff.
- 7.6.2 Construction activities would be carried out in line with best practice and normal tidal activity would continue in the Haven for the duration of the construction period. The assessment concluded that the surface water would experience no significant effects, either temporarily or permanently from Project construction.
- 7.6.3 Construction best practice measures would be used to reduce the chance of a decrease in water quality. Such measures would include contaminant control and appropriate management of the dredging activities to prevent an excess build-up of small particles of silt within the Haven.
- 7.6.4 A preliminary Water Framework Directive (WFD) assessment has been undertaken for the Project. The Project components have the potential to impact upon elements relevant to WFD. The principal risk identified in the assessment was degrading the structure of the river. However, the Project components are an integral part of managing flood risk, and the water body is already classified as heavily modified. The Project components are unlikely to significantly alter the hydromorphological (physical characteristic) of the water body. Similarly,

it has been determined that the risk of decreasing water quality is minimal. Therefore, the Project components would not result in a significant effect in terms of WFD.

- 7.6.5 Water quality monitoring would be carried out prior to, during and post construction. If any changes in water quality are detected, measures would be put in place to return the water quality to an acceptable level which would be outlined in the ecological management plan. Such measures could include stopping dredging activities to reduce the amount of excess silt in the water in construction.
- 7.6.6 The assessment has shown that there would be no significant effects on water quality within the Haven as a result of the operation of the tidal barrier.

## **7.7 Estuarine processes and geomorphology**

- 7.7.1 There would be a slight increase in the speed of water flowing through the Haven at the location of the tidal barrier due to the narrowing of the channel. However, the modelling carried out has shown that the overall changes in velocity remain low and would not substantially increase the rate of erosion or sediment removal within the Haven. Therefore, this is not considered to be a significant effect. However, erosion control would be provided during construction and surveys would be carried out during the construction period, to determine the rate of erosion and deposition to ensure the control measures are effective.
- 7.7.2 There are no significant effects anticipated once the barrier is operational. However, it is possible that there may be an increase in the rate of erosion to the channel bed. Surveys to map the bed of the Haven are carried out regularly by PoB to identify the need for channel maintenance during operation, and additional protection against erosion would be installed, if needed.
- 7.7.3 In addition, although the sheet piles are not anticipated to result in a significant effect, enhancement measures would be investigated in the next design phase; this could include willow spilling and green bank reinforcement.

## **7.8 Contaminated land and ground conditions**

- 7.8.1 During construction there is a potential risk to workers who may come into direct contact with contaminated land and associated ground gas. This is considered to be a temporary significant adverse effect. Best practice measures would be employed to reduce the risk of exposure. These would include: regular training, preparation of method statements to establish ways of working, appropriate use of Protective Personal Equipment (PPE) (such as dust masks), dust suppression, and collection of drainage water and management of surface water. These measures would reduce the effect to non-significant.

7.8.2 Once the tidal barrier is operational, there is a small risk to operators in the control building due to the potential accumulation of ground gas in the building, resulting in a permanent adverse effect. However, the control building would be designed to include ground gas protection measures which would eliminate the risk and therefore be non-significant effect.

## 7.9 Waste and resources

7.9.1 With the implementation of best practice waste management practices, which would follow the UK Waste Hierarchy of Re-use → Recycle → Recover → Dispose, the County's waste infrastructure would be able to support the likely waste products including dredged material associated with the Project without substantial alteration to their routine work and working practices. As such, no significant effects are anticipated on waste and resources.

7.9.2 The waste management procedures to be adopted during construction would be documented in the site waste management plan which would be approved by Boston Borough Council prior to the start of construction.

## 7.10 Navigational impact

7.10.1 During construction the assessment has shown that there would be significant effects to navigation or boat users as a result of:

- Reduced manoeuvrability, increased river traffic and reduced river width;
- Increased collision risk;
- Reduced available quay length; and
- River restrictions/closures.

7.10.2 The above effects are discussed in more detail below and a summary of the proposed mitigation is provided in 7.10.7 with the significant residual effects provided in 7.10.8.

7.10.3 The works would include construction activities and new structures within the navigable river channel. There would also be a large increase in river traffic as construction plant may comprise barges or safety craft and it is assumed that 90% of construction material for the Project would be brought to site by barge. This would result in a reduction in the available navigable channel width which would lead to reduced manoeuvrability of all vessels in the vicinity of the construction works. There is also the potential requirement for one way traffic through the by-pass channel for larger vessels.

7.10.4 Due to the increase in the number of vessels in the channel during construction there are increased risks of collision with construction plant and between users and with moored ships on the river berths. Smaller, less manoeuvrable craft may be more susceptible to that hazard. In addition, while the WDE works are ongoing all PoB commercial vessels would be turned outside the wet dock. This increase in the number of cargo ships turned outside the WDE

- increases the risk of collision with other users. Divers are likely to be required during construction which would pose additional safety risk to divers themselves and river users.
- 7.10.5 During construction the PoB's available quay length would be reduced in order to upgrade the quay walls and the WDE. This would impact commercial vessel activities both inside and outside the Wet Dock and would lead to an associated reduction in port capacity. In addition, relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB's operation and in particular their berthing/unberthing operations.
- 7.10.6 It is anticipated that the installation of the barrier gate would be the only activity that would require the river to be closed to maritime traffic. It is currently estimated that the closure would be for up to two days; however, this would be confirmed during the next design phase. Activities such as dredging and installation of scour protection would require navigation restrictions to be put in place for short periods of time, up to one hour at a time. Outside of these specific elements of work there may also be isolated restrictions on navigation where deemed appropriate by the works contractor and the Harbour Master.
- 7.10.7 The construction effects would be managed through an appropriate programming of the works, installation of aids to navigation, collision protection measures appropriate to the range of river users, and implementation of effective communication between the Harbour Authority, Canal River Trust, Environment Agency, the works contractor and river users. In addition, there would be a provision of moorings within the PoB Estate and upstream and downstream of the tidal barrier for use by those affected by river closures during construction. Additionally, the Witham Sailing Club and fishing fleet would be re-located as part of the enabling works.
- 7.10.8 With the implementation of the mitigation measures it has been assessed that all the significant effects would be reduced to non-significant apart from:
- Increased collision risk – risk of collision with moored ships on river berths by vessels utilising the bypass as a result of increased in-channel activities; and
  - Reduction in available quay length – progressive closure of riverside berths and relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB's operation and require all commercial vessels to be turned outside the WDE.
- 7.10.9 Once built and operational, the assessment has shown that the tidal barrier would result in significant effects as a result of:
- Reduced manoeuvrability and river width;
  - Increased collision risk;
  - River restrictions/closures;
  - Reduction in available quay length; and
  - Underkeel clearance restriction.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 7.10.10 The above effects are discussed in more detail below and a summary of the proposed mitigation is provided in 7.10.16 with the significant residual effects provided in 7.10.17.
- 7.10.11 The barrier installation would reduce the channel width at the location of the barrier. This would result in a reduction in the available navigable channel width at high tide. This would lead to reduced manoeuvrability of all vessels in the vicinity of the barrier and potential requirement for one way traffic larger vessels. In addition, any local increase in bed height as a result of sediment deposition could reduce manoeuvrability and increase the risk of collision and grounding.
- 7.10.12 The barrier may reduce visibility and have an impact on sight lines of all vessels navigating this part of the Haven. A reduction in visibility of the structure would increase risks of collision with the river users and structures. When navigating through the barrier at night or when it is closed at night as a result of an extreme tide warning there is a risk of collision with the barrier, other ships or ships moored on the riverside berths. Changes in velocity and risks of vortex's forming just south of the barrier tie-in may increase the risk of collisions. In addition, the new barrier has the potential to attract new river users who would be unaware of the risks associated with the new barrier and new navigation conditions.
- 7.10.13 During periods when the barrier is closed, river traffic is at risk of being trapped upstream or downstream of the barrier.
- 7.10.14 The barrier is located at one of PoB's berths thereby removing it from use for PoB vessels.
- 7.10.15 Any local increase in bed height as a result of increased sediment deposition could reduce the manoeuvrability of larger ships and increase the risk for collision and grounding. In addition, the bed level would be maintained at its current depth at the barrier location. However, the effect on a vessel impacting with a hard structure (if this is to occur) is likely to be more severe than an impact with the existing bed conditions.
- 7.10.16 The effects during operation would be managed through a river traffic management system managed by the PoB / Harbour Master, provision of suitable upstream and downstream waiting areas when the barrier is closed, lighting and navigation aids and collision measures. PoB would undertake surveys of the Haven channel bed and maintenance dredging would be undertaken regularly to reduce the potential of sediment building up which may affect navigation. These measures, once implemented, would reduce the majority of significant effect to non-significant.
- 7.10.17 The only remaining significant impact would be the impact to PoB's quay length and operations. Once the barrier is in place a section of quay wall would not be useable to moor and offload vessels although the landside areas would remain useable. Alongside this, the

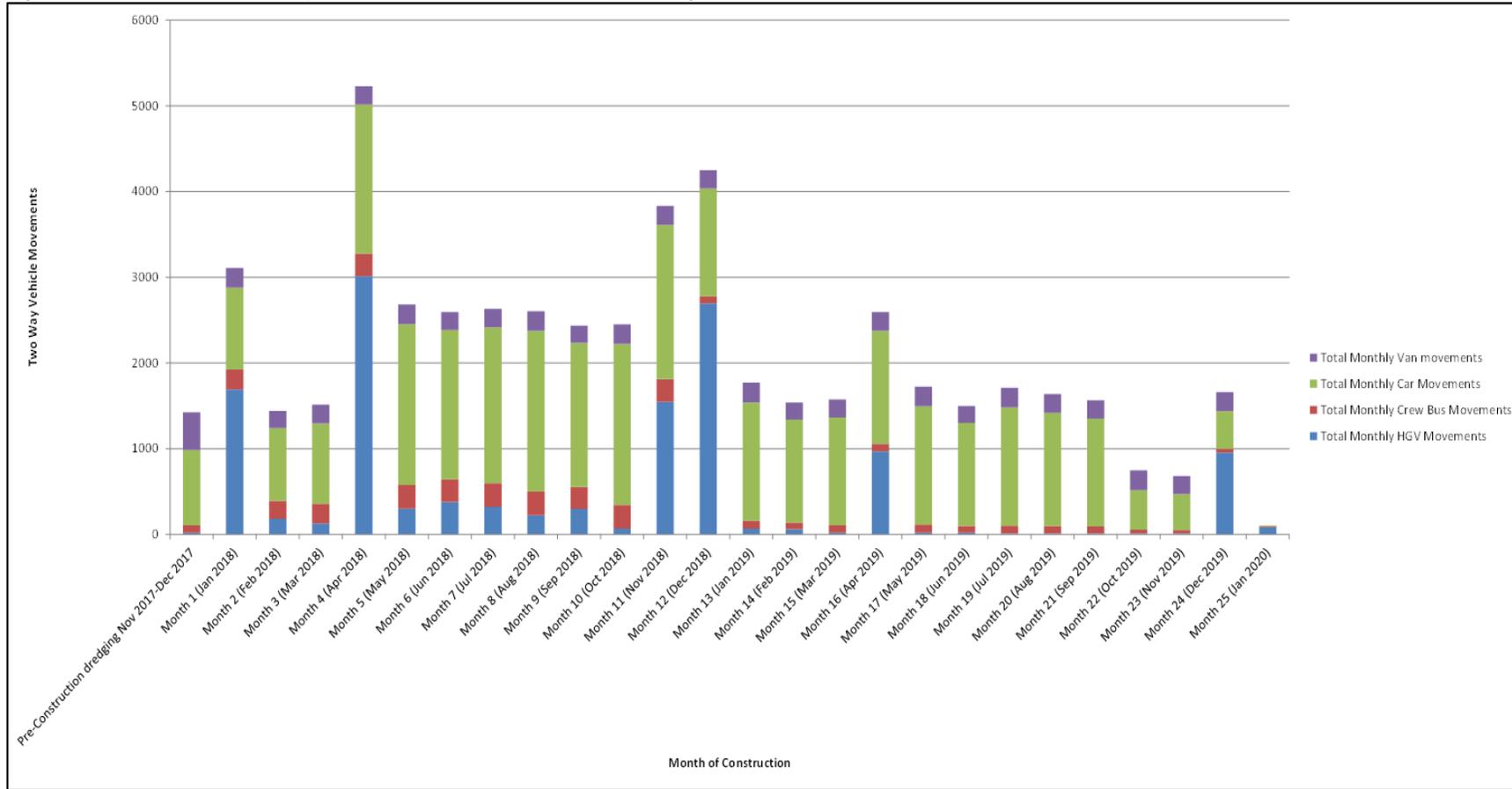
widening and other improvements to the WDE would have long term positive effects on PoB's operations.

#### **7.11 Road traffic and transport**

- 7.11.1 Construction is expected to increase road traffic levels during construction on both the left and right banks of the Haven. Traffic from the left bank compound is expected to follow St John's Road onto the A16 and A52, and traffic from the right bank construction compound would follow Marsh Lane onto the A16.
- 7.11.2 During the first full year of construction in 2018 a total of approximately 34,800 total two way vehicle movements are estimated, and broken down as follows:
- 53% cars;
  - 31% HGVs;
  - 8% crew bus; and
  - 8% delivery vans.
- 7.11.3 The profile of monthly vehicle movements across the construction period, including pre-construction capital dredging (Phase 1) has been estimated and is summarised in Figure 7.3.

**Boston Barrier Tidal Project**  
 A17/3 – Environmental Statement: Non-Technical Summary

Figure 7.3: Predicted monthly vehicle movements to the Project during construction



Source: Mott MacDonald 2016

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

- 7.11.4 The increase in traffic could lead to an increase in delays on the local roads which is considered a significant adverse effect. Any road-based construction impacts would be temporary and would be managed effectively by a construction traffic management plan (CTMP) which would reduce the effects to non-significant. This plan would be agreed with Boston Borough Council prior to the start of construction.
- 7.11.5 Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kv electrical cables to reduce disruption to users of the National Cycle Network Route 1. This is not considered a significant effect.
- 7.11.6 The Boston Public Footpath No.14 (Macmillan Way), would be diverted throughout the entirety of construction phase of the Project, and would result in a temporary adverse significant effect. The CTMP would provide information on the diversion which would be distributed to local residents and businesses. In addition, appropriate signage would be provided and specified in the CTMP. This is anticipated to reduce the effect to non-significant.
- 7.11.7 There are no effects anticipated to result during the operation of the tidal barrier.

## **7.12 Air quality**

- 7.12.1 The assessment has shown that local air quality, including within the Boston Air Quality Management Area (AQMA), would not be affected and therefore, the reported effect is not significant, as a result of the additional construction traffic required by the Project.
- 7.12.2 Construction activities on site would not result in significant effects but on site activities do have the potential to increase dust levels. This would be managed and controlled through good site practice such as damping down of spoil material and limiting stockpiles on site. The mitigation measures would be documented in the construction method statement which would be submitted to Boston Borough Council for approval prior to the start of construction.
- 7.12.3 The operation of the tidal barrier would not reduce air quality in the vicinity of the Project.

## **7.13 Community**

- 7.13.1 During construction, the appointed contractor would develop a local recruitment policy and local business register to assess and maximise local employment and business opportunities for local companies. This would be captured and delivered through the construction method statement.
- 7.13.2 The diversion of Boston Public Footpath No.14 (Macmillan Way) and the disruption to cyclists as a result of the Project are not anticipated to result in significant community effects.

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

However, the removal of the disused hoist is anticipated to result in a permanent beneficial effect, in terms of safety, for users of Boston Public Footpath No.14 (Macmillan Way). In addition, following construction, the Boston Public Footpath No.14 (Macmillan Way) would be improved making it more attractive for walkers and accessible for persons of restricted mobility.

- 7.13.3 There is the potential for odour as a result of drying of the dredged materials across the four dredging phases. However, this is not anticipated to result in a significant effect.
- 7.13.4 Once operational, the Project would result in long term benefits for the community and local buildings by reducing the risk of flooding and the resulting damage to houses, streets and community stress.

## 8 Cumulative assessment

- 8.1.1 The Project considered two types of cumulative effects inter-project and in-combination effects.
- 8.1.2 Inter-project effects arise due to interactions between the Project and past, present and future (reasonably foreseeable) developments in the locality of the Project which have not been included in the baseline. In-combination effects result due to interactions between different elements (i.e. noise and landscape affecting the same receptor) within the Project.
- 8.1.3 Eleven developments (five residential developments and six Environment Agency schemes) were identified within the vicinity of the Project which had the potential to result in inter-project cumulative effects (see Table 8.1). Three of the Environment Agency schemes were scoped out of the assessment. One was scoped out due to the type of work being undertaken and two were scoped out as they were still in the inception stage.

Table 8.1: Developments and schemes in the vicinity of the Project

ID	Brief description	Location	Scoped in/out
1	Erection of 75 dwellings	Broadfield Lane; Approx. 500m west of site boundary	Scoped in to assessment.
2	Erection of 60 dwellings	London Road; Approx. 250m south west of site boundary	Scoped in to assessment.
3	Erection of 108 dwellings and associated infrastructure	Boston College De Montfort Campus, Mill Road, approx. 450m north east of site boundary	Scoped in to assessment.
4	Erection of 32 detached, semi-detached and terraced dwellings	Sir Isaac Newton Drive approx. 250m north of site boundary	Scoped in to assessment.
5	Erection of 26 dwellings	St Thomas Drive, approx. 250m south west of site boundary	Scoped in to assessment.
6	Installation of a piled toe revetment	Downstream Grand Sluice approx. 150m north west of site boundary	Scoped in to assessment.
7	Routine maintenance	Black Sluice and Lower Witham within the site boundary	Scoped out of assessment due to type of work.
8	Armouring of low spots in the catchment embankments.	Black sluice; and SFFD at various locations up to several km's from the site boundary	Scoped out of assessment due to still being in inception stage.
9	Maintaining Standard of	Both sides of Haven, immediately	Scoped in to

## Boston Barrier Tidal Project

### A17/3 – Environmental Statement: Non-Technical Summary

ID	Brief description	Location	Scoped in/out
	Protection – as part of the Flood Defence Grant in Aid (FDGiA) scheme	downstream of the project boundary	assessment.
10	Flood Defence Works	Western Power Distribution site	Scoped in to assessment.
11	Flood Defence Works - Metsa Wood	Haven Banks approximately 900m downstream of the site boundary (Metsa)	Scoped out of assessment due to still being in inception stage.

- 8.1.4 An assessment of the remaining eight developments determined that there would be no inter-project cumulative effects with any of the residential developments during either construction or operation. In addition, it was determined that with the implementation of mitigation and construction best practice measures by the Environment Agency schemes it would be unlikely that the schemes would result in significant cumulative effects during construction or operation.
- 8.1.5 The potential for in-combination cumulative effects within the Project has also been assessed. It determined that there was the potential for in-combination effects during construction as a result of a decrease in visual amenity, increase in noise and a loss of community assets. However, the assessment determined that it was unlikely that significant in-combination cumulative effects would result during construction.
- 8.1.6 During operation it was determined that there was the potential for in-combination cumulative effects as a result of increased protection from flood risk for community and heritage assets and reduction in visual amenity as a result of the Project. However, the assessment showed that significant in-combination cumulative effects during operation were unlikely.

## 9 Conclusion

- 9.1.1 This Report has summarised the findings presented in the ES from the work carried out within the EIA to support the Boston Barrier Project. The potential significant positive and adverse effects have been identified and measures have been provided to mitigate the significant adverse effects. The identified mitigation would reduce all significant permanent adverse effects to non-significant apart for effects on cultural heritage assets that could be buried in the mud flats within the Haven, reduced quay length within the PoB Estate and visual amenity for receptors along Wyberton Low Road, users of the Boston Public Footpath No.14 (Macmillan Way) and river users.
- 9.1.2 There are also a number of temporary significant adverse effects that would only be experienced during the construction phase. To ensure that the significant adverse effects during construction are managed appropriately management plans would be developed and agreed with Boston Borough Council prior to the start of construction, these include:
- Construction Method Statement;
  - Construction Traffic Management Plan;
  - Noise and Vibration Management Plan;
  - Ecological Management Plan; and
  - Site Waste Management Plan.
- 9.1.3 The Project would be constructed in accordance with the approved statement and plans.
- 9.1.4 Boston and the Haven have a long history of flooding which is affecting the potential for redevelopment and investment within the town of Boston. The construction of the tidal barrier and flood defences would improve this situation whilst at the same time contributing to the feeling of well-being associated with improved flood protection in the wider community. The Project is seen as an important piece of infrastructure in terms of flood protection works and improving community resilience.
- 9.1.5 In addition, the Project would result in a number of permanent positive effects, including, reducing the potential for permanent damage to historic buildings and streetscapes, increasing the potential investment in historical building stock, improving the Boston Public Footpath No. 14 (Macmillan Way) making it more attractive for walkers and accessible for persons of restricted mobility, reducing the immediate aftermath of flood events (such as mud and debris left by the flood water), and building activities related to the repair of buildings and streetscapes.
- 9.1.6 This ES satisfies all requisite statutory requirements relevant to the Project and it is considered that the construction and operation of the Project is justified, taking into account environmental and economic considerations and is in accordance with the principles of sustainability.



**Would you like to find out more about us  
or about your environment?**

**Then call us on**

**03708 506 506** (Monday to Friday, 8am to 6pm)

**email**

**enquiries@environment-agency.gov.uk**

**or visit our website**

**www.gov.uk/environment-agency**

**incident hotline 0800 807060** (24 hours)

**floodline 0345 988 1188** (24 hours)

Find out about call charges ([www.gov.uk/call-charges](http://www.gov.uk/call-charges))



Environment first: Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle if possible.