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1 Qualifications and Experience

1.1 I am Emma Lunt, a Chartered Environmental Scientist working within Mott MacDonald's Water and Environment division. Mott MacDonald is an international major multi-disciplinary infrastructure consultancy. Mott MacDonald is one of the largest firms of consulting engineers and environmental specialists in the United Kingdom (**UK**), with in excess of 16,000 staff worldwide. We have a strong international and UK record in helping to deliver complex infrastructure projects.

1.2 My academic qualifications include a BSc (Hons) in Environmental Science and an MSc in Environmental Impact Assessment, Auditing and Management Systems, both from the University of East Anglia. I am a full member of the Institution of Environmental Sciences and I am a Chartered Environmentalist with the Society for the Environment.

1.3 I am the Environmental Management Team Leader and I am responsible for leading a team of 40 environmental professionals who successfully deliver a range of Environmental Impact Assessment (**EIA**) projects both nationally and internationally. Overall, I have 17 years' experience gained in leading multi-disciplinary teams delivering large infrastructure projects in the water, transport, energy, and oil and gas sectors. This has included an involvement in a significant number of EIA projects, advising on environmental monitoring, mitigation, and public and stakeholder engagement. Notable EIA projects include the High Speed 2 (**HS2**) London to West Midlands, Centro Midland Metro Birmingham City Centre Extension, Bacton Offshore Gas Storage Project, Covenham to Boston Transfer Pipeline, Chelmsford Effluent Pipeline, as well as the Norwich Northern Distributor Road.

1.4 My role in the EIA for the Boston Barrier Scheme (the **Scheme**) included responsibility for the technical review of the Environmental Statement (**ES**).

2 Scope of Evidence

2.1 In my Proof of Evidence I address environmental issues relevant to the Order application. My evidence is concerned with the scope, method of assessment and findings of the EIA as reported in the ES and supporting documents submitted with the Order application. In particular, I focus on the environmental effects identified as significant in the EIA, the measures proposed by the Environment Agency to mitigate adverse effects, and the residual significant effects arising from the Scheme with mitigation measures incorporated.

2.2 The evidence I present within my Proof of Evidence is my opinion based on a number of environmental studies that have been undertaken by environmental specialists to inform the EIA for the Scheme. I have not undertaken the individual environmental assessments myself, but I have familiarised myself with and critically reviewed the assessments undertaken and their key findings.

2.3 My Proof of Evidence complements that of the other expert witnesses, in particular Mr Anderson (**EA/1/1**) who covers scheme need, development and benefits, Ms Timothy (**EA/9/1**) who addresses the cultural heritage technical topic, Ms Evans (**EA/2/1**) who deals with surface water and flood risk, Mr Forni (**EA/10/1**) who deals with noise and vibration and Mr Mallin (**EA/3/1**), Ms Watson (**EA/4/1**) and Captain McArthur (**EA/5/1**) who lead on the navigational technical topic.

2.4 In Section 4, I outline the main alternatives considered, including the strategic environmental approaches and polices that have informed the selection of the Scheme.

2.5 In Section 5, I consider the EIA, describing the process and conformity with the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (**B/11**) (**TWAO**), Statutory Instrument (**SI**) 2006/958 and the EIA Directive (85/337/EEC) as amended, the key environmental mitigation measures proposed to avoid, reduce or remedy any adverse environmental effects of the Scheme and the planning conditions which will bind the Environment Agency to the provision of mitigation.

2.6 I provide a clear outline of any environmental significant residual effects identified as part of the EIA process in Section 5.

2.7 In Section 6, I discuss the objections and representations received from the statutory bodies, stakeholders and residents in so far as they relate to the EIA and environmental matters. This section also provides my response to these objections, including further expansion of the responses given in the Statement of Case, where appropriate.

2.8 In Section 7 of this Proof of Evidence I consider and discuss the Statement of Matters (**SoM**) and provide a response to these Matters.

2.9 Finally, I summarise and conclude this Proof of Evidence in Section 8.

3 Introduction

3.1.1 The TWA Order application and the application to be made for a direction granting planning permission are to be determined by the Secretary of State for the Department for Environment, Food and Rural Affairs (**Defra**). The application for listed building consent is to be determined by the Secretary of State for Communities and Local Government.

3.1.2 The Secretary of State issued a Statement of Matters for the TWAO inquiry in January 2017.

3.1.3 In this Proof of Evidence, I address, in particular the following matters from that Statement of Matters, in whole or in part:

2. The main alternative options considered by the Environment Agency and the reasons for choosing the proposals comprised in the scheme.

3. The justification for the particular proposals in the draft TWA Order, including the anticipated flood risk, environmental and socio-economic benefits of the scheme.

4. The extent to which the scheme would be consistent with local flood risk, environmental, economic and planning policies.

5c and 5d. The justification for the location, design and operation of the scheme including:

c) the dismissal of a proposed 'sea lock' element of the scheme on environmental grounds; and

d) the omission of the 'water level management' scheme from the proposed plan at this time and why this is justified.

6. The likely environmental impacts of constructing and operating the scheme.

7. The compatibility of the scheme with future climate change scenarios.

8. The adequacy of the Environmental Statement submitted with the application for the TWA Order, having regard to the requirements of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006, and whether the statutory procedural requirements have been complied with.

9. The measures proposed by The Environment Agency for mitigating any adverse impacts of the scheme, including:

a) the proposed Code of Construction Practice;

b) any measures to avoid, reduce or remedy any major or significant adverse environmental impacts of the scheme; and

c) whether, and if so, to what extent, any adverse environmental impacts would remain after the proposed mitigation.

10. The conditions proposed to be attached to the deemed planning permission for the scheme, if given, and in particular whether those conditions satisfy the six tests referred to in Planning Practice Guidance, Use of conditions (Section ID:21a).

4 Main alternatives to the Scheme

4.1 Introduction

4.1.1 Mr Anderson is his Proof of Evidence (**EA/1/1**) explains the alternatives the Environment Agency considered to address flood risk management in Boston and in developing the Scheme.

4.1.2 In this section of my Proof of Evidence, I consider the environmental aspects of the main alternatives to the Scheme considered, principally drawing upon the published information presented in the following environmental reports:

(a) Strategic Environmental Scoping Report, July 2004 (part of the Boston Haven Flood Management Studies (BHFMS(**D/1**))

(b) Strategic Environmental Assessment – Environmental Report, May 2006 (for the Boston Combined Strategy (**C/3/4**))

4.1.3 In addition, I have reviewed the Boston Sea Lock Preliminary Feasibility Study (**BSLPFS**) prepared by Balfour Maunsell in 1994 (appended to the proof of evidence of Mr. Anderson (**EA/1/2**)) which considers a sea lock and barrage towards the mouth of the Haven to understand the environmental matters identified and considered at that time and whether they remain appropriate today. My review is set out in section 4.5 below.

4.1.4 Based on my own judgement and the environmental information that I have reviewed, I have also considered whether the barrier is in my opinion in the best location in environmental terms. This is discussed in section 4.4.

4.2 Boston Haven Flood Risk Management Studies

4.2.1 Between 2003 and 2005, the Environment Agency undertook work for the development of the Boston Haven Flood Risk Management Studies (BHFRMS) (**D/1**) (this is a suite of studies rather than a single strategy document). Within the BHFRMS a range of flood risk management policy options were considered including; hold the existing line of defence, advance the existing line of defence, managed realignment, urban realignment and no active intervention.

4.2.2 Mr Anderson (**EA/1/1**) in his Proof of Evidence gives further explanation of the BHFRMS and provides an overview of the flood management policy options considered. In this Proof of Evidence, I address the environmental matters considered as part of the BHFRMS.

4.2.3 From an environmental perspective all flood risk management policy options were subject to a preliminary screening exercise to eliminate those that would not be feasible or viable for further consideration. This is reported in a Strategic Environmental Scoping Report in 2004 (the **2004 Scoping Report**) (**D/1**). During the preparation of the 2004 Scoping Report internal Environment Agency and external consultation was undertaken.

4.2.4 Chapter 6 of the 2004 Scoping Report sets out the key environmental issues and constraints considered by the BHFRMS and is based upon a review of the existing baseline environmental conditions.

4.2.5 The key environmental matters identified and considered at this stage in the 2004 Scoping Report are summarised here:

(a) Need to be sensitive to the local communities and river uses. Many local communities are reliant on the river for recreational activities such as walking, cycling, boating, navigation and angling as well as proving the appropriate level of flood protection.

(b) River related industries, in particular the Port of Boston and commercial fishing activities, are a key constraint, their long-term viability must be considered.

(c) Land required for potential flood storage areas may present some conflicts with other land uses, such as agriculture. If flooded, contaminated land could cause a significant water quality problem.

(d) Sustainable land drainage operations and outfalls into the Haven must be considered along with the effective operation of water and wastewater infrastructure.

(e) Key ecological constraints are concerned with the Wash SPA/SAC RAMSAR/SSSI, downstream impacts must be considered in accordance with the legal requirements.

(f) Boston has significant historical interest as a historic port, and is designated as an area of known archaeological interest and there are numerous listed buildings and Conservation Areas in Boston. Any proposals should prevent damage to these assets and be in keeping with the character of Conservation Areas.

(g) Any new structures would need to be designed in a sensitive way to create benefits to landscape character and visual amenity.

(h) Increased access to the riverside and provision of recreation and amenity enhancements could be developed in partnership with appropriate bodies/organisations.

(i) Habitat creation opportunities e.g. creation of intertidal habitat or softening of hard edges of watercourse with marginal vegetation.

(j) Possible navigation and recreational enhancement opportunities in association with the Fens Waterways Link Project.

(k) Inclusion of fish passes.

(l) Opportunities for integrating public art into the flood defence works.

4.2.6 A list of the Strategic Environmental Assessment (**SEA**) objectives is contained in, Appendix 2, Part 4 of the 2004 Scoping Report (**D/1**).

4.2.7 I have critically reviewed the 2004 Scoping Report and in my opinion the report develops appropriate objectives and identifies all the reasonable environmental constraints and opportunities to be assessed in the consideration of options for flood risk management in the tidal stretches of the River Witham. The identified environmental constraints and opportunities in my opinion remain valid today.

4.2.8 The 2004 Scoping Report, due to its nature, does not recommend a preferred flood risk option. It is the BHFRMS that recommends an - Advance the existing line of defence - encompassing a barrier that would improve the standard of protection to 1 in 300 chance of flooding in any year. The BHFRMS also went on to indicate that a barrier should be located between the Swing Bridge and upstream of Hob hole outfall. A barrier downstream of Hob hole was not considered as it was felt that the environmental impacts on the Wash SPA/SAC/RAMSAR/SSSI would be unacceptable.

4.2.9 A full SEA process was not completed for the BHFRMS. I understand that this is because the possibility of combining the flood risk management needs of Boston and the potential to improve navigation as part of the Fens Waterways Link became a consideration. This lead to the preparation of the Boston Combined Strategy (**BCS**) (**C/3/4**).

4.3 Boston Combined Strategy (BCS) - Strategic Environmental Assessment (SEA) Environmental Report

4.3.1 Mr Anderson's Proof of Evidence (**EA/1/1**) provides an overview of the strategic policy and options considered by the BCS. My Proof of Evidence focuses on the SEA which supported the development of the BCS (**Appendix 1)**.

4.3.2 Between September 2005 and October 2006, the Environment Agency undertook the BCS SEA in parallel with the development of strategic policy and options to manage flood risk in Boston and provide navigation through improvements to the Fens Waterways Link.

4.3.3 The BCS SEA built upon the earlier work undertaken and reported in the 2004 Scoping Report (discussed above). Figure 1.1 in the BCS SEA Environmental Report describes the evolution of the combined strategy and the key interactions between the SEA and the BCS.

4.3.4 Chapter 6 of the BCS SEA Environmental Report sets out the assessment and evaluation of the environmental effects of the flood management policy options and a second assessment of the navigational approaches and options.

4.3.5 In summary, the flood risk management policy options considered in the BSC SEA Environmental Report broadly replicates those defined in the 2004 Scoping Report, and are; hold the existing line of defence, advance the existing line of defence, managed realignment, urban realignment and no active intervention.

4.3.6 The BCS SEA Environmental Report then went on to consider the following additional navigation approaches and options; new channel to west, tidal lock in Black Sluice, new barrage and navigation link and no active intervention: i.e. Do Nothing.

4.3.7 A summary of the BCS SEA objectives is provided below:

(a) Flood Management: Reduce the risk of flooding to people, property and the environment.

(b) Human Beings: Provide an opportunity for investment, leading to long-term economic improvements and employment benefits.

(c) Recreation and Amenity: Be an important recreational resource and contribute to the health and wellbeing of local communities.

(d) Landscape: Conserve and enhance the landscape character of the area.

(e) Cultural Heritage and Archaeology: Protect and enhance features of archaeological importance and historic character throughout Boston.

(f) Flora and Fauna: Protect and enhance biodiversity and designated sites of local, national and international importance.

(g) Climate Change: Ensure the strategy is sustainable in terms of long-term climate change.

(h) Water: Ensure there are no adverse impacts on water levels, quality and flows within the study area.

(i) Geomorphology: Ensure favourable geomorphological regimes are maintained.

(j) Traffic, Transport and Navigation: Provide functional local and regional transport routes including a waterborne transport corridor for people and freight.

(k) Land Use: Ensure the strategy does not conflict with existing land use.

4.3.8 The objectives described above and detailed in full in the BCS SEA Environment Report align well with those initially reported in the 2004 Scoping Report. I therefore believe that the approach taken by the Environment Agency, to use the 2004 Scoping Report as the basis for the full SEA, was appropriate and reasonable.

4.3.9 The full results of the SEA are presented in detail in Appendix D1 of the BCS SEA Environmental Report (**Appendix 1**).

4.3.10 The BCS SEA Environmental Report indicates that of the options considered for a combined flood risk management and navigation improvement option, the 'combined option VI'; a multi-purpose barrier (between the Swing Bridge and Maud Foster Sluice) to increase the standard of protection, that partially excludes the tide to provide a navigational link fulfils both sets of requirements.

4.3.11 In addition, the BCS SEA Environmental Report states that for a flood risk management option, option 2a (a tidal surge barrier) is the preferred option. The following two substantial strategic environmental benefits are outlined as to why this is the case; (i) manages the flood risk to people property and the environmental, and (ii) unlikely to have any significant effects one the Wash SPA/SAC/RAMSAR/SSSI, water quality, flows as the length of the watercourse would still be characterised by the regular tidal/fluvial flow conditions as the barrier would not alter these conditions.

4.3.12 I believe that the development of SEA objectives and the strategic environmental assessment described in the BCS SEA Environmental Report was undertaken in a robust and wide ranging manor to include appropriate and reasonable objectives by which the options for the BCS were developed and assessed the preferred flood risk management option is option 2a (a tidal surge barrier) which is the Scheme for which this Order application applies.

4.3.13 It is common practice when developing SEA objectives that early screening out of options takes place to avoid options that were either previously excluded by other studies, excluded by professional judgement of the environmental specialists and wider project team or excluded following consultation with key stakeholders. In the case of the BCS SEA it is clear from the environmental objective 'to protect and enhance biodiversity and designated areas/sites' that any option or combination of options that would likely cause a substantial detrimental effect on the Wash

SPA/SAC/RAMSAR/SSSI either as the policy option would require substantial engineering solutions to be located in or immediately adjacent to the designated site would be unacceptable when compared to the SEA objective. In my opinion, it is therefore reasonable to have focused the barrier options upstream of Hob hole outfall and ideally even upstream of Maud Foster Sluice.

4.4 Consideration of alternative locations as part of the Scheme development

Documented in the Environment Statement

4.4.1 Section 2, paragraph 2.5.5 to 2.5.16 of the ES Volume 1 (**A/17/1**) sets out the detailed assessment process that the Environment Agency followed to identify the main alternative locations for a barrier and the subsequent selection of the proposed Scheme. I have not repeated this here. In addition to the information present in the ES Mr Anderson's Proof of Evidence (**EA/1/1**) provides further details and background to the approach and the decision making process for selection of the preferred barrier location.

4.4.2 I have reviewed Section 2 of the ES, and can confirm based on my knowledge of the Scheme development, that it accurately represents where environmental considerations have played an important factor in determining the preferred Scheme selection.

Consideration of barrier locations at the mouth of the Haven upstream to Hob hole outfall

4.4.3 From my review of the Boston Sea Lock Preliminary Feasibility Study 1994 (appended to the proof of evidence of Mr. Anderson (EA/1/2)), current legislative requirements protecting designated sites, and based upon my professional judgement the potential impact on the Wash SPA/SAC/RAMSAR/SSSI resulting from the construction and operation of a barrier at the mouth of the Haven would be of a magnitude exceeding the threshold to gain approval.

4.4.4 **Appendix 2** provided two panoramic images showing the mouth of the Haven, giving an indication of the current environmental conditions.

4.4.5 The construction and operation of a barrier at the mouth of the Haven or anywhere upstream of the tidal Haven to Hob hole outfall would cause damage to, and the loss of saltmarsh and intertidal habitats and the disturbance of internationally important bird populations for which the Wash SPA/SAC/RAMSAR/SSSI is designated.

4.4.6 **Appendix 3** shows the boundaries of the Wash SPA/SAC/RAMSAR/SSSI.

4.4.7 Even the loss of a relatively small proportion of the designated site would be counter to the purposes of Article 6(3) and 6(4) of the Habitats Directive, i.e. to maintain the overall coherence of the Natura 2000 Network.

4.4.8 The framework known as the 'mitigation hierarchy' seeks to avoid adverse impacts in the first instance followed by minimisation and then compensation by means of a 'dispensation' which exist in law (i.e. in our circumstances there are other barrier locations which would not have an impact on the integrity of the designated sites).

4.4.9 It is therefore my opinion that a barrier at this location would not be consented, as other alterative locations exist such as that selected for the proposed Scheme which meet the same flood management objectives.

4.4.10 Furthermore, consultation undertaken by the Environment Agency when this location was considered as part of the 1994 Feasibility Report involved discussions with English Nature (now **Natural England**), Eastern Sea Fisheries Joint committee (**ESFJC**), Royal Society for the Protection of Birds (**RSPB**), BBC, Lincolnshire County Council (**LCC**), Port of Boston and English Heritage (now **Historic England**). It is reported that the environmental stakeholders were not in favour of a barrier/barrage location being selected for further consideration near the mouth of the Haven.

4.4.11 In addition, the likelihood of gaining approval at a future later date for a water level management scheme would be substantially reduced if the barrier was located between the mouth of the Haven and Hob hole outfall.

4.4.12 In 2000 the European Commission adopted the Water Framework Directive (**WFD**), after completion of the 1994 Feasibility Report. The WFD is implemented in England and Wales by The Water Environment (Water Framework Directive) Regulations SI 3242/2003(**B/27**). Two of the key objectives of the WFD are to:

(a) Prevent the deterioration in the status of aquatic ecosystems, protect them and improve the ecological and chemical conditions of waters; and

(b) To conserve habitats and species that depend directly on water.

4.4.13 Future water level management with a barrier at mouth of the Haven would permanently impound water over 5+ km length of river channel removing either fully or partly altering the tidal regime/nature of the Haven estuary. Simply put this would alter and likely cause a deterioration, and potential loss of tidal and intertidal habitats such as saltmarsh and mudflats and the species they support.

4.4.14 In addition, there would likely be a considerable change in the river geomorphology which could further contribute to the deterioration in and the loss of habitats and aquatic ecosystems, thus being at odds with the requirements of the WFD.

4.4.15 In my opinion a barrier at the mouth of the Haven and for a considerable distance upstream, would compromise a future water level management scheme. A water level management scheme in this location would not positively contribute to meeting the requirements of the WFD, specifically on the two objectives mentioned above and as such the Environment Agency would be unlikely to continue to support a Scheme that would not contribute to meeting the WFD objectives.

Consideration of barrier between Maud Foster Sluice and Hob hole outfall

4.4.16 The environmental conditions between Maud Foster Sluice and Hob hole outfall are dominated by the narrow and straight channelised section of the Haven. The channel was thought to be cut in the 1800’s and is flanked on either side by saltmarsh and mudflats habitats and then by grassed earth embankments. The surrounding land

use is typical of the Fens agricultural heritage, with a few scattered farms or isolated properties.

4.4.17 **Appendix 2** shows a panoramic image of the mouth of the Haven, giving an indication of the current environmental conditions.

4.4.18 In my opinion the habitats between Maud Foster Sluice and Hob hole outfall are likely to provide a 'functional link' for the species of the Wash SPA/SAC/RAMSAR/SSSI designated sites.

4.4.19 **Appendix 3** shows the boundaries of the Wash SPA/SAC/RAMSAR/SSSI.

4.4.20 Functionally linked land can include habitats associated with an existing SPA and provides a (potentially important) role in maintaining or restoring a protected population at favourable conservation status. The precautionary principle applies equally to functionally linked land where effects might be significant and there is insufficient information to ascertain that there would not be an adverse effect on the integrity of a site, in terms of the population of the species for which the site has been classified or designated, authorisation has been denied.

4.4.21 Bird species which form part of the features of the Wash SPA/RAMSAR/SSSI are known from the baseline surveys and biological records to be present within the Haven but outside the boundaries designated sites. Wetland birds are also known to be present on waterways and land adjacent to the Haven. The Haven, upstream of the Wash SPA/RAMSAR/SSSI site boundary and land either side of the Haven, can therefore be considered to be 'functionally linked' land.

4.4.22 Applying the mitigation hierarchy, the construction and operation of a barrier in these functionally linked areas, which could generate likely significant effects in terms of disturbance and displacement, should be avoided in the first instance and minimised thereafter by locating the barrier at the furthest possible distance upstream from the 'functionally linked' land.

4.4.23 In my opinion, therefore it is highly likely that for a development of the scale and nature as proposed by the Scheme, that for an undetermined distance from the designated site boundary's upstream towards Maud Foster Sluice (option E – see further para 4.4.26) the impacts of a magnitude could still exceed the threshold to gain approval.

4.4.24 The exact distance is determined on a case by case basis but it is often limited the land use, urban development, and other potential disturbing activities as well as the suitability of the habitats. It is therefore reasonable to assume that the closer to Boston (options A –E – see further para 4.4.26) a barrier is constructed and operated the least impact on the designated sites would incur and hence a barrier scheme would more likely secure approval.

Consideration of barrier locations between Grand Sluice and Maud Foster

4.4.25 Overall, the environmental conditions between Grand Sluice and Maud Foster are generally similar in nature and the receptors are broadly of a similar type and typical of a more urban/industrial area. From an environmental perspective, the more

industrial nature of this stretch of river makes it preferable to the stretches of the Haven between Maud Foster and the mouth of the Haven as it is more inland and hence a greater distance from the Wash SPA/SAC/RAMSAR/SSSI designated sites.

4.4.26 Within this stretch of the river, five potential locations (options A-E) were considered for the proposed barrier and are described in Section 2.5 of the ES (**A/17/1**).

4.4.27 A possible advantage of option E over the proposed barrier location (option B) and the remaining options A, C and D is that it would be located further downstream from residential properties along Wyberton Low Road. Thus, the potential noise disturbance during construction would be less by the very nature that the works are a greater distance from these properties, although the noise disturbance could be increase for properties along Fishtoft Road.

4.4.28 However, the impacts on the day to day operations of Port of Boston would be substantially different if option E was selected. This is documented in the submitted ES (A/17/1) and further discussed in Mr Anderson's Proof of Evidence (**EA/1/1**).

Conclusions barrier locations

4.4.29 I have critically reviewed the environmental considerations that were used to inform the selection of the location of the proposed barrier. In my view the proposed barrier location remains the best overall in environmental terms when trying to balance, and weigh against each other, a number of environmental factors. The Environment Agency's choice of location for the barrier is therefore justified from an environmental perspective.

4.4.30 Furthermore, the location selected for the barrier in my opinion is most likely to allow a future water level management scheme to be implemented at a later stage with the least environmental harm, and is therefore least likely to preclude the delivery of water level management in the future.

4.4.31 To confirm, I am of the opinion that there is no alternative barrier / barrage type or alternative location which would have less environmental impact than the proposed Scheme.

Environmental Effects of a Combined Barrier and Water Level Management (WLM) Scheme

4.4.32 The evidence of Mr Anderson (**EA/1/1**) sets out the current position with regards to WLM. I understand that the Scheme has been designed so as not to compromise the introduction of WLM in the future.

4.4.33 In this section I therefore summarise the potential environmental effects if WLM were to be introduced in the future. WLM is complex and therefore, detailed technical environmental assessments would need to be undertaken to ensure that all potential significant effects are identified and addressed prior to the introduction of WLM.

4.4.34 Based on my professional judgement I have provided a high level assessment of the potential significant effects associated with the introduction of WLM in the future and these are set out below.

4.4.35 For my Proof of Evidence, I have based my high level assessment on the Environment Agency's definition of WLM as described in the Updated Scoping Report in the appendices of Ms Timothy's Proof of Evidence (**EA/9/2**), as I consider this to be a reasonable basis /point in time to make a judgement on the potential environmental effects. Any future promoter of a WLM scheme would need to review the WLM design to ensure it fulfils their requirements and the circumstances prevailing at that time as such a future WLM scheme may change from that described below.

4.4.36 For the Environment Agency, the preferred WLM requirements are to hold a water level on any given day during the summer boating season to mirror the River Witham. This level would be governed by the River Witham flows which range from between 0.8 to 1.35m AOD. To meet the needs of the sea going river users, as well as inland river users, WLM could be operated flexibly on the days they wish to go to sea, by managing an anticipated lower water level, circa 0.00m AOD.

4.4.37 Water would be impounded on alternate tides during the inland summer boating season from 1st April to the end of October only.

4.4.38 The majority of the infrastructure required for a future WLM scheme would be provided by the Scheme; however, additional works will be required to facilitate WLM including the:

(a) the creation of new mooring and landing facilities for the Boston and District Fishermen's Association (BDFA) downstream of the barrier, which could be on the Port of Boston's frontage; and

(b) permanent downstream mooring pontoons to ensure all vessels have safe mooring should the barrier be closed.

Cultural Heritage

4.4.39 The Scheme would provide the majority of infrastructure required for WLM, therefore, it is not anticipated that any additional significant effects would result on buried archaeology during construction.

4.4.40 The changing tide, which exposes the mud banks and archaeological remains, is a key part of the town's historic character. It is anticipated that WLM could negatively affect the historic character and appearance of the town of Boston by reducing the tidal range in the summer months when the barrier is expected to be in operation. This would include exposed archaeological remains in the river bed conservation areas and listed buildings.

4.4.41 WLM would impound water in the Haven at higher levels for longer periods which may have a positive or negative impact on adjacent buried archaeological remains depending on the nature of the remains. There is also potential for indirect significant effects to archaeological remains from disturbance or removal of the mud banks from the change in tidal range and normal tidal behaviour, or through dredging to enable moorings to be created.

4.4.42 There are potential indirect positive effects from WLM with more use and income generation through recreational visitors encouraging and enabling investment in historic buildings and spaces.

Landscape and visual amenity

4.4.43 The additional infrastructure required for WLM, would be viewed as part of normal port activities and therefore would not result in any significant landscape and visual effects.

4.4.44 The changing tide which exposes the mud banks is a key characteristic of the river through the town of Boston. The river reach is typically a vertical sided channel consisting brick, concrete or sheet piles in varying condition. At low tide mud banks are also exposed which detracts from the quality of the views from riverside buildings and locations, the Scheme is not expected to affect the exposure of tidal mudflats downstream of the barrier. WLM would retain higher water levels in the town core area upstream of the barrier in the summer months and expected to have a beneficial effect on landscape (townscape) character through improved navigation and increased waterfront activities.

Land use

4.4.45 There is the potential for disruption to Port of Boston operational activities during the construction works related to WLM. However, it is anticipated that the extent of works would not result in a significant effect in terms of land use.

4.4.46 During operation, the Boston fishing fleet would be permanently relocated downstream of the barrier to an outer quay berth on the Port of Boston. This would result in a loss of available quay space for the Port of Boston which is considered to result in a significant adverse effect.

Noise and vibration

4.4.47 The construction works required for WLM has the potential to temporarily increase noise levels on the left bank, which could result in significant adverse effects. However, mitigation measures, similar to those proposed for the Scheme, would be introduced to minimise the significant effects.

4.4.48 WLM will require the barrier to be operated on alternate tides during the summer months which is significantly more than the limited operation for potential tidal flooding and maintenance operations required for the Scheme. Initial calculations indicate that external noise levels due to the operation of plant machinery inside the control room and Wet Dock control building would be below the existing baseline noise levels recorded during the baseline survey during the day and night time. Therefore, no operational significant effect is likely with the inclusion of WLM.

Ecology and nature conservation

4.4.49 The new mooring and landing facilities for the Boston fishing fleet could be constructed within the Port of Boston operational area, which has a very low ecological value. Therefore, no significant effects are anticipated from the

construction of these components. It is assumed that the downstream mooring pontoons could be constructed in the same location as the Witham Sailing Club mitigation area. No significant effects were identified within the ES with regards to the construction of this area, therefore, no significant effects are anticipated during the construction of the mooring pontoons required for WLM.

4.4.50 It is anticipated that ecological receptors would experience no significant effects, either temporarily or permanently from the operation of WLM with the exception of fish, in particular smelt. Significant effects would result from the reduction of the period that fish are able to undertake migration. However, with the implementation of mitigation measures including provision of refuge areas, a fish pass and fish monitoring it is anticipated that these effects could be reduced to non-significant.

4.4.51 Upstream of the barrier where water will be held back, saltmarsh and mudflats habitats will be temporarily inundated. It is difficult to predict the long-term impacts of this, it is however possible that significant effects could arise. These could possibly be mitigated through areas of habitat creation elsewhere in the Haven estuary.

4.4.52 Changes in velocity also have the potential to affect areas of intertidal mudflat habitat, and saltmarsh habitat downstream of the barrier location, due to changes in erosion and sediment deposition patterns. However, changes to sediment processes are likely to be localised and are estimated to affect approximately 250m of the Haven downstream of the barrier structure. At this stage, it is difficult to establish if there are likely to be any potential significant effects associated with any change or loss of downstream habitats due to changes in geomorphological processes.

Surface water and flood risk

4.4.53 The construction of the new mooring and landing facilities for the Boston fishing fleet, and mooring pontoon downstream of the barrier are unlikely to increase tidal or flood risk and therefore would not result in significant effects.

4.4.54 WLM has the potential to reduce flushing during tidal exchange as a result of the obstruction and restriction caused by the barrier gate being in the up position in the channel during alternate tides. This would have the potential to adversely affect water quality, sediment disposition and salinity within the Haven which many alter flood risk. Further modelling of the tidal and fluvial conditions including flow would be necessary to determine the effects associated with WLM and to inform the development of mitigation to ensure that any potential significant effects were minimised.

4.4.55 WLM would not be operated during winter months or at times of high flows or in the event of a fluvial flood warning being notified by the Environment Agency; therefore, it is unlikely to result in an increase upstream fluvial flood risk in these events.

Estuarine process and geomorphology

4.4.56 The construction of the new mooring and landing facilities for the Boston fishing fleet, and downstream mooring pontoon required for WLM would be constructed within a stretch of the Haven which is already heavily modified.

4.4.57 Potential significant adverse effects resulting during operation of the Scheme with WLM include long-term changes to erosion and deposition patterns as a result of the presence of the barrier, and changes to the tidal prism. The geomorphological conditions of the Haven are complex, particularly due to its already modified nature, thus further altering the tidal regime/conditions is likely to change the river conditions.

4.4.58 WLM does have the potential to increase deposition of sediment within the Haven upstream of the barrier location due to the change in 'flushing' of the channel. Furthermore, the barrier would be used to impound water on alternate tides during the inland summer boating season from the 1st of April to the end of October. It is considered that WLM would affect the volume of the tidal cycle on each alternate tide and has the potential to result in a significant effect.

Contaminated land

4.4.59 No significant effects are anticipated during construction or operation of WLM following construction of the barrier.

Navigation impact assessment

4.4.60 The introduction of WLM would likely require the permanent relocation of the Boston fishing fleet downstream of the barrier, potentially to the Port of Boston, further reducing the available quay length available to the Port of Boston resulting in a potential permanent significant effect

4.4.61 As the barrier would be used to impound water on every alternate tide from April 1st to the end of October, river traffic is at risk of being trapped upstream or downstream of the barrier during its use. However, a permanent existing upstream mooring area already exists and a permanent downstream mooring facility is planned as part of WLM. In addition, it is anticipated that the Harbour Master would provide notices to river users regarding the closure of the barrier and therefore, all users would be well informed about the time and duration of barrier closure and held upstream of Grand Sluice or either on the upstream or downstream mooring facilities either side of the barrier. Therefore, although additional closures of the barrier are expected, it is unlikely that significant effects would arise as mitigation measures would be implement where possible to reduce any significant effects and could be offset by the beneficial effects the improved navigation link to the Fens.

4.4.62 The use of the barrier for WLM is also likely to have a potential long term positive impact on navigational opportunities on the Fens Waterways Link. It would be beneficial to those users wanting to navigate downstream of Grand Sluice up to the barrier as this reach would be available for a longer period than at present.

Traffic and transport

4.4.63 During construction and operation, it is considered unlikely that WLM will generate large numbers of additional vehicle trips which would affect the local road network. Therefore, there will not be any potential significant effects on road capacity, routing and access, and amenity.

Air Quality

4.4.64 No significant effects are anticipated during construction or operation of WLM.

Summary of Environmental Effects of a Combined Barrier and Water Level Management Scheme

4.4.65 In my opinion, the assessment of environmental WLM impacts has shown that there are a number of potential significant environment effects that are likely to arise if WLM was introduced in the future after construction of the Scheme. However, until a full and detailed environmental assessment is undertaken that comprehensively considers the complex nature of the geomorphological interactions, and establishes the extent to which mitigation measures could reduce significant effects, a complete picture of the environmental effects associated with WLM cannot be fully understood.

4.5 Sea Lock and Barrage towards the mouth of the Haven

4.5.1 In the early 1990's the Port of Boston commissioned a study, The Boston Sea Lock Preliminary Feasibility Study 1994 by Balfour Maunsell (the 1994 Study) (as appended to the proof of evidence of Mr. Anderson (**EA/1/2**)) to investigate the benefits of constructing a sea lock in the Haven. Support for the study was drawn from the NRA (predecessor to the Environment Agency), Boston Borough Council and Lincolnshire County Council.

4.5.2 The sea lock and barrage was a very different undertaking to the Boston Barrier. However, both proposals were aimed at seeking to address the problem of tidal flood risk in Boston. Mr Anderson in his Proof of Evidence (**EA/1/1**) provides further information regarding the 1994 Study. In my Proof of Evidence, I address the environmental matters associated with the Sea Lock proposal.

4.5.3 Chapter 6 of the 1994 Study reports the environmental studies undertaken at the time the feasibility study was prepared.

4.5.4 The environmental appraisal focuses on the statutory designations, the water quality and conservation/ecological aspects of the area and then assesses potential environmental impacts during the construction and operational phases of the sea lock and barrage proposal.

4.5.5 The 1994 Study considers four locations for the sea lock between 'Pilgrims Memorial' (just upstream of the Hobhole outfall), Site 1, and Tabs Head, Site 4, close to the mouth of the Haven. Sites 2 and 3 are located between sites 1 and 4. The environmental appraisal considers the relative impacts of these four locations.

4.5.6 The assessment itself is largely qualitative, relying on interpretation of known processes and/or impacts of the proposed development to give a relative priority of the preferred location. Based on the analysis of environmental issues undertaken, the 1994 Study reports that the preferred location for a sea lock and barrage is near Hob hole.

4.5.7 Paragraphs 45 to 52 of the 1994 Study present a summary of the environmental specific conclusions and recommendations, these are summarised below.

4.5.8 The 1994 Study concludes that that the sea lock and barrage may have significant impacts on the environment, particularly on the internationally important designated conservation sites (the Wash SPA/SAC/RAMSAR/SSSI); the protected habitats and the species they support.

4.5.9 The following major potential adverse significant impacts were identified:

(a) Destruction of habitats and ecological damage; including loss of intertidal habitat and saltmarsh, disturbance of internationally important bird populations and impacts on macro invertebrates and shellfish communities.

(b) Reduction in water quality due to impoundment (both upstream and downstream of the barrage).

(c) Increased disturbance from noise and commercial traffic.

(d) Changes in siltation patterns (although rates unlikely to change) which was considered likely to impact upon nearby shell fisheries.

4.5.10 Based on my understanding of the environmental conditions, and the likely construction requirements for a sea lock and barrage of this size, substantial off line construction including upgrading of access roads and other infrastructure would be required. This would contribute significantly to the extent of damage to habitats outside of the river channel itself and into the wider grazing marsh and saltmarsh, which supports the features designated as part of the Wash SPA/SAC/RAMSAR/SSSI.

4.5.11 The 1994 Study reports that the principal environmental benefit of the sea lock and barrage scheme arise from the availability of increased opportunities for recreational facilities on the Haven and the improved visual amenity of the area. The study also suggests that there is potential for increased commercial development and employment.

4.5.12 I have reviewed and critically examined the environmental information presented in the 1994 Boston Sea Lock Preliminary Feasibility Study and can confirm in environmental terms my agreement with its findings on the preferred location. I agree that of the 4 locations between Hob hole and Tabs Head, considered in the Study, the most upstream location would be the least damaging overall in environmental terms as it minimises the impact to the Wash SPA/SAC/RAMSAR/SSSI designated sites, reduces the loss of a fully tidal estuary and intertidal habitats, and impounds the least volume of water and hence minimises water quality and siltation matters.

4.5.13 However, I do not conclude that a sea lock and barrage at Hob hole will not give rise to a likely significant effect upon the integrity of the Wash SPA/SAC/RAMSAR/SSSI designated sites as the size and nature of the barrage and sea lock project is likely to cause the permanent loss of habitats which support the bird species for which the Wash is designated. Disturbance to these same bird species is likely during construction also. Overall these two factors are the key reason for my conclusions.

4.5.14 Furthermore, consultation carried out as part of the 1994 Study confirmed that a number of statutory authorities, including English Nature (now Natural England) were

opposed in principle to the sea lock and barrage scheme at any of the locations considered by the BSLPFS (between Hob hole outfall and the mouth of the Haven).

4.5.15 In addition, I have reviewed the process which a sea lock and barrage scheme would need to adhere to, to gain approval under the EU Habitats Directive. (Incidentally, this process was followed, in part, for the Scheme.)

4.5.16 In summary Article 6(3) of the EU Habitats Directive, states that an Appropriate Assessment is required where a plan or project not directly connected with or necessary to the management of a Natura 2000 site(s), may give rise to significant effects upon a Natura 2000 site(s) e.g. the Wash SPA/SAC. The requirement for an Appropriate Assessment has been transposed into UK law under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (**Habitats Regulations**) (S.I. 2010/490) (as amended) (**B/22**) and is commonly referred to as a 'Habitats Regulations Assessment' (**HRA**).

4.5.17 The Habitats Regulations Assessment process is summarised in **Appendix 4** of my Proof of Evidence.

4.5.18 Article 6 (3) and (4) of the EU Habitats Directive states that where a project is likely to have a significant effect on a Natura 2000 site, the Member State concerned must carry out an assessment of the project and study the alternatives and, if there are no alternative solutions, it may nevertheless authorise the project for imperative reasons of overriding public interest (**IROPI**) and provide compensation.

4.5.19 Even the 1994 Study indicates that a sea lock and barrage would likely have a significant effect on a Natura 2000 site. Thus, requiring any proponent of this type of scheme in the locations identified between Hob hole and Tabs Head to consider the alternatives.

4.5.20 In my opinion consent for a sea lock and barrage between Hob Hole and Tabs Head (mouth of the Haven) would be unlikely to gain consent as the consideration of alternative solution test would not be met as there are other credible alternatives that would fulfil the key objective of providing improved flood protection to the town of Boston (i.e. the Scheme).

4.5.21 Evidence from a similar and comparable project, the Dibden Bay Container Terminal, which required a large intertidal and subtidal dredge and landward infrastructure that would result in the loss of mudflats, was refused permission at public inquiry by the Secretary of State as there were credible alternatives and there was no case for IROPI.

4.5.22 Furthermore, the 1994 Study recommends that:

'In further development of this study it may be appropriate to consider a further sea lock and barrage options upstream of the designated sites.'

4.5.23 In my opinion this recommendation and the example of Dibden Bay Container Terminal are a clear indication of the difficulties that would be faced when developing a flood risk management scheme to provide protection to the town of Boston between the town and the mouth of the Wash.

Conclusions – Sea lock and barrage

4.5.24 As set out above, from my experience, and based upon the review of the 1994 Study and the potential impacts of a sea lock and barrage between Hob hole and the mouth of the Haven on the designated features of Wash SPA/SAC/RAMSAR/SSSI, particularly the loss of saltmarsh and mudflat habitats and bird species that these habitats support, would be of a magnitude exceeding the threshold to gain approval.

4.5.25 In addition, the current legislative requirements protecting designated sites requires alternative locations to be considered which could provide the same or similar flood risk management objectives to the sea lock and barrage proposal where significant effects are likely. Alternative locations which are not likely to have a significant effect impact on the Wash SPA/SAC/RAMSAR/SSSI clearly do exist (i.e. the Scheme) therefore I believe that a sea and lock and barrage proposal in the locations identified in the 1994 Study would not secure approval under the requirements of the Habitats Regulations 1994.

4.5.26 Thus, in my opinion is reasonable for the Environment Agency not to consider a sea lock and barrage (or barrier) proposal in the locations considered in the 1994 Study.

4.6 Conclusions – Alternatives

4.6.1 The totality of these studies and assessments in my opinion provides robust evidence showing that a wide range of potential alternatives (flood risk management technique, location, and structure type) were properly considered prior to the selection of the preferred Scheme and its location. Furthermore, the evidence shows that environmental matters were considered as an integral part of the decision-making process. I should make clear that my understanding is that although the Environment Agency did consider alternative options in this way, as matters stand today there is no alternative to the Scheme which could or would be implemented to meet the same need if the Scheme does not proceed.

4.6.2 Furthermore, it is my opinion that the Scheme as proposed, in it is current location just downstream of Black Sluice, will not prevent a future WLM scheme, whereas other alternative locations may potentially cause substantial environmental harm. Thus, not meeting the Environment Agency's commitment that the flood risk management Scheme is neutral in terms of the future introduction of water level management.

5 Environmental Assessment and the ES

5.1 Adequacy of the Environmental Statement and compliance with the statutory procedural requirements

5.1.1 The Scheme was the subject of a full scoping exercise pursuant to the Rules 2006 (**B/11**): Rule 6 which assisted in identifying all likely significant impacts that required assessment.

5.1.2 An EIA Scoping Report was prepared and was used for the basis of consultation to ensure the EIA addressed the key environmental issues and appropriate

methodologies for the EIA process. A Scoping Opinion was received from the Secretary of State for Defra under the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules, 2006 (**B/11**).

5.1.3 Section 3 of the ES Volume 1 (**A/17/1**): Main Report sets out the environmental assessment process undertaken.

5.1.4 Section 5 of the ES Volume 1 (**A/17/1**): Main Report sets out the consultation process undertaken during the Scheme's development, focusing on responses to the Scoping Report and draft ES. These responses assisted in defining the scope of EIA. Table D:1 of the ES Volume 1: Main Report provides a summary of the stakeholders' comments for consideration in the production of the various technical chapters. In addition, the Consultation Report (**A/5**) summarises the consultation carried out on the Scheme prior to the submission of the TWAO application.

5.1.5 In my opinion, the ES complies with requirements of the Rules 2006; Rule 11, together with the Annex 1 to the Rules 2006 (**B/11**) which requires the provision of certain information within the ES.

5.1.6 In accordance with best EIA practice, the assessment of impacts is conservative, considering a 'reasonable worst case' where there is any 'degree of uncertainty'. In my opinion the EIA therefore constitutes a robust and transparent assessment of the 'likely significant environmental effects' associated with the 'reasonable worst case scenario'.

5.1.7 I believe the prediction of potential impacts that has been undertaken in parallel with the development of Scheme design, as an iterative process thus allowing for the incorporation of design measures to offset and mitigate potentially unacceptable environmental impacts and provide better integration with the local environment. These design measures are highlighted in ES and are described as appropriate in the relevant discipline chapters of the ES.

5.1.8 In my opinion the Environment Agency has carried out a thorough and comprehensive consultation process with the various agencies and organisations and has adjusted the scope of the EIA appropriately. In conclusion, I believe that a comprehensive and robust assessment has been taken in the preparation of the ES and that it complies with the requirements of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (**B/11**).

5.2 Environmental and socio-economic benefits of the Scheme

5.2.1 Section 1.3 of the ES Volume 1 (**A/17/1**) sets out the objectives of the Scheme and as such the high level benefits that the Scheme would look to achieve. These are repeated here:

(a) Flood Risk Management: To reduce the risk to people and the developed and natural environment from flooding;

(b) Economics: To maximise amenity, social and economic opportunities; and

(c) Environment: To minimise the adverse impacts on the natural and built environment of the area and to maximise opportunities for environmental enhancement.

5.2.2 Mr Anderson in his Proof of Evidence (**EA/1/1**) deals in detail with the benefits of the Scheme. I have set out here further information that I consider relevant to the environmental and socio-economic benefits.

5.2.3 As detailed in Section 1 of the ES Volume 1 (**A/17/1**) the function of the barrier is to reduce the risk of a tidal surge flooding the town of Boston. By reducing the risk of tidal surge flooding, the Scheme would not only provide protection against flooding, but it would also reduce stress and anxiety associated with the fear of such an event to the community. In my opinion this is a substantial socio-economic benefit of the Scheme, albeit one that is difficult to quantify.

5.2.4 Other socio-economic benefits of the Scheme include giving confidence to potential investors to invest in the local economy contributing to its growth, increased employment opportunities, and the saving of expenditure by not needing to prepare for flood events to the same scale as currently experienced.

5.2.5 Furthermore, the barrier would remove the need for smaller scale and in some cases individual flood risk management and prevention measures upstream through the town of Boston which in itself would be disruptive and unlikely to provide the same level of social economic benefit as that of the barrier.

5.2.6 In addition, the Scheme's environmental objective is to minimise the adverse impacts on the natural and built environment of the area and to maximise opportunities for environmental enhancement. In my opinion the Scheme has been developed in a way to meet this objective, specifically the Scheme is promoting the following environmental benefits and enhancements:

(a) Horsetail re-establishment along the right bank;

(b) Protection of a large number of historic buildings in Boston from flooding (and associated damage);

(c) Improvement of the footpath surface along Macmillan's Way through the construction footprint; and

(d) Protection from environmental damage that occurs as a result of flooding.

5.3 Likely environmental impacts and effects of constructing and operating the Scheme

5.3.1 This section provides an overview of the EIA process which has been undertaken for the Scheme. The EIA findings were presented in the ES and Technical Reports that accompanied the Order application. The ES comprises the following volumes which set out the anticipated environmental impacts of constructing and operating the barrier and associated flood protection works.

(a) **A17/1** - Environmental Statement: Volume 1: Main Report;

(b) **A17/2A** - Volume 2a: Technical Reports: Cultural Heritage, Landscape and Visual Impact Assessment, Land Use, and Noise and Vibration;

(c) **A17/2B** - Volume 2b: Technical Reports: Ecology and Nature Conservation, Surface Water & Flood Risk, Estuarine & Geomorphology Processes, and Contaminated Land;

(d) **A17/2C** - Volume 2c: Technical Reports: Flood Risk Assessment, and Ground Investigation;

(e) **A17/2D** - Volume 2d: Technical Reports: Navigational Impact Assessment, Traffic and Transport, Air Quality, and Outline Site Waste Management Plan; and

(f) **A17/3** – Environmental Statement: Non-Technical Summary.

5.3.2 A summary of the environmental impacts and effects is provided in the sections below.

Cultural heritage

5.3.3 Section 6 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on cultural heritage. The ES reports that the archaeological receptors likely to be affected by the Scheme comprise prehistoric fen deposits and wooden structures in tidal mud banks. Built heritage assets that could be positively ad negatively affected include St Nicholas Church, St Botolphs Church, Swing Bridge, gatehouse and controls cabin, the Boston Conservation Area and the Skirbeck Conservation Area.

5.3.4 In-channel excavation and capital dredging activities could potentially expose deposits which would be permanently removed. An archaeological project design along with supporting archaeological and site management activity and methodologies for investigation would be developed and agreed with relevant stakeholders prior to construction. Following implementation of mitigation, the assessment predicted a moderate adverse effect.

5.3.5 Key views downstream through the Scheme would be interrupted by construction activity and there would be increased levels of construction noise. This would reduce the quiet character of St Nicholas Church and its churchyard, and along with the interruption and obscuring of historic views, would result in a temporary moderate adverse effect during construction.

5.3.6 Earlier iterations of the Scheme design included a sheet piled river wall along the right bank. Mitigation developed during the design process embedding the sheet piles within the right bank, means that only a minor adverse permanent effect is predicted.

5.3.7 Once the Scheme is operational, the reduction in flood risk would lower the potential for damage to historic buildings and streetscapes, notably St Botolphs Church, Swing Bridge, gatehouse and controls cabin, Boston Conservation Area and

associated listed buildings. It raises the prospect of increased investment in conservation of historical buildings. A moderate beneficial effect is predicted.

5.3.8 Further detail is provided on cultural heritage matters by Ms Timothy in her Proof of Evidence (**EA/9/1**).

Landscape and visual amenity

5.3.9 Section 7 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on landscape and visual amenity. Sensitive receptors identified in the ES include several types of local landscape character area (LLCA) visual receptors with views of the Scheme.

5.3.10 The Estuary Corridor LLCA would be subject to a moderate adverse effect during construction due to piling, the presence of construction plant on the right bank, and works within the channel associated with the barrier. These would introduce new prominent elements into the LLCA that would be at variance with the existing character.

5.3.11 The presence of construction plant in an elevated location on the flood embankment would have a moderate adverse visual effect, albeit temporary, on residents of Wyberton Low Road between London Road and Marsh Lane. Additional mitigation measures are not considered feasible.

5.3.12 The construction works would be a noticeable feature of the view for river users of the Haven but the Scheme would only be prominent for a relatively short reach of the river and a small part of the whole sailing experience towards and from the Wash. The construction works for the piling would move sequentially along the bank so construction activity would not be present in one location for the whole of the construction period. Likewise, the barrier works would not be present for the whole construction period. River users are predicted to experience a moderate adverse effect.

5.3.13 The presence of new elements of the Scheme including the barrier and new floodwall partly screening views of the river would result in a noticeable deterioration in the view for recreational users of Macmillan Way. Implementation of a landscape plan (including lighting) along Macmillan Way near the barrier structure would reduce the impact, such that a moderate adverse effect is predicted.

5.3.14 For residents in properties on Wyberton Low Road, the presence of the new barrier structure, its associated lighting and floodwall would introduce new prominent elements in the direct line of the view and close by, resulting in a noticeable change in the existing view. Mitigation measures to reduce the ‘engineered appearance’ of the right bank crest and the new floodwall have been incorporated into the Scheme. These include the establishment of a native wildflower meadow seed mix adjacent to the wall to soften the appearance from the footpath and the creation of a sinuous path along the grassed crest of the embankment. Taking these mitigation measures into account, a moderate adverse effect is predicted.

5.3.15 Furthermore, lighting requirements around the barrier structure for navigational safety and operation will be designed to limit sky glow and light spill to minimise the light disturbance for residents in properties along Wyberton Low Road.

5.3.16 The barrier would be a large scale element in the view experienced by river users of the Haven and the floodwalls would be noticeable features for a relatively short section of the river. Mitigation measures, as described above, to reduce the 'engineered appearance' of the right bank crest and the new floodwall have been incorporated into the Scheme and a moderate adverse effect is predicted.

Land use

5.3.17 The Land Use Technical Report (**A/17/2A**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on land use. There would be a change in land use within the Port of Boston due to construction activities and the construction of control buildings however the loss of land is small and the effect not significant. The proposed replacement towers and aerial conveyor would result in a minor beneficial effect on Frontier's operations.

5.3.18 Further detail is provided on land use and compensation matters by Mr Scriven in his Proof of Evidence (**EA/7/1**).

Noise and vibration

5.3.19 Section 9 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts of the Scheme in so far as they relate to effects on noise and vibration. Potential construction noise impacts were identified on residents in the vicinity of the Scheme in the ES. 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.

5.3.20 Certain properties in the residential areas immediately surrounding the works will experience increases in noise levels because of construction activities. To reduce the noise levels to an acceptable level the following measures would be introduced:

(a) Construction noise and vibration management plan;

(b) Appointed contractor would apply for 'Prior Consent' under Section 61 of the Control Pollution Act 1974 (**B/6**); and

(c) Best practicable means (**BPM**) as defined in BS 5228:2009 - Part 1 Noise[1].

5.3.21 A draft Noise and Vibration Management Plan has been prepared in consultation with Boston Borough Council, to ensure appropriate mitigation measures are delivered through the construction of the barrier and associated works.

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[1] http://shop.bsigroup.com/ProductDetail/?pid=000000000030258086

5.3.22 Further detail is provided on noise and vibration matters by Mr Forni in his Proof of Evidence (**EA/10/1**) and the draft Nosie and Vibration Management Plan included in the appendices to Mr Forni's proof of evidence (**EA/10/2**).

Ecology and nature conservation

5.3.23 Section 10 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on ecology and nature conservation.

5.3.24 During construction, fish populations may be temporarily affected by the narrowing of the Haven, and an increase in local noise and vibration. A package of measures would be implemented through the ecological management plan to ensure the effects are not significant.

5.3.25 The ES reported that operation of the barrier is not expected to affect animals or plant life negatively. However general measures such as the timing of maintenance to avoid migration seasons and fish monitoring would be implemented.

5.3.26 In addition, the Ecology and Nature Conservation Technical Report (**A/17/2B**) provides and explanation of the important and protection afforded to the Washes SPA/SAC/RAMSAR/SSSI including details of the qualifying features which are summarised in Table 4.2, of the above mentioned report.

5.3.27 The Habitats Regulations Assessment (**HRA**) is contained in Appendix D of the Ecology and Nature Conservation Technical Report (**A/17/2B**) which supports the location of the Scheme, concluding that the Scheme does not have the potential to cause a significant effect, alone and/or in combination, on the Wash SPA/SAC/RAMSAR sites. This is because, the Scheme's location is outside the boundaries of the designated sites, to being approximately 4.5km way, nor is it functionally linked.

Surface water and flood risk

5.3.28 Section 11 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on surface water and flood risk.

5.3.29 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. 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. 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. No significant effects are predicted during construction or operation.

5.3.30 Further detail is provided on flow conditions and flood risk matters in the evidence of Ms Evans (**EA/2/1**).

Estuarine processes and geomorphology

5.3.31 Section 12 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on estuarine processes and geomorphology.

5.3.32 The ES reports that there would be a slight increase in the speed of water flowing through the Haven at the location of the 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 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.

5.3.33 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 Port of Boston to identify the need for channel maintenance during operation, and further additional protection against erosion would be installed, if shown to be necessary. This monitoring and mitigation will be secured by the Environment Agency through a legal agreement with the Port of Boston.

Contaminated land

5.3.34 Section 13 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on contaminated land.

5.3.35 During construction there is a small potential risk to workers who may come into direct contact with contaminated land and associated ground gas, this due to the present of made ground in part on the Port of Boston. 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 personal protective equipment (such as dust masks), dust suppression, collection of drainage water and management of surface water. Taking these measures into account, the effect is assessed to be non-significant.

5.3.36 Once the 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.

5.3.37 These risks are typical of the made ground conditions, during the detailed design phase of the Scheme further considerations will be given to these, to fully understand, mitigate and avoid the risk where possible.

Navigational impact assessment

5.3.38 Section 14 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts as far as they relate to effects on navigation. During construction and

operation of Scheme the assessment has shown that mitigation would require to minimise significant effects to navigation or boat users to as low as reasonably possible. Further details of these navigational matters and the proposed Navigational Management Plan are addressed in the Proofs of Evidence prepared by Mr Mallin (**EA/3/1**), Captain McArthur (**EA/5/1**) and Ms Watson (**EA/4/1**).

Traffic and transport

5.3.39 Section 15 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on traffic and transport.

5.3.40 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. During the first full year of construction in 2018 a total of approximately 34,800 two way vehicle movements are estimated. The increase in traffic could lead to an increase in delays on the local roads. Any road-based construction impacts would be temporary and would be managed effectively by a construction traffic management plan, which would ensure the effects are not significant.

Air quality

5.3.41 ES Volume 2D (**A/17/2D**) sets out the impacts in so far as they relate to effects on air quality. No environmental effects are reported in the ES (**A/17/1**) as no significant air quality effects were predicted.

5.3.42 Construction traffic would not have a significant effect on local air quality, including within the Boston Air Quality Management Area (**AQMA**). Dust arising from construction would be controlled through good site practice such as damping down of spoil material and limiting stockpiles on site, such that the effect on neighbours would not be significant.

5.3.43 The ES reports that operation of the barrier would not alter air quality in the vicinity of the Scheme.

Community

5.3.44 Section 17 of the ES (**A/17/1**) and the Non-Technical Summary (**A/17/3**) set out the impacts in so far as they relate to effects on community.

5.3.45 The ES reports that a moderate beneficial effect would be caused by the contractor sourcing local labour during the construction phase and providing training and /or apprenticeships to upskill the local labour market.

5.3.46 Once the Scheme is operational, Boston residents would experience a reduction in impacts caused by flooding: a moderate beneficial effect. Local residents and users of Macmillan Way would enjoy a moderate beneficial effect following reinstatement of the path to a higher specification, including access for wheelchair users and pushchairs.

Cumulative and combined effects

5.3.47 Section 19 of the assessment in the submitted ES (**A/17/1**) determined that there would be no inter-project cumulative effects with any of the identified 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 these schemes would result in significant cumulative effects during construction or operation.

5.3.48 The potential for in-combination cumulative effects within the Scheme 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.

5.3.49 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 Scheme. However, the assessment showed that significant in-combination cumulative effects during operation were unlikely.

Climate Change

5.3.50 Climate change is a key consideration in the environmental assessment process and is a fundamental consideration in the flood risk assessment.

5.3.51 The Flood Risk Assessment was carried out in accordance with the National Planning Policy Framework (NPPF, 2012) (**C/1/1**) and associated Planning Practice Guidance (PPG, 2014) (**C/1/10**).

5.3.52 During the course of the preparation of the FRA (**A/17/2C**), the climate change guidance for developments was updated in Flood risk assessments: climate change allowances (UK Government 19th February 2016). The previous estimate of net sea level rise in The Wash over the next 100 years remains the same as National Planning Policy Framework guidelines (March 2012).

5.3.53 Ms Evans' Proof of Evidence (**EA/2/1**) addresses these climate change considerations in more detail.

5.4 Mitigating any adverse residual impacts of the Scheme

5.4.1 In this section I provide details of the temporary and permanent significant residual effects of the Scheme and the required mitigation. In addition, I discuss the environmental management plans that will be developed for the Scheme, thus ensuring that the mitigation measures can be secured.

5.4.2 Significant residual effects are defined as moderate or major effects. These are detailed in listed in Table 18.1 (construction effects) and Table 18.2 (operation effects) of the submitted ES **(A/17/1)**.

5.5 Delivery Mechanisms for the Mitigation Measures

5.5.1 A separate Code of Construction Practice (**CoCP**) will not be produced for the Scheme; however, the plans identified within Volume 1: Main Report of the ES (**A/17/1**) set out the mitigation, monitoring, and reporting requirements for the Scheme to ensure adequate control over all construction activities. Thus, an equivalent approach to producing a CoCP is proposed.

5.5.2 The Environment Agency's standard practice and approach to managing environmental issues during construction and operation of scheme is through the preparation and implementation of an Environmental Action Plan. An Environmental Action Plan (EAP) was prepared during the EIA process and is presented in Section 20 of the submitted ES (**A/17/1**).

5.5.3 In addition, the proposed planning conditions will ensure that mitigation measures will be delivered and that the local planning authority has control over their implementation and enforcement. A set of draft planning conditions was submitted with the Order application (**A/10**).

5.5.4 The following environmental management plans are proposed for the Scheme:

(a) EAP (provided in outline (**Chapter 20 A/17/1**));

(b) Construction Method Statement;

(c) Noise and Vibration Management Plan (**EA/10/2**);

(d) Ecological Management Plan;

(e) Archaeological Scheme of Investigation;

(f) Site Waste Management Plan (provided in outline (**A/17/2D**));

(g) Construction Traffic Management Plan (**CTMP**) (provided in outline (Appendix B of the Traffic and Transport technical assessment **A/17/2D**));

(h) Sediment Management Plan; and

(i) Navigation Management Plan (draft prepared (please see the Appendices to Mr Mallin's Proof of Evidence **EA/3/1**)).

Environmental Action Plan

5.5.5 The EAP can be found in Chapter 20 of the submitted ES (**A/17/1**) and sets out the mitigation that will be implemented pre, during and post construction. It is split into two sections, the first covers general construction principles that will be implemented to minimise environmental impacts and the effects of construction. The second, documents the specific environmental mitigation that is required to be implemented to reduce the impacts of the construction phase.

Construction Method Statement

5.5.6 The construction method statement will set out all details relating to the working practices to be used during construction of the Scheme. This will include but not be limited to measures relating to dust management, pollution control, emergency procedures and pollution response plans, community liaison and complaint procedures, and details of temporary construction compound (including site layout arrangements and restoration arrangements).

Noise and Vibration Management Plan

5.5.7 A draft noise and vibration management plan has been prepared (**EA/10/2**). It sets out the procedures for the management of noise and vibration arising from the construction of the works. This will as a minimum ensure that the Section 61 consent process is properly managed and that BPM is employed to control noise and vibration for all work undertaken. The plan will be used in the preparation of construction risk assessments to inform site staff of the noise level requirements to properly manage noise and vibration throughout the construction phase.

5.5.8 Mr Forni in his Proof of Evidence (**EA/10/1**) discusses further the details of the intended mitigation measures described in the draft Noise and Vibration Management Plan.

Ecological Management Plan

5.5.9 The ecological management plan is currently being prepared and will provide details of the measures to be taken in connection with the Scheme to protect wildlife and habitats during the construction phase. The plan will include but not be limited to the impacts on the following as identified in the submitted ES (**A/17/1**), Havenside Local Nature Reserve, estuarine habitats, aquatic invertebrates, fish, waterbirds (non-breeding populations), terrestrial habitats, hedgehog, bats, birds, and reptiles. As a minimum, the ecological management plan will also include the following plans and method statements:

(a) Breeding bird method statement;

(b) Hedgehog method statement;

(c) Water quality management plan;

(d) Reptile mitigation and management plan; and

(e) Fish monitoring plan.

Archaeological Scheme of Investigation

5.5.10 An Archaeological Scheme of Investigation will be prepared which will define how the appointed contractor and the specialist archaeological sub-contractors will investigate the significance of known and predicted archaeology, and identify the need for recording and subsequent activities in accordance with the planning condition requirements.

Site Waste Management Plan

5.5.11 A detailed site waste management plan will be prepared which is based on the outline site waste management plan provided in the submitted ES (**A/17/2D**). The purpose of this Site Waste Management Plan is to ensure that waste generation is dealt with in a structured and auditable manner, from the commencement of the Scheme through to construction and operation. This plan will be reviewed monthly during construction and operation and updated if required.

Construction Traffic Management Plan

5.5.12 A CTMP based on the draft CTMP provided in the submitted ES (**A/17/2D**) will be prepared. The plan will outline the measures that are to be implemented to regulate the flow of vehicles required for the construction period. This plan will be reviewed monthly and updated if required.

Sediment Management Plan

5.5.13 A sediment management plan will be developed to demonstrate arrangements to monitor and manage siltation throughout construction. The plan will state the monitoring arrangements for both sediment within the water column and deposited sediment within the channel. The plan will include a description of monitoring arrangements, including the frequency of monitoring.

5.5.14 The plan will also provide management arrangements. These arrangements will include, as a minimum, arrangements for sediment management during typical construction activities, as well as increased requirements in the event that existing management measures are deemed insufficient to protect sensitive receptors.

Navigation Management Plan

5.5.15 A draft navigation management plan has been developed (please see the Appendices to Mr Mallin's Proof of Evidence **EA/3/2**). This plan provides details of the how navigation will be managed throughout construction and operation, documenting all the required mitigation measures. The plan will continue to be developed and refined in consultation with the Harbour Authority and will clearly document the navigational arrangements during construction.

5.5.16 Mr Mallin (**EA/3/1**),Ms Watson (**EA/4/1**) and Captain McArthur (**EA/5/1**) in their Proofs of Evidence discuss further the details of the intended mitigation measures described in the Navigation Management Plan.

Conclusion

5.5.17 Rule 11(1)(b) of The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (the **Rules**) (**B/11**). Sets out that: 'An environmental statement submitted in connection with an application shall include…a description of the measures proposed to be taken in order to avoid, reduce and, if possible, remedy any significant adverse effects on the environment of the proposed works'.

5.5.18 The level of precision offered in the ES on mitigation measures depends on their type. Measures that are less sensitive to the fine detail in the design, such as constrained construction working hours, may be described fully in the ES while others, such as screening of noisy operations, can only be confirmed in detail on the basis of the technical design. The Rules do not require that mitigation measures are presented in the ES in full technical detail i.e. as specifications and drawings for construction or detailed construction environmental management plans.

5.5.19 In my opinion the approach of setting out mitigation measures in the ES is commensurate with the stage of Scheme design and provides flexibility to present some forms of mitigation in outline and subsequently aligning the detail of the mitigation measure with the technical design of the scheme.

5.5.20 Furthermore, the main mitigation measures proposed will be secured through pre commencement planning conditions attached to the consent, as well as contractual obligations with the contractor appointed to construct the Scheme. Crucially, these mechanisms allow mitigation measures to be refined after submission of the ES.

5.5.21 A draft of the proposed planning conditions is provided in the Request for section 90 (2A) direction submitted (**A/10**).

5.6 Transportation of Waste Materials

5.6.1 In this section I summarise the potential disruption that the construction of the Scheme will cause on the local environment because of the transportation of waste material to landfill by road-based construction traffic. A full description of this issue is set out within the Traffic and Transport Technical Report (**A17/2D**) of the ES. The assumptions used regarding the construction programme to inform the EIA are based on the information available at the time of the assessment and would be subject to review during the detailed design stage. Therefore, the numbers of road vehicles that are used to inform the assessment are considered as a worst case scenario. The Environment Agency and their appointed contractor will investigate, as part of the detailed design process, alternatives to disposal at landfill – where these are possible then the disruption will be further minimised.

5.6.2 The construction phase of the Scheme is likely to generate large volumes of waste within the immediate environment. Consequently, this will result in substantial movement of excavated and dredged materials within the site itself and off-site. Some of this material may be contaminated and therefore will need to be removed and treated off-site by a specialist licensed waste contractor. Where material is to be disposed of off-site, this will be done locally, with sites identified within 2 to 35 miles of the Scheme site. One of the Environment Agency's construction targets is to ensure that no more than 20% of waste material generated on the Scheme is sent to landfill.

5.6.3 The Environment Agency's contractor will apply the principles of the UK Waste Hierarchy (Defra, 2011) to re-use, recycle or recover and treat waste on site where reasonably practical in order to minimise the amount of waste disposed of off-site.

5.6.4 Careful consideration has been given to the identification of possible locations for the treatment and disposal of dredged material, which include vacant warehouse properties on site located within the Port of Boston and nearby sites within the Scheme area, with room for lagoons. The disposal of the excavated and dredged material (once deposited and dried within the Scheme area) to a licensed landfill site within Lincolnshire was assessed in the ES as the worst-case scenario.

5.6.5 Dredged and excavated material is proposed to be reused within the works as fill material (if this material is found to be suitable).

5.6.6 Debris is not anticipated as it is a requirement that all vehicles that are to carry 'loose' materials are covered to prevent spill on to the highway.

5.6.7 The submitted ES (**A/17/2D**) identifies two designated construction haul routes from the main site to identified landfills.

5.6.8 A CTMP would be used to monitor the impact of construction traffic over the entire construction period. The draft CTMP (**A/17/2D**) that has been produced for the TWAO application would be developed and finalised following the appointment of a contractor. The document states that HGV traffic associated with the removal of the excavated and dredged material off site will use the major highway links avoiding, where possible, the local road network and minor roads.

5.6.9 Overall, with the measures identified I consider that the transportation of dredged and excavated materials to landfill resulting from the construction of the Scheme will not give rise to debris being left throughout Boston, or along the proposed haul routes and that the use of specific haul roads will minimise any potential disturbance.

5.7 Planning conditions

5.7.1 The application for deemed planning consent (**A/10**) included a series of draft conditions. These conditions have been developed in discussion with Boston Borough Council as Local Planning Authority.

5.7.2 I have reviewed the draft planning conditions against the six tests referred to in the Planning Practice Guidance, Use of conditions (Section ID:21a): necessary, relevant to planning and to the development to be permitted, enforceable, precise, and reasonable in all other respects (**C/1/10**). Many of the planning conditions are pre-commencement conditions, as such they will give considerable powers of enforcement to the local planning authority. I consider that the proposed draft planning conditions are necessary and comply with the six tests referred to in the Planning Practice Guidance, Use of conditions (Section ID:21a). In particular, they will ensure that mitigation measures proposed in the ES are implemented fully.

5.7.3 Furthermore, the Planning Officer's report to Boston Borough Council's planning committee on the 13th September 2017 made the following recommendation:

The Committee is asked to lend its full support to the scheme as proposed and to make clear that it raises NO OBJECTIONS and seeks delegated authority to the Development Control Manager to amend and finalise the suggested list of conditions contained at the rear of this report.

5.7.4 In addition to the draft conditions submitted, two further conditions are proposed.

5.7.5 Firstly, related to the preparation of a Navigation Management Plan. Secondly, relating to the design and approval of the mitigation measures required for Frontier Ltd.

5.7.6 The proposed wording of the additional conditions are as follows for the Navigation Management Plan:

(a) "Navigational Management Plan" means a plan setting out the measures to be implemented during construction and operation of the Development to aid navigation.

(b) Prior to any works being undertaken within the river area, a Navigational Management Plan shall be submitted to and approved by the Local Planning Authority, after consultation with the Harbour Authority.

The Development must be carried out in accordance with the approved Navigational Management Plan, or any amendments to the approved Navigational Management Plan, as may be approved by the Local Planning Authority, after consultation with the Harbour Authority.

Reason: to aid navigation during construction and operation of the Development.

5.7.7 The proposed wording of the additional condition are as follows for the approval of detailed plans for the grain conveyer for Frontier Ltd.

(a) Works relating to the construction of the replacement grain conveyor and associated supports and equipment must not commence until details of theexternal appearance, including details of external materials, have been submitted to, and approved by, the Local Planning Authority. The Development must be carried out in accordance with the approved details or any amendments to those details as may be approved by the Local Planning Authority.

Reason: In the interests of visual amenity.

5.8 Extent to which the scheme would be consistent with local flood risk, environmental, economic and planning policies

5.8.1 Section 6 of the Statement of Case (**I/1**), Chapter 4 of the submitted ES (**A/17/1**) and the Planning Statement (**A/12**) all provide the planning and environmental policy context for the Scheme.

5.8.2 Specifically, the Planning Statement (**A/12**) sets out those planning policies relevant to the Scheme and assesses whether the Scheme accords with these policies.

5.8.3 The Planning Policy documents reviewed were:

(a) The National Planning Policy Framework (**NPPF**), 2012 (**C/1/1**);

(b) The East Inshore and Offshore Marine Plan, 2011 – 2036 (**C/1/2**);

(c) Consultation Draft South East Lincolnshire Local Plan, 2016 (**C/2/2**);

(d) Boston Interim Plan (Non-Statutory Development Control Policy), 2006 (**C/3/2**); and

(e) Adopted Boston Borough Local Plan, 1999 (**C/3/1**).

5.8.4 At the national level, the Scheme is in accordance with the NPPF and the East Inshore and Offshore Marine Plan.

5.8.5 The Planning Statement establishes that the Scheme does not give rise to any material harm with regard to issues such as economic growth, landscape and visual impacts, climate change and flooding, environmentally valuable land, biodiversity (aquatic and terrestrial), port development, tourism and leisure, and the historic environment.

5.8.6 The principal need for the Scheme is supported by local policy, both existing and emerging.

5.8.7 Support for the nature of the Scheme is seen within the Adopted Boston Borough Local Plan (Saved Policies) 1999 (**C/3/2**) and is specifically referenced within the emerging South East Lincolnshire Local Plan (2011-2036) (**C/2/2**).

6 Objections and Representations

6.1 Introduction

6.1.1 A number of objections and representations have been made to the TWAO application in respect of the Scheme. In this section I address the comments raised in relation to the environment and the scope of my evidence.

6.1.2 Responses raised by Objectors and in Representations not considered below are included in the proofs of other expert witnesses.

Dredged Materials being disposed on land

6.1.3 The issue of dredged materials being disposed on land has been raised by OBJ/8 – Capt. BDC Franklin. In Section 5.6 of this Proof of Evidence a detailed explanation is provided as to the measures the Environment Agency will take to prevent disruption and debris in Boston.

6.1.4 I consider that the transportation of dredged and excavated materials to landfill resulting from the construction of the Scheme will not give rise to debris being left throughout Boston, or along the proposed haul routes and that the use of specific haul roads will minimise any potential disturbance.

Detailed Design of Works

6.1.5 **OBJ/5** – Frontier Agriculture Ltd, have raised concerns over the precise detail in the application surrounding work no.8 (replacement of and extension to the existing grain conveyor and ship loading facility) being the proposed mitigation to Frontier Agriculture Ltd.

6.1.6 Orders under the Transport and Works Act 1992 (**B/**1) are routinely employed to allow the construction, operation and maintenance of major new infrastructure works, like the Boston Barrier Scheme, to be authorised by statute and for the associated grant of deemed planning permission. It is not unusual for the detailed design of elements of the proposed development not be set out within the Order or associated documents. It is one of the main reasons why these types of Order are utilised as they offer a degree of flexibility in final design and siting arrangements through the operation of limits of deviation.

6.1.7 The Environment Agency in discussions with Frontier Agriculture Ltd has agreed to the inclusion of a new planning condition which would require it to secure the approval of the local planning authority in relation to the detailed design of the replacement conveyor facilities comprised within Work No. 8.

6.1.8 To date the Environment Agency has been working with Frontier to develop the design of Work No. 8, and will continue to do so.

Location and Design of the Barrier

6.1.9 A number of concerns regarding the location and design of the Scheme were raised by various objectors, including, **OBJ/2 –** Mr Matthews**, OBJ/10 –** Mr H Smith**, OBJ/07 –** Cllr. David Brown (Wyberton Ward), **OBJ/08** Capt. BDC Franklin, **OBJ/22 –** Boston and District Fisherman's Association**,** and **OBJ/21 -** Mr H Smith**.**

6.1.10 Section 4.4 of this Proof of Evidence, provides a detailed explanation as to the development of the preferred option and location of the Scheme.

6.1.11 I have critically reviewed the environmental considerations that were used to inform the selection of the location of the Scheme and in my opinion the preferred location of the Scheme is most suitable, when put into the context of needing to balance the positive and negative aspects of multiple environmental and social factors in coming to a recommendation.

6.1.12 I am also of the opinion that there is no other barrier / barrage type alternative which would have less environmental impact than the proposed Scheme and is most likely to allow a future water management scheme to be implemented at a later stage with the least environmental harm.

Comments on Environmental Statement by IWA

6.1.13 In their objection, OBJ/9 – IWA raise several matters and make several comments. However, I will focus my response specifically on those comments relating to ‘other relevant parts of the ES as they are applicable to my Proof of Evidence.

6.1.14 The IWA states that '*the main ES report concludes that all significant permeant effects are mitigated. In IWA's view…this is wishful thinking. Without any details on many issues, a worst case approach is needed which clearly confirms significant and adverse effects in many areas and on my issues*'. The ES provides a summary of significant environmental effects. The technical reports which support the ES identifies both potential significant and non-significant navigational effects (i.e. all effects) associated with the Scheme, based on a worst-case. Mitigation measures are proposed and where the level of detail is not currently developed sufficiently pre-commencement planning conditions will ensure the delivery of the mitigation described and committed to by the Environment Agency. This approach aligns well with the requirements of the EIA Directive and TWA 'The Rules'.

6.1.15 I set out here as fact the following clarifications and corrections identified by the IWA, none of which in my opinion alter the overall assessment as reported in the ES.

(a) '…*sets out magnitude of criteria. 'Geographic area' seems a poor criterion to suggest…*' The geographical or spatial extent of an impact is an important aspect in determining the magnitude of an impact and is accepted EIA methodology. This is just one aspect that is considered when determining the magnitude of impact and impacts with a small spatial extent can have a higher magnitude of impact.

(b) '*The standard EA assessment of 'significance*' *in Table 3.2 (of the Navigation Impact Assessment) seems a convenient way of reducing issues that need addressing*'. The approach used is accepted methodology for determining significance of effect. This allows those impacts which are considered to have a higher significance to be appropriately assessed resulting in a proportionate EIA process.

(c) '*… it is not correct to say that being present half the year should reduce the sensitivity ...*'. The sensitivity has been reduced during the winter time to take account of the change in usage of the Haven as was requested within the MMO letter dated 22.5.2015. It is noted that the magnitude of change should have been amended to reflect the change in impact rather than the sensitivity. However, the conclusion of the assessment is still correct as a high value receptor with a minor negative magnitude of change will result in a minor/moderate adverse significance of effect.

(d) '*… falling objects …should be a moderate negative impact*'. This impact is considered unlikely to occur as safety measures will be in place and as such is in line with the criteria for determine the magnitude of impact.

(e) '*Traffic increase and increased collision …should be moderate negative with a significant outcome…*' It is anticipated that the barge movements would be for a short duration and as such is in line with the criteria for determine the magnitude of impact.

(f) '*…localised flow velocities… should be moderate adverse*' and '*…localised accretion…should be moderate adverse.*' This is correct, the significance should be moderate adverse. This does not change the assessment as the

impacts are still considered to be a significant effect and have been considered as such in terms of required mitigation.

(g) '*Gate closed-flood event…should be moderate adverse and significant…*' The sensitivity of the receptor is incorrectly reported as very high whereas it should have read high resulting in the Moderate Adverse/Minor Adverse significance rating, which is not considered significant.

(h) '*…Why is there not an impact on receptor's recreation…*'. Recreational effects are considered under safety or operational related impacts. These two impacts would directly affect recreational activities and their time.

(i) '*…a suggested error… POB dredging licence …states 33,000 wet tonnes but ES states 66,000 tonnes of which around 28,000 is used annually.*' For correction and clarity Port of Boston dredging licence (Licence no.: L/2015/00382/1) provides for the following quantities to be disposed of:

- Dry tonnes – 19,980 of silt and 2,667 of sand; and
- Wet tonnes – 33,300 of silt and 3,334 of sand.

6.1.16 Other matters raised by IWA are considered and addressed in the Proofs of Evidence provided by other expert witnesses.

Water Level Management

6.1.17 A number of concerns were raised with regards to water level management including its role in regeneration of the Boston (**OBJ/21 – Mr H Smith**) and impact on heritage assets (**REP/06 – Historic England**).

6.1.18 Section 4.5 of this Proof of Evidence, provides a detailed explanation as to the environmental effects of implementing WLM after the construction on the Scheme. In my opinion, there are a number of potential significant environment effects that are likely to arise through the future introduction of WLM. However, WLM is a complex scheme and a complete picture of the environmental effects associated with WLM cannot be fully understood until detailed assessments are undertaken and mitigation developed.

6.1.19 Additional information on the above matters have been addressed in the Proof of Evidence provided by Mr Anderson (**EA/1/1**) who covers scheme need, development and benefits, and Ms Timothy (**EA/4/1**) who addresses the cultural heritage technical topic.

7 Response to Statement of Matters

7.1.1 Statement of Matters 2 (main alternative options) is covered in Section 4 of this Proof of Evidence and in ES Volume 1: Main Report (**A/17**/1), Section 2, paragraph 2.5.5 to 2.5.16).

7.1.2 Statement of Matters 3 (anticipated flood risk, environmental and socio-economic benefits of the scheme) is covered in Section 5.2 of this Proof of Evidence and in ES Volume 1: Main Report (**A/17/1**), Section 6 to 16.

7.1.3 Statement of Matters 4 (extent to which the scheme would be consistent with local flood risk, environmental, economic and planning policies) is covered in Section 5.8 of this Proof of Evidence and in the Planning Statement (**A12**), Section 5 and in ES Volume 1: Main Report (**A/17/1**), Section 4.

7.1.4 Statement of Matters 5c (dismissal of a proposed 'sea lock' element of the scheme on environmental grounds) is covered in Section 4.6 of this Proof of Evidence and in Mr Anderson's (**EA/1/1**) Proof of Evidence.

7.1.5 Statement of Matters 5d (omission of the 'water level management' scheme from the Scheme) is covered in paragraphs Section 4 of this Proof of Evidence and in Mr Anderson's (**EA/1/1**) Proof of Evidence.

7.1.6 Statement of Matters 6 (environmental impacts of constructing and operating the Scheme) is covered in Section 5.3 of this Proof of Evidence and in ES Volume 1: Main Report (**A/17/1**), Section 6 to 16.

7.1.7 Statement of Matters 7 (the compatibility of the Scheme with future climate change scenarios) is covered in paragraphs 5.3.50 to 5.3.53 of this Proof of Evidence and in Ms Evans' Proof of Evidence (**EA/2/1**).

7.1.8 Statement of Matters 8 (the adequacy of the ES submitted with the TWA Order) is covered in Section 5.1 of this Proof of Evidence and in ES Volume 1: Main Report (**A/17/1),** Section 3.

7.1.9 Statement of Matters 9 (the measures proposed by the Promotor for mitigating adverse impacts of the Scheme) is covered in Section 5.4 and 5.5 of this Proof of Evidence and in ES Volume 1: Main Report (**A/17/1**), Section 6 to 16.

7.1.10 Statement of Matters 10 (the proposed Planning Conditions attached to the Scheme, if given, and whether those Conditions satisfy the six test referred to in Planning Practice Guidance, Use of Conditions) is covered in Section 5.7 of this Proof of Evidence.

8 Conclusions

8.1 In my evidence I have addressed the identified items in the Statement of Matters including the main alternative options to the Scheme considered by the Environment Agency.

8.2 These environmental topic items have been assessed as part of the EIA process for the Scheme and I have indicated where the information can be found in the main body of the Proof of Evidence and in the ES.

8.3 I have addressed the Statement of Matters, objections and representations, which relate to my area of expertise and the scope of my evidence.

8.4 I have expressed my view, and demonstrated, that the ES submitted with the Order application has been prepared in accordance with, and in regard to, the requirements of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006. I have provided evidence to demonstrate that the ES has been prepared in line with the statutory procedural requirements.

8.5 Overall I conclude that there are no reasons, in terms of environmental impact, why the Secretary of State should not authorise the Order.

9 Statement of Truth

9.1 I hereby declare as follows:

9.2 Insofar as the facts stated in this Proof of Evidence are within my own knowledge I believe them to be true, and that the opinions I have expressed represent my true and complete professional opinion.

9.3 This Proof of Evidence includes all facts which I regard as being relevant to the opinions which I have expressed and that I have drawn the inquiry's attention to any matter which would affect the validity of those opinions.

9.4 I understand that my duty to the Inquiry is to help it with matters within my expertise and I have complied with that duty.

9.5 The Institution of Environmental Sciences requires all members to abide by its Code of Conduct. I confirm I have prepared my evidence in accordance with the Code of Conduct of my professional institution and I confirm that the opinions expressed are my true and professional opinions.