




**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR TRANSPORT'S  
'MINDED TO APPROVE' LETTER IN RESPECT OF COMPENSATORY MEASURES**

**OCTOBER 2013**

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**APPROVAL & REVISION REGISTER**

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**CONTENTS**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>5</b>
1.1	Purpose of the Report.....	5
<b>2</b>	<b>OVERVIEW OF THE RISKS IDENTIFIED BY NE.....</b>	<b>6</b>
2.1	The Risks .....	6
<b>3</b>	<b>FURTHER CONSULTATION UNDERTAKEN BY THE APPLICANT WITH NE .....</b>	<b>9</b>
3.1	Correspondence.....	9
<b>4</b>	<b>A BRIEF REVIEW OF PRECEDENT .....</b>	<b>10</b>
4.1	UK Port Projects Impacting on Feeding SPA Birds .....	10
4.2	The Relevance of Precedent .....	10
4.3	Immingham Outer Harbour (IOH) .....	11
4.4	Bathside Bay Container Terminal (BBCT) .....	12
4.5	Addressing Uncertainty.....	17
4.6	Summary .....	19
<b>5</b>	<b>APPLICANT'S RESPONSE TO NE'S EIGHT KEY POINTS OF 9-11-12 .....</b>	<b>21</b>
5.1	Issue 1 – Quantum of Mudflat .....	21
5.2	Issue 2 – Time Lag .....	26
5.3	Issue 3 – The value of the further overcompensation at East Halton.....	38
5.4	Issue 4 – The Depth of the Compensatory Mudflat.....	38
5.5	Issue 5 – Baseline Invertebrate Data .....	40
5.6	Issue 6 – RTE Management Measures .....	44
5.7	Issue 7 – Development of The MR Site .....	45
5.8	Issue 8 – The Design of CCS Wet Grassland .....	46
<b>6</b>	<b>APPLICANT'S RESPONSE TO PARAGRAPHS 6 AND 7 OF NE'S 16-11-12.....</b>	<b>48</b>
6.1	Paragraph 6 – Inconsistencies Identified by RSPB .....	48
6.2	Paragraph 7 – Miscellaneous Issues .....	48
<b>7</b>	<b>A NOVEL DESIGN? .....</b>	<b>56</b>
7.1	Natural England's Concern.....	56
7.2	EU Guidance On Article 6(4) Of The Habitats Directive .....	57
7.3	EU Guidance on ' <i>The Implementation of the Birds and Habitats Directive in Estuaries and Coastal Zones</i> ' .....	58
7.4	DEFRA'S 2012 Guidance.....	59
<b>8</b>	<b>CASE STUDIES OF REGULATED TIDAL EXCHANGE .....</b>	<b>60</b>
8.1	General.....	60
8.2	Case Studies .....	61
	Teesmouth National Nature Reserve, 1993 (9 ha).....	61
	Lippenbroek, Belgium, (c. 10 ha).....	62
<b>9</b>	<b>CONTINGENCY.....</b>	<b>65</b>
9.1	DEFRA Guidance.....	65
9.2	Natural England's Advice .....	65
9.3	Contingency 1: The Compensation Ratio .....	66
9.4	Contingency 2: The EMMP's .....	66
9.5	Contingency 3: The Wet Roost.....	67
9.6	Contingency 4: The Wet Grassland at Cheery Cobb Sands .....	67
9.7	Contingency 5: The Wet Grassland at East Halton.....	68



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S '*MINDED TO APPROVE*' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

9.8	Summary .....	68
<b>10</b>	<b>RESPONSE TO PARAGRAPH 6 OF THE '<i>MINDED TO APPROVE</i>' LETTER.....</b>	<b>69</b>
10.1	General .....	69
10.2	Paragraph 6(1)(a).....	69
10.3	Paragraph 6(1)(b).....	69
<b>11</b>	<b>LIST OF ACCOMPANYING DOCUMENTS .....</b>	<b>71</b>

**APPENDICES**

**APPENDIX 3.1** Correspondence between ABLE and Natural England, 28 August onwards

**APPENDIX 4.1** Legal Agreement in respect of Immingham Outer Harbour

**APPENDIX 4.2** Draft Legal Agreement in respect of Bathside Bay, and Draft European Sites Compensation, Mitigation and Monitoring Agreement

**APPENDIX 5.1** Analysis of mudflat area and exposure at the RTE fields and at the AMEP site

**APPENDIX 5.2** Revised Development Programme and Explanatory Note



**ABLE MARINE ENERGY PARK  
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TRANSPORT'S 'MINDED TO APPROVE' LETTER  
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**1 INTRODUCTION**

**1.1 Purpose of the Report**

1.1.1 On 12 January 2012 the Infrastructure Planning Commission accepted an application made by Able Humber Ports Limited (AHPL) to construct a Marine Energy Park at Killingholme in North Lincolnshire. The Examination of the application was completed on 24 November 2012 and the Panel's report (PR) was submitted to the Secretary of State for Transport (SoS) on 24 February 2013.

1.1.2 On 28 August the Department for Transport (DfT) advised AHPL that whilst the SoS was ' *minded to approve* ' the application, two matters prevented him from doing so at that time. One of the two reasons given was the limited level of confidence he understood that Natural England had expressed during the Examination with regard to the Applicant's proposals for compensatory measures. Specifically, at paragraph 6 of DfT's letter, the author states:

6. For the reasons explained at paragraphs 17 to 23 and 40 in this letter, the Secretary of State considers that he is not yet in a position to decide whether to accept the Panel's recommendation. He is, nevertheless, minded to agree with the Panel that he should make an Order granting development consent for the project, subject to receiving satisfactory evidence of the following:

(1) in relation to the "*substantial risk*" identified by Natural England that the ecological compensation measures will not work, confirmation from the applicant that:

(a) reasonable additional measures can be implemented to reduce that risk, or

(b) developments since the Panel examination have increased Natural England's confidence in the effectiveness of the compensation proposals such that they no longer consider the risk to be "*substantial*"; and

1.1.3 It is clear that the Panel had regard to NE's views on the residual risk that the compensation measures might not work when making their decision; the Panel's Report (PR) makes specific reference to those concerns at paragraph 10.173. However, they balanced that statement against the inherent risk associated with all compensatory measures, noting at paragraph 10.174 *ibid.*

'10.174 NE observes that there must always be a risk associated *with any project* that the compensatory measures will fail, and especially with a scheme that has not been used before in the UK. This truism is recognised in European case-law –

*'The preservation of existing natural resources is preferable to compensatory measures simply because the success of such measures can rarely be predicted with certainty'* [ECJ, Case C-239/04, para 35]'

1.1.4 The purpose of this report, and the accompanying documents, is to provide additional information, not considered at the time of NE's reported risk assessment and to enable consultation on that additional information. Further than this, its purpose is to raise awareness of other material to which regard should be made in determining the residual ecological risks of the project.

## **2 OVERVIEW OF THE RISKS IDENTIFIED BY NE**

### **2.1 The Risks**

2.1.1 The source of the SoS's understanding that NE has identified a '*substantial risk*' that the compensation measures may not work is stated in paragraph 23 of DfT's letter to be, '*submissions put to the Panel*'. In this regard, it is noted that the PR records at paragraph 10.173:

*'10.173 The Panel particularly sought the views of NE as scientific advisor to the government for these matters. NE takes a more nuanced view, stating that –*

*'It is right to acknowledge that much work has been put into developing (albeit at a very late stage) interesting and apparently workable plans for mudflat habitat at Cherry Cobb Sands. The proposal is however novel, and the environment is challenging. It is possible that that the compensatory measures will succeed, however there is a substantial risk they will not.'*  
[HEA 086, para 8]'

2.1.2 At paragraph 19 of the DfT's letter, the author further refers to the fact that NE's '*acceptance of the legal agreement* (the Deed in Relation to the Able Marine Energy Park dated 29 April 2013) *was without prejudice to its advice on the uncertainties and risks over the effectiveness of the compensation proposals explained in the evidence to the Panel*'. This latter observation is taken from NE's letter to the DfT dated 1 May 2013 which records:

*'(w)e are satisfied that the (legal agreement) provides .. a robust legal mechanism for the delivery of the Measures described within it. It is important to make clear that Natural England's acceptance of the legal agreement and accompanying EMMPs is without prejudice to Natural England's advice on the uncertainties and risks over the effectiveness of the proposals themselves. **These concerns are set out in detail in our 9 November submission and in paras 6 to 8 of Natural England's 16 November submission** and are matters which the Secretary of State will need to take into account in deciding whether to grant the order for the development consent', (emphasis added).*

2.1.3 NE's correspondence dated 9 November 2012 includes a document titled '*Outline of Natural England's position and Key Points of Concern*', which provides substantive information regarding your concerns at that particular time. Specifically, on the first and second page of that document, they list eight '*key points*', which for completeness are reproduced below.

*' For the purposes of this summary, Natural England's key points are:*

- The combined managed realignment and regulated tidal exchange (RTE) proposal provides the minimum amount of compensatory mudflat - 88.1ha of mudflat, decreasing to a minimum of 45.2ha. Limited adjustments will be possible at the detailed design stage. This leaves very little scope for underperformance of the mudflat habitat. **(Issue 1)***
- There is a significant time lag in the provision of functional compensatory habitat: the mudflat will not be functional for up to 7 years after habitat loss (by the end of 2019); the compensatory wet*

*grassland will not be functional until 3-4 years after habitat loss (by 2015/6). It is highly unlikely that this will be able to provide sufficient habitat for the number of birds displaced from Killingholme Marshes. (Issue 2)*

- *The risk posed by the time lag cannot simply be overcome by additional compensatory provision. Natural England has doubts over the further area of habitat proposed at East Halton Marshes (see EX28.3 pt 8). It is provisionally suggested that the land be managed as pasture/grassland, although little detail is provided. It is therefore not clear how it will compensate for the species affected by the proposal rather than provide terrestrial habitat for species such as golden plover and lapwing. It also forms part of the land for the Able Logistics Park (ALP) development, so as Natural England understands it, would not be available in any event. This needs explaining. (Issue 3)*
- *Clarity is required on the sources of and robustness of the quality features for mudflat set out, for example, at para.1.13.2 of EX28.3 Pt 2, in particular, why a minimum depth of 100mm is suitable, contrary to the advice of the RSPB. (Issue 4)*
- *The invertebrate data relied upon to assess the quality of the new mudflat should reflect surveys carried out at Killingholme Marshes foreshore; the Applicant's consultant has acknowledged that there appears to be some errors in the interpretation of the survey data for benthic invertebrates. If this cannot be resolved, Natural England advises that new baseline data will need to be collected at the correct time of year. (Issue 5)*
- *The RTE proposal is heavily engineered and relies greatly on operational management in order for the objectives to be met. Some quite major interventions are proposed, such as maintenance dredging. There needs to be more information on monitoring and the thresholds that will be applied before such management measures are engaged (see Royal Haskoning review). (Issue 6)*
- *Information and further clarity is required as to how the adjacent managed realignment site will develop and the extent to which that will affect the intake, discharge and conveyance of water to and around the RTE site (see Royal Haskoning review). (Issue 7)*
- *With regards to the area of wet grassland proposed at Cherry Cobb Sands, Natural England notes that there are a number of gaps, as follows:*
  - *No survey of underground utilities has been carried out.*
  - *There has not been detailed modelling based on topographical and hydrological data to confirm the functionality of the site, the statements regarding water volumes appear to be based on a number of assumptions*
  - *There is no explanation of the timescale for creating the open water area for the wet roost, or as to how that will be achieved*
  - *The appropriate timescale for the establishment of sufficient invertebrate biomass is at least 3-4 years, not 2-4 years (as*



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

*confirmed by the Applicant's consultant in personal communication with Richard Saunders) (Issue 8)'.*


*Plainly it is never possible to say that compensation will definitely work. There is always a level of risk and a possibility of failure. To some extent this can be addressed by monitoring and management. However, even taking into account the possibility of adaptive management, at present it is clear that the level of risk in this case is substantial,' (issue references added).*

- 2.1.4 The Applicant understands that the '16 November submission' referred to in NE's letter dated 1 May 2013, to be their 'Written Summary of Oral Representations' which records their position subsequent to the Specific Issue Hearing in relation to the compensation measures held on 12 and 13 November 2012. Paragraphs 6 to 8 of that NE document provide contemporaneous comments on the effectiveness of the RTE/MR site at Cherry Cobb Sands. Paragraph 8 contains another reference to 'substantial risk' and, again for completeness, is reproduced below.

*'It is right to acknowledge that much work has been put into developing (albeit at a very late stage) interesting and **apparently workable plans for mudflat habitat** at Cherry Cobb Sands. The **proposal is however novel**, and the environment in which it is located is challenging. It is possible that the compensatory measures will succeed, however there is a **substantial risk** that they will not. It is acknowledged that there will always be doubts in relation to compensation proposals, however the doubts in this case are amplified by a combination of the points noted above: time lag, limited extent, questionable quality and uncertain implementation', (emphasis added).*

- 2.1.5 The remainder of NE's '16 November submission' elaborated on the following key points: benthic invertebrates; changes to Intertidal habitat at NKM foreshore; operation and management of the RTE; the wet grassland and roost; potential impacts on the foreshore in front of the RTE; overcompensation; time lag; the EMMP's and the conclusion of a legal agreement. However, the reference to 'substantial risk' within paragraphs 6-8, which they pointedly identified in their 1 May 2013 letter, was clearly limited to the certainty in relation to creating sustainable mudflat habitat.



	<p style="text-align: center;"><b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR TRANSPORT'S</b> <b>'MINDED TO APPROVE' LETTER IN RESPECT OF</b> <b>COMPENSATORY MEASURES</b></p>	<p style="text-align: center;"><b>OCT 2013</b></p>
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**3            FURTHER CONSULTATION UNDERTAKEN BY THE APPLICANT WITH NE**

**3.1            Correspondence**

3.1.1        Letters exchanged between the Applicant and NE from 28 August 2013 onwards are included in Annex 3.1.

3.1.2        In addition to those letters included in Annex 3.1, the Applicant also issued various draft reports to NE and the final versions of those reports are either incorporated into this document or issued separately. A list of the associated documents to be read in conjunction with this report is provided in Section 11.

#### **4 A BRIEF REVIEW OF PRECEDENT**

##### **4.1 UK Port Projects Impacting on Feeding SPA Birds**

4.1.1 It is apparent from consultation that the significant impact of AMEP that concerns NE is the potential effect on feeding birds using the North Killingholme Marsh foreshore. Two Port projects have been consented in the last eight years that are similar to AMEP with respect to their ecological impacts on feeding SPA birds. These are:

- Immingham Outer Harbour, Port of Immingham, granted in 2004 and impacting on feeding birds using the Humber Estuary Special Protection Area (SPA).
- Bathside Bay Container Terminal, Harwich, originally granted 2006, not yet constructed. Expiry date extended in 2013 until 2021, impacting on feeding birds using the Stour and Orwell Estuaries SPA.

Both projects were assessed to have an adverse effect on feeding birds that were interest features of the two project's respective SPAs, and both consents permitted time lags between the damage occurring to the protected habitat and the creation of compensatory habitat.

##### **4.2 The Relevance of Precedent**

4.2.1 Ecological decision-making frequently needs to have regard to the Precautionary Principle, due the lack of certainty involved. In such circumstances the level of precaution should be proportionate to the level of risk, its duration and whether or not any potential consequences are reversible. Decisions incorporating the Precautionary Principle should also be consistent and demonstrably even-handed. This general approach is made clear in current Government guidance on the application of the Precautionary Principle, *'The Precautionary Principle: Policy and Application'*<sup>1</sup> (ILGRA, 2002). In particular the following text from the guidance is noted below:-

*'(precautionary) measures must observe the principle of proportionality, taking account of short-term and long-term risks; must not be applied in a way resulting in arbitrary or unwarranted discrimination; and should be consistent with measures already adopted in similar circumstances or following similar approaches'*, (underline added, page 15 of the guidance).

4.2.2 In addressing the potential impact on SPA birds, a precautionary approach has been adopted by the Applicant. The basis of the approach is that the SPA is considered to be at 'carrying capacity', so that any birds that are displaced by the project are assumed to have no comparable habitat to sustain them, or, in the alternative, they can be absorbed into another area of the SPA but sequential displacement of birds occurs until ultimately the least competitive birds are displaced. In effect it is a worst-case scenario, and the same approach has no doubt been used in both schemes identified in paragraph

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<sup>1</sup> <http://www.hse.gov.uk/aboutus/meetings/committees/ilgra/pppa.pdf>

<sup>(2)</sup> Bird species for which a Likely Significant Effect was agreed as reported in the Statement of Common Ground for the Shadow Habitats Regulations Assessment of AMEP (24 August 2012)

### **4.3 Immingham Outer Harbour (IOH)**

4.3.1 IOH became operational in July 2006, but the compensation sites (comprising a managed realignment site at Welwick, downstream on the north bank of the Humber and at Chowder Ness, upstream on the south bank) were only breached (rather than being functionally 'effective') around 10 months later. The legal Agreement between English Nature and others (including the Royal Society for the Protection of Birds (RSPB), two Wildlife Trusts, and Associated British Ports (ABP)), dated 30<sup>th</sup> June 2003, clearly identifies the following impacts at Schedule 1 of the Agreement which required compensation:-

***'Immingham Outer Harbour...***

*'Function lost: mudflat used by **feeding** water birds in the middle estuary',*  
and,

*'Total number affected: 603 peak mean'....*

***Quay 2005***

*'Function lost: mudflat used by **feeding** water birds in the middle estuary',*  
and,

*'Total number affected:           Peak in Feb 96 = 334*

*Peak in Jan 02 = 97*

*Mean of two peaks = 215*

Further, at Paragraph 2.5 of the Agreement, Objective (a) of the compensation measures is stated to be:-

***'the creation of intertidal habitats with the ability to provide **feeding habitat** for in excess of 800 (peak mean over five years) **feeding waterbirds**, (emphasis added).***

4.3.2 Schedule 2 of the Agreement, further identifies a particular risk of the Welwick Managed Realignment Scheme to be that it was, **'a new design never tried before'**. The same risk is identified in Schedule 3 for the Chowder Ness Managed Realignment Site, which is also providing compensatory habitat for IOH. Moreover, it is clearly implied that it might take longer than 10 years for the site to become fully effective; at least that is the implication from paragraph 6.1 of the Agreement which required the relevant Monitoring Plan to be reviewed 5 and 10 years after physical completion of the compensation scheme. The resulting risk and uncertainty was resolved by providing compensation in the overall ratio of 2:1, but that included habitat such as grassland that was other than 'like for like'. Analysis of the Agreement shows whilst the sites were '*designed*' to include 31 ha of mudflat (paragraph 2.4(a)), it was understood by all the signatories that the ratio of mudflat compensation for IOH could potentially degrade to 0.43:1 (Creation (7 ha at Welwick + 4.5 ha at Chowder Ness): Loss (27 ha)), as evidenced in Schedules 2 and 3.

4.3.3 Furthermore, there was no requirement in the Agreement for the compensatory habitat to be functional at the time the habitat loss occurred. In HST v Secretary of State for Transport and ABP [2005] EWHC 1289 (Admin), HST (Humber Sea Terminal, now C.Ro Ports (Killingholme) Ltd)

4.3.3 Furthermore, there was no requirement in the Agreement for the compensatory habitat to be functional at the time the habitat loss occurred. In *HST v Secretary of State for Transport and ABP [2005] EWHC 1289 (Admin)*, HST (Humber Sea Terminal, now C.Ro Ports (Killingholme) Ltd) sought to argue that the granting of a Harbour Revision Order for IOH had been unlawful because, *'it was critical that the replacement habitat be available before, or at the latest at the same time as, the destruction of the existing habitat (but) there was no trigger to start the compensatory works in the agreement, something usually achieved by a prohibition on development until the compensation measures were in place'*. In rejecting this argument, Ousely J observed that the argument failed *'because of the advice which (The Secretary of State) had received from English Nature as to the satisfactory nature of the compensation measures. The (compensation) land had been increased to its present size (as set out in the legal Agreement) to take account of the risks and possible time lags between work starting and the replacement reaching its full potential'*.

4.3.4 A copy of the legal Agreement is included in Annex 4.1.

#### **4.4 Bathside Bay Container Terminal (BBCT)**

4.4.1 Hutchison Ports (UK) Ltd (HPUK) was granted planning consent on 29 March 2006 for BBCT, following a Public Inquiry. Condition 1 of the Bathside Bay permission required that the development be *"...commenced before the expiration of 10 years from the date of the permission"* (i.e. by 29 March 2016). In February 2010 HPUK made a new application to Tendring District Council for a replacement permission subject to a new time limit to expire in 2021. The Government confirmed in November 2011 that it would not call-in the application. The new application was approved at a meeting of the Council's Planning Committee held on 29 January 2013 and a Decision Notice was subsequently issued on 14 February (Tendring Council reference 10/00202/FUL). In accordance with Condition 1 of the new permission, the scheme must now be commenced before 29 March 2021.

4.4.2 We have carefully reviewed the original environmental impact assessment for Bathside Bay as recorded in the Environmental Statement for that project. We have also considered in detail: the legal Agreement and the draft *'Compensation, Mitigation and Monitoring Agreement'* for the delivery of the compensation measures (both as provided to us by Natural England on 3<sup>rd</sup> October 2012 in what is described as their *"near final form"*); correspondence originating from English Nature at the material time and finally the Planning Inspectorate's Report to the Secretary of State. For ease of reference, we provide (necessarily brief) abstracts from these documents below.

##### The Environmental Statement

- a) Chapter 4, Section 4.5.10 (*'Analysis of roosting wildfowl population'*), paragraph 4.5.10.4:-

4. Table 4.10 shows that, based on the 5 year mean peak over the winters of 1995/96 to 1999/00, Bathside Bay supported 3.1% of the estuarine wildfowl population during the high water period. As the counts are undertaken during the period approaching, and just after, the time of high water, these birds are likely to be roosting on areas of saltmarsh around the fringes of the Bay, in areas of scrub vegetation on previously reclaimed areas around the perimeter of the Bay and on a sand and gravel spit at the eastern end of the Bay. During site visits to the Bay, shelduck have been observed to be roosting on the water surface over the high tide period.

b) Chapter 4, Section 4.5.10 ('Waterfowl usage of Bathside Bay at low water'), paragraphs 4.5.10.11 – 12:-

11. Table 4.13, therefore, shows that Bathside Bay is a valuable habitat (based on its area) for a number of birds species, including mute swan, dark-bellied Brent goose, shelduck, mallard, ringed plover, knot, dunlin, sanderling, bar-tailed godwit and redshank. This could be due to many factors, such as:

- The presence of a favoured prey item of these species in greater abundance than elsewhere in the system (possibly linked to sediment type);
- The location of the Bay at the mouth of the estuary;
- The proximity of roost sites at high water.

12. In reality, a combination of the above is likely to be the case.

c) Chapter 4, Section 4.5, paragraph 4.5.11.2:-

2. The Bathside Bay count sector occupies 2.8% of the total counted area of the estuarine system. Therefore, the fact that the Bay supported between 2.2% and 2.4% of the estuarine waterfowl population in the winters of 1999/2000 and 2000/2001 means that Bathside Bay is of comparable importance overall in terms of total feeding waterfowl population (all species) it supports in relation to the remainder of the estuarine system. This supports the conclusions drawn from the analysis of peak waterfowl populations and peak waterfowl density within the Bay in comparison with other sectors in the Stour and Orwell estuaries.

d) Chapter 10, Table 10.1:-

**Table 10.1 Summary of potential impacts (after mitigation) of the Bathside Bay development on favourable condition targets for the Stour and Orwell Estuaries SPA (listed in Tables 4.4 and 4.5)**

PARAMETER	CONSTRUCTION PHASE		OPERATIONAL PHASE	
	IMPACT	Affected objective	IMPACT	Affected objective
Benthic invertebrates (intertidal)	MAJOR ADVERSE	4, 9	NO IMPACT	-
Benthic invertebrates (subtidal)	MODERATE ADVERSE	4,9	MINOR ADVERSE	-
Feeding waterfowl	MAJOR ADVERSE	2, 6, 7, 8, 9, 10, 11, 12	NEGLIGIBLE	-
Roosting waterfowl	MODERATE ADVERSE	2, 5, 6, 7, 8, 11	NEGLIGIBLE	-
Saltmarsh	MODERATE ADVERSE	3, 4, 5, 6, 8, 9, 11, 12	NEGLIGIBLE	-
Grazing marsh	NO IMPACT	-	NO IMPACT	-
Grassland	NO IMPACT	-	NO IMPACT	-

e) Chapter 10, Section 10.5, paragraph 3, as reproduced below:-

3. It is concluded, based on the information provided in Tables 10.2 and 10.3, and given the nature and scale of the tidal works, that the proposed development will have an adverse effect on the integrity of the Stour and Orwell Estuaries SPA due to:

- The loss of intertidal area (and hence feeding habitat for waterfowl) that contributes to the designated status of the SPA;
- The loss of roosting area (saltmarsh and raised sand and gravel areas) that support waterfowl during the high water period; and,
- Through the above two points, the potential for the proposed development to increase pressure for resources (food, space, etc.) within the remainder of the system.

Draft Legal Agreement: Schedule 1, Part 2

1.2 *HIPL shall use reasonable endeavours to ensure that the Compensation Scheme is implemented so that subject to Force Majeure if the Marine Works are commenced:*

1.2.1 *in the period from July to September in any calendar year the Breach shall occur not more than 27 months later;*

*and,*

3.2 *The targets against which the success of the Compensation Scheme will be assessed in any review following a report in accordance with Schedule 3 hereof are that the Managed Realignment Site should be capable of supporting the following assemblage of water birds:*



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

- 3.2.1 *An assemblage of roosting water birds comprising, on a 5-year mean peak basis at least 2,240 wildfowl and waders including in particular oystercatcher, ringed plover, knot, dunlin, dark bellied Brent goose, turnstone and shelduck in similar proportions to those supported by Bathside Bay during the winters of 1995/96 to 1999/00; and*
- 3.2.2 *An assemblage of feeding water birds, comprising on a 5-year mean peak basis at least 1560 wildfowl and waders including in particular ringed plover, dark-bellied Brent goose, shelduck, knot and mallard in similar proportions to those supported by Bathside Bay during the winters of 2000/1 to 2003/04. (Underline added).*

Compensation, Mitigation and Monitoring Agreement'

- f) Section 3.3.2

*'It is, however, recognised that it may take a longer period of time (possibly to between 5 and 10 years) for the invertebrate community structure to fully develop to one comparable of a typical healthy mudflat which would be expected to support larger-bodied, longer-lived species'*

English Nature Correspondence to the Department for Transport, Local Government and the Regions

- g) 25 January 2002, pg 4:-

**3.4 Benthic Invertebrate Communities:** it is particularly noteworthy that in all the attributes considered (including species richness, abundance and diversity) the samples from Bathside Bay indicate that it is comparable with, or in some cases, better than other parts of the estuarine system (within the SPA).

- h) 23 May 2003, pg 3, paragraph 3:-

In general, English Nature supports the findings of the ES in respect of nature conservation issues, in identifying the nature of the impacts, the magnitude of those impacts, and in evaluating the significance of those impacts. **Our only fundamental disagreement** is in relation to the impact identified on page 302, the decreased exposure (of some 3ha) of intertidal land within the SPA due to a reduction in tidal range. We do not disagree with the identified nature or scale of this impact, but we cannot agree that this is of only **minor adverse significance**. This represents a loss of productive intertidal area, fundamental to the feeding of waterfowl, and thus the significance of this impact should be scaled up accordingly. We would argue that this should be treated as being of **major adverse significance**.

Planning Inspectorate Report

*'18.149 The site is geographically close to the Stour and Orwell and is adjacent to the Hamford Water SPA. It is local to BB in terms of waterfowl usage, being about 4.5km south of the Stour/Orwell estuary, and was selected and designed to provide a habitat for feeding and roosting to support a similar assemblage of*

waterfowl', (underline added).

4.4.3 We have also reviewed the Environmental Statement for the compensation site, and the Non-Technical Summary for that states the following at Section 10, page 41:-

16. The site is not expected to experience rapid accretion from naturally available sediment sources.

and,

19. In view of the possibility of overlap between the impact occurring at Bathside Bay and the creation of a valuable feeding habitat within the realignment scheme, it is proposed to create a larger area of intertidal than would be required in a like-for-like situation (i.e. a 1:1 replacement of intertidal area). Hence, the proposal is to create approximately 105ha of intertidal area as opposed to the 69ha that would be lost at Bathside Bay.

4.4.4 Thus, it is clearly evidenced in the information reviewed for Bathside Bay that:-

- i. The intertidal habitat that will be lost comprises 2.8 per cent of the habitat resources (cf. 0.45 per cent at AMEP).
- ii. The intertidal habitat has a rich invertebrate assemblage, of potentially greater functional value than the local average for the habitat type (cf. the recent spring and autumn 2013 benthic surveys show that this is not the case at AMEP);
- iii. The invertebrate assemblage supports an important assemblage of feeding SPA species comprising up to 2.4 per cent of the total population (cf. 2.7 per cent at AMEP (ES, paragraph 11.5.73).
- iv. The high tide roost that will be lost currently supports 3.1 per cent of the estuarine population (cf. AMEP, North Killingholme Haven Pits roost site will remain undisturbed).
- v. The impact of the development on feeding SPA species was assessed to be '*Major Adverse*', and this finding was supported by English Nature (item (h) above).
- vi. The impact of the development on roosting waterfowl was assessed to be '*Moderate Adverse*' (in other words a lesser impact than on feeding SPA species), and this finding was supported by English Nature (item (h) above).
- vii. The time lag from between the start of the marine works and the breach of the sea defences could be 27 months (cf. a maximum of 15 months at AMEP).
- viii. The time lag for fully functioning habitat to develop thereafter (at this site with low accretion rates) is estimated to be 5-10 years.
- ix. The managed realignment site for Bathside Bay is not expected to accrete naturally (cf. AMEP which will naturally accrete rapidly); to accelerate functional development 150,000m<sup>3</sup> of dredge arisings will be pumped into parts of the site as soon as the breach is made.



4.4.5 In order to support their 2010 application to extend the time limit for starting the development, HPUK submitted a 'Supplementary Environmental Report', (the SER') (Royal Haskoning, 2010). We have also reviewed the ornithological data contained in that report and reproduce below, Table 5.1 from the SER. In short, it shows that the importance of Bathside Bay can be greater than reported in the original ES; in February 2007 the site supported 3.6 per cent of the estuarine bird population. In percentage terms this is greater than the proportion of birds counted on the proposed AMEP site (which is recorded to be 2.7 per cent of the Humber Estuary SPA population, (AMEP ES paragraph 11.5.73)). On average Bathside Bay supported 2.4 per cent of the SPA population throughout the three winters for which counts are reported.

**Table 5.1 Summary of waterbird count data (low water) over the winters of 2006-2007 to 2008-2009**

<b>2008-2009</b>	<b>November 08</b>	<b>December 08</b>	<b>January 09</b>	<b>February 09</b>
Bathside Bay	1,355	1,241	1,332	No count
Stour and Orwell	43,203	42,662	57,695	-
<i>Percentage usage of Bathside Bay</i>	<i>3.1</i>	<i>2.9</i>	<i>2.3</i>	-
<b>2007-2008</b>	<b>November 07</b>	<b>December 07</b>	<b>January 08</b>	<b>February 08</b>
Bathside Bay	951	1,008	1,935	866
Stour and Orwell	45,974	50,588	55,646	54,244
<i>Percentage usage of Bathside Bay</i>	<i>2.1</i>	<i>2.0</i>	<i>3.5</i>	<i>1.6</i>
<b>2006-2007</b>	<b>November 06</b>	<b>December 06</b>	<b>January 07</b>	<b>February 07</b>
Bathside Bay	1,291	895	993	1,900
Stour and Orwell	55,351	58,711	67,511	52,513
<i>Percentage usage of Bathside Bay</i>	<i>2.3</i>	<i>1.5</i>	<i>1.5</i>	<i>3.6</i>

4.4.6 Neither Natural England, nor the RSPB opposed the extension of the time limit, notwithstanding the greater impacts reported in the SER, the potential time lag and the recorded residual uncertainty (see below) regarding the outcome of the compensation measures.

4.4.7 A draft of the legal Agreement relating to the compensation measures for BBCT is included in Annex 4.2.

#### **4.5 Addressing Uncertainty**

4.5.1 It is evident from the IOH legal Agreement that there were significant uncertainties with respect to the development of the managed realignment site at Welwick in particular. The confidence margins for intertidal habitat creation can be abstracted from Schedule 2 of the Agreement and are reproduced below:

Mudflat: 22 ha +/- 15 ha;

Saltmarsh 20 ha +/- 12 ha.

4.5.2 At the lowest end of the confidence range, Welwick would have provided only 7 ha of mudflat and taken together with the 4.5 ha of mudflat to be created at Chowder Ness, this would have permitted a compensation ratio far lower than 1:1. Whilst Schedule 5 of the Agreement provides a Monitoring Plan, there is no reference to a Management Plan for either compensation site to

ensure optimal conditions are maintained in the long term. Therefore the only way in which uncertainty seems to have addressed for the IOH compensation site was by the provision of an initial 1.83:1 ratio of intertidal habitat creation: habitat loss, ((45 ha at Welwick + 4.5 ha at Chowder Ness): 27 ha loss).

4.5.3 In contrast to IOH, the draft Mitigation and Monitoring Agreement for Bathside Bay addresses the residual risk of failure as follows:

*'Risk of failure and possible intervention measures*

11. *On the basis of the engineering and environmental studies that have been undertaken, as well as evidence from implemented managed realignment schemes, it should be emphasised that there is a high level of confidence that the primary and detailed objectives for the managed realignment site can be achieved. It is, however, acknowledged that there is a degree of uncertainty (albeit limited) in predicting how managed realignment sites will develop. In view of this, it is necessary to put in place a comprehensive monitoring strategy and to define targets against which the success of the scheme can be assessed (as set out herein). It is also necessary to be informed of possible intervention measures that could be applied in the event that the managed realignment site does not develop as expected.*

12. *The nature of the management that may be required will be dependant on the problem that has been identified through the monitoring of the site. However, Table 8 lists some of the potential problems that may be encountered and describes the intervention that could be implemented to address the problems and to increase the likelihood of the site fulfilling its objectives.*

13. *It should be noted that Table 8 lists general potential problems with managed realignment sites and not problems that are specific to the Little Oakley Managed Realignment. The aim of Table 8 is to demonstrate that there are a range of management measures that can be adopted. Any management of the site will be subject to the agreement of the Regulatory and Advisory Group.*

**Table 8 Possible problems and intervention measures that may be required**


<b>Potential problem</b>	<b>Possible intervention measure</b>
<i>Land levels too high leading to a greater proportion of saltmarsh to mudflat than desired</i>	<i>Localised lowering of land levels within the site</i>
<i>Land levels too low leading to a lower proportion of saltmarsh to mudflat than desired</i>	<i>Localised raising of land levels to encourage further saltmarsh growth</i>
<i>Significant accretion leading to excessive saltmarsh growth at the expense of mudflat</i>	<i>Localised removal of fine sediment to readjust land levels and encourage mudflat development</i>
<i>Localised 'ponding' at low water</i>	<i>Infilling of localised depressions within maintenance dredged material and/or the introduction of land drains</i>
<i>Excessive shallow water areas present at low water</i>	<i>Alterations to the creek structure to facilitate drainage, possibly combined with localised pumping of maintenance dredged material</i>
<i>Gradual coarsening of substratum to detriment of biological communities</i>	<i>'Topping up' with further maintenance dredgings</i>
<i>Poor colonisation by vegetation</i>	<i>Consider seeding and/or planting options</i>

4.5.4 Thus it was clearly recognised during the BBCT application process that significant intervention measures might be required at the Bathside Bay compensation site, including raising and lowering of intertidal levels in the future to ensure optimal habitat conditions were sustained.

#### **4.6 Summary**

4.6.1 Compensation provision for the two comparator schemes that required functional mudflat to be developed is set out in Table 4.1. Neither scheme provided any separate contingency habitat to address the risk of the mudflat achieving less functionality than necessary to fully offset the damage. Whilst IOH had a Monitoring Plan the legal Agreement made no reference to a Management Plan. The BBCT Agreements recognised the residual potential risk of a failure of the site to function effectively and proposed an adaptive management approach.

4.6.2 For ease of comparison, the compensation provision for AMEP is set out in Table 4.2.

	<b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR</b> <b>TRANSPORT'S 'MINDED TO APPROVE' LETTER</b> <b>IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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**Table 4.1:** Summary of IOH and Bathside Bay Compensation

Habitat	Loss	Compensation	Ratio
<b>Immingham Outer Harbour</b>			
Functional Intertidal mudflat	27 ha	7-37 ha (Welwick) 4.5 ha (Chowder Ness)	0.43:1
Saltmarsh	0 ha	8-32 ha	n/a
Grassland	0 ha	9-15 ha	n/a
<b>Bathside Bay</b>			
Functional Intertidal mudflat	69 ha	69 ha	1:1
Saltmarsh	2.8 ha	10-20 ha	3.6:1
Sand and Shingle	5 ha	Approx. 5 ha	c. 1:1

**Table 4.2:** Summary of AMEP Compensation

Habitat	Loss	Sustainable Compensation	
		RTE	MR
Functional Intertidal mudflat	43.1 ha	45-60	2
Disturbed Intertidal mudflat		12-27	-
Total mudflat		c.74 ha (1.72:1)	
Estuary	21.2 ha	-	31 ha
Total Intertidal habitat		105 ha (2.33:1)	
Total area of development		133 ha	
Functional wet grassland	None	46 ha	
Wet roost	None	5 ha	

## **5 APPLICANT'S RESPONSE TO NE'S EIGHT KEY POINTS OF 9-11-12**

### **5.1 Issue 1 – Quantum of Mudflat**

5.1.1 This issue essentially relates to the quantum of habitat to be provided by the Applicant's compensatory measures. This is a matter also highlighted in paragraph 7 of NE's 16 November submission which states that:

*'(t)he area of sustainable mudflat created is not 2:1 (it is acknowledged that 88 ha will only be a nominal starting figure, but that the mudflat in the managed realignment area will rapidly accrete to saltmarsh). In fact long-term mudflat will be provided only at a ratio of just over 1:1, and as Dr Dearnaley confirmed at times the amount of mudflat available to birds could at times be as little as c.15 ha (c.0.333:1) because other fields would need to be impounded during parts of the tidal cycle: even if Black-tailed Godwit would feed at depths of 100mm water, smaller species would not'.*

5.1.2 The perceived risk therefore, was that whilst 45 ha of BTG foraging habitat would normally be available at all times, in the compensation scheme NE understood that were periods when only 15 ha would be available.

5.1.3 In fact, NE's statement is a very narrow view of the true situation. In the first instance, it should be borne in mind that the immediate direct loss of mudflat at NKM is 31.5 ha. A further 11.6 ha may have reduced functionality due to disturbance but will still exist. Of this total intertidal area, 100% (43.1ha) is tidally inundated on average spring tides, 85% (36.6 ha) on average mean tides and only 52% (22.4 ha) on average neap tides. Thus, the 43.1 ha of mudflat to be lost both directly and indirectly in the short term, is not always available in any event, as the foreshore has distinct zones due to the spring-neap tidal variation as illustrated in Figure 5.1, and this broader picture of mudflat 'availability' and tidal inundation should be more clearly understood, as the replacement habitat will not be inundated on the same natural cycle. (The figure of 43.1 ha also excludes the benefit that will be derived from creating 2 ha of intertidal mud on the North Bank when a channel is excavated through saltmarsh on the north bank to create a pathway for the waters to enter the MR/RTE site at Cherry Cobb Sands).

5.1.4 Considering firstly the spatial extent of mudflat habitat, the area of long-term managed mudflat within the Regulated Tidal Exchange (RTE) part of the realignment site will, after final design, have an area of about 72 ha (4 No. 18 ha 'fields'). Of this total about 6 ha (1.5 ha per field) will comprise the footprint of energy dissipating area, drainage creeks and ponds. A further 6ha (across all fields but an average of 1.5ha per field) is considered to represent the area of the RTE fields that may not be fully functional as a result of recent management activities. Thus, in combination, the RTE fields have the potential to provide up to 60 ha of functional intertidal area over spring tide periods.

5.1.5 During the spring-neap cycle the amount of intertidal area actually available for foraging will vary depending upon the average elevation of the RTE fields, and the actual tidal range. In order to retain functionality over neap tide periods the design includes for the use of one of the RTE fields as a reservoir to maintain a wet intertidal habitat in the other three fields throughout the neap tide period. Then during the following mean tide period and spring tide period the site is fully intertidal again and wholly available.

- 5.1.6 When one of the fields is impounded to a depth **in excess of** 100mm, for the reason described above, it is recognised that that particular field will not provide an intertidal feeding resource for Black tailed godwits. Over the neap tide period, when the site would not naturally inundate, the reservoir of water is to be used to feed water into the fields in succession so that they generally do not stand drained for more than 24 hours. Over the neap tide period, the three fields not used as the reservoir will generally be filled, impounded and drained on a three day cycle. The filling is planned to provide an initial average water depth across the RTE field of about 100mm. When this level is achieved there will be parts of the RTE field where the water depth is greater than 100mm and parts where it is less providing some degree of habitat availability to a range of birds. This level can be fine-tuned. The intent however is to keep the mudflat wet and deliberately suppress saltmarsh development through the use of shallow impoundment. There is however no need to impound to a particular depth of water greater than necessary to meet the objectives. In general the practice would be to minimize the volume of water required to wet the field. The least volume of water the better. The practice in summer months may be different to winter months, due to evaporation (although this would only be a few millimetres per day), and would be adapted over time.
- 5.1.7 Following the filling of a field over the period of the impoundment, water levels would generally be expected to slowly reduce due to seepage and also a small amount of evaporation during the summer. The remaining impounded water will then generally be run-off the site on the following day and the RTE field allowed to remain drained until the following day when the field would either be refilled from the reservoir (during neap tides) or by the naturally rising tidal range (following neap tides). Under this programme of water level management the RTE fields would generally not remain drained for much more than 24 hours. This contrasts with the existing intertidal area at Immingham to be lost under the footprint of the development or in the zone of disturbance where more than 20 ha will gradually dry out over the neap tide period.
- 5.1.8 The RTE design and management is specifically intended to avoid this prolonged drying of parts of the mudflat with the intent being to provide a low density muddy habitat across the whole of the field. Apart from the times that one of the fields is necessarily impounded to provide the reservoir function all the fields will, on a daily basis, provide access to feeding across the whole area of the site. During the periods when the fields are filling and emptying with the tide, there will be times when the field is inaccessible as a feeding resource because of the depth of inundation. However, these inaccessible periods will be much less than at Immingham, where the rate of change of water levels will be greater than within the RTE sites because of the throttling effects of the sluices in the latter, which will reduce the rate of rise and fall of the tide and the maximum water levels that can occur.
- 5.1.9 The amount of **time** per tide that birds can physically feed at the RTE sites will, in fact, always be greater than at Immingham. The **area** available for birds to feed at the RTE site will almost always be greater than at Immingham because normally only one field would be impounded as a reservoir. An exception to this could occur if it were necessary to undertake maintenance activities (bed levelling and removal of sediment) whilst a field was impounded over spring tides. This would temporarily reduce the available area by a further 15 ha during the period of impoundment for the maintenance.

- 5.1.10 If an approach to management of levels and sediment accumulation were adopted whereby the management was undertaken by land based plant then parts of the field under management would still provide a feeding resource during the maintenance period albeit of reduced extent due to disturbance and the potential drying of the field over the maintenance period. Maintenance periods would not be expected to last more than five or six days in succession for a particular field whether the maintenance is undertaken by land based plants of water borne plant and can easily be timed to avoid the significant periods for black-tailed godwits.
- 5.1.11 The inundation regime during the managed phase is set out in a comprehensive manner in the Applicant's report EX28.3, Chapter 7, Tables 9.1, 9.3 and 9.4 (*sic*) for three different scenarios. To assist in a more comprehensive understanding the inundation regime that is proposed, the Applicant instructed HR Wallingford to prepare further illustrations and to explain further the mudflat availability over a typical 14 day Spring-Neap cycle. This work is detailed in Annex 5.1.
- 5.1.12 With respect to the long-term (100 year) direct and indirect loss, this is 45 ha. In brief, 5ha of the 45 ha of mudflat lost due to AMEP in the long term arises due to geomorphological change within the Middle Estuary and is nothing whatever to do with BTG foraging areas on the NKM foreshore. Moreover, that particular 5 ha essentially comprises a sliver of land along the lowest water contour and is therefore only rarely available during the tidal cycle for foraging birds.
- 5.1.13 In NE's letter dated 11 October 2013, they state at paragraph 18 that,  
*'Able UK has confirmed that the RTE will create c60ha of long-term sustainable mudflat, which will be reduced to c45ha as part of the operational management of the RTE when during neap tide cycles one of the 15ha cells will be impounded. This amounts to a compensation ratio of 1.5:1 (on occasions 1:1) as compared to the 2:1 ratio that was initially proposed by Able UK and agreed by Natural England. Natural England subsequently advised that a ratio of 1:1 is acceptable provided the RTE/MR meets its quality objectives and targets'.*

It is worth clarifying that NE's original support for the compensation scheme at the time the application was submitted was based upon a proposal for managed realignment by Black and Veatch (BV). Specifically on 2 November BV reported to NE the following.

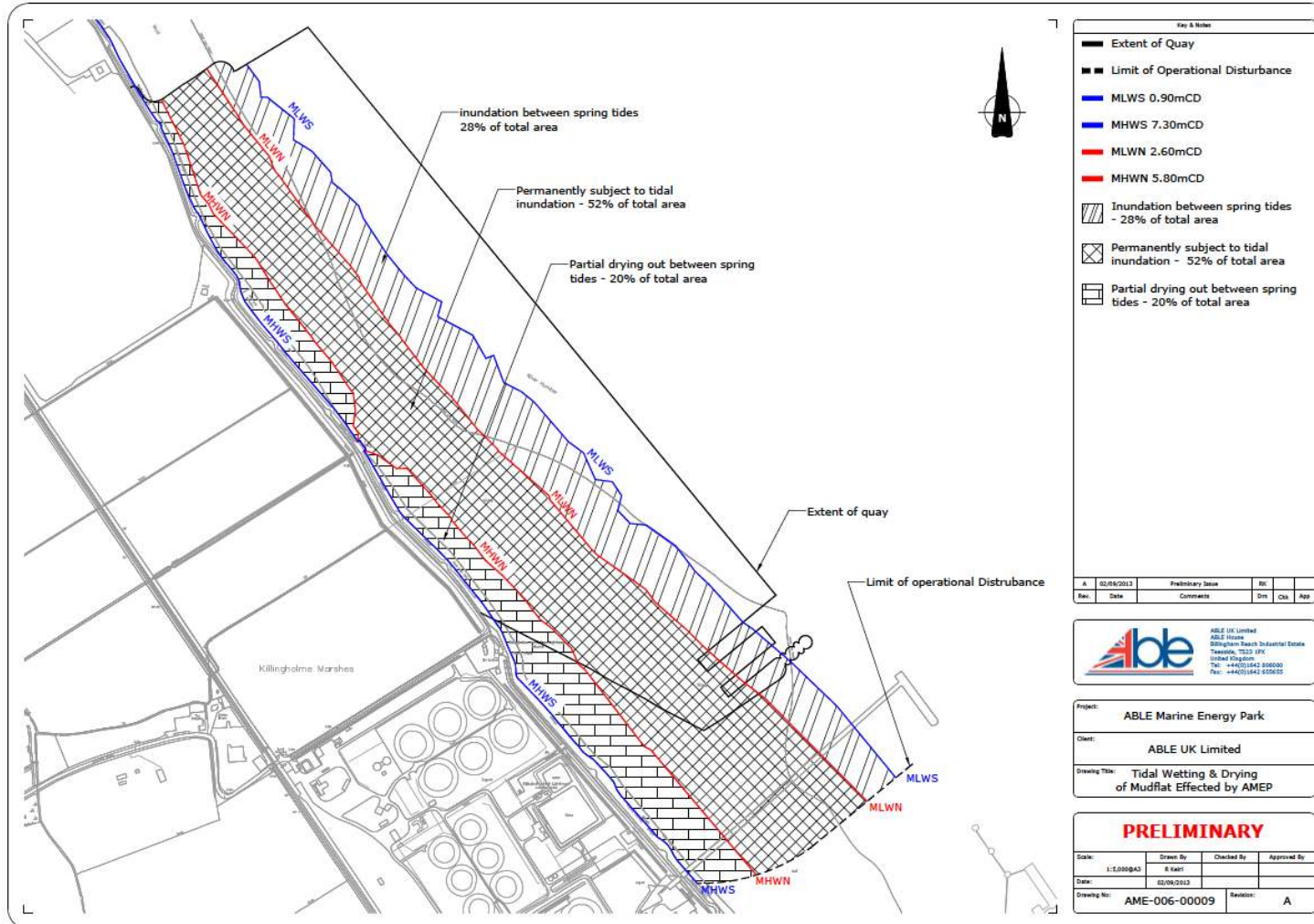
Model predictions of sedimentation are uncertain but confidence has been gained from the experience at the nearby Paull Holme Strays site where tidal conditions are similar and monitoring provides good evidence of the rates of development of physical and ecological parameters. The design objective will be to create substantially more than 38 ha after 5 years and to retain sufficient mudflat after ten years to provide a margin for design uncertainty. Sensitivity testing will indicate the margin of uncertainty available for key parameters without compromising the absolute minimum requirement for 38 ha of mudflat compensation to be provided in the long term.

- 5.1.14 Thus, and for the avoidance of doubt, it was always understood that an initial compensation ratio of 2:1 for mudflat was not sustainable in a managed realignment (MR) scheme and it was originally chosen to ensure that a


compensation ratio of 1:1 was achievable in the long term for that particular solution.

- 5.1.15 However, as further work was undertaken by the Applicant following acceptance of the application, it became evident that an MR solution might be even less sustainable than believed. Accordingly, 2;1 overcompensation came to be seen as an inappropriate way to mitigate the risk of long-term saltmarsh development on an MR site in the Humber Estuary. Accordingly, the Applicant initially amended the design to a simple form of Regulated tidal Exchange (RTE), and then finally to a more managed proposal with specific intervention to ensure the mudflat habitat created was sustainable. Part of the intertidal compensation has been retained as an MR site, and this will initially develop as mudflat habitat although the mud in that location is likely to convert to a saltmarsh over time. The initial overcompensation ratio agreed for intertidal habitat has been retained in the design, **but** additional engineering works are now proposed to reasonably ensure that the mudflat is managed in a way that provides greater certainty in the long-term. The overall extent of intertidal habitat created, 105 ha provides a ratio of habitat creation : loss, of 2.33:1, far greater than either IOH or Bathside Bay.
- 5.1.16 At paragraph 9 of NE's letter dated 11 October 2013, they note that the Applicant had acknowledged that '*at times there may be only 30ha of mudflat available (a compensation ratio of 0.66:1)*'. Whilst true, stripped of its context, it is a somewhat disingenuous abstract from the information the Applicant provided to NE. It was made quite clear that this eventuality would only arise for a few days during maintenance periods which could themselves be planned outside of the key autumn and winter periods.





**Figure 5.1: Zonation of the NKM Foreshore**

	<b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR TRANSPORT'S</b> <b>'MINDED TO APPROVE' LETTER IN RESPECT OF</b> <b>COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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## 5.2 Issue 2 – Time Lag

5.2.1 Insofar as time lag is concerned, the Panel considered the competing views of various parties at Paragraphs 10.178 *et seq* of the PR, before concluding that:

*'On balance, having considered the texts of both the EU Guidance and the DEFRA draft Guidance carefully, the Panel concurs with the applicant. In our view the test is the coherence of the Natura 2000 network, and this must allow for damage to occur at a given site provided the necessary compensation measures have been secured not necessarily delivered. The two sets of guidance both clearly allow for a possible time lag, although obviously they will not encourage it', (paragraph 10.187).*

5.2.2 The SoS supported the Panel's views that a time lag between creating new habitat and losing existing, was permitted (as it was for IOH in 2004, for Bathside Bay in 2006 and once again in 2013) subject to the programming restrictions on the Quay works in the draft Order at Schedule 11, Requirement 21. On this basis, it may not be appropriate to continue to include time lag as an issue within any analysis of risk.

5.2.3 Notwithstanding the above observations, the Applicant draws attention to their response to the Examiner's Rule 17 letter dated 15 November 2012, which included an ecological risk assessment for the works programme that would be permitted by the Applicant's draft Order. This information was submitted by the Applicant on 24 November 2012, so after NE's submissions dated 9 and 16 November 2012.

5.2.4 In brief, the short-term ecological consequence of the project being implemented in accordance with the base programme was risk assessed by suitably qualified and experienced ornithologists, viz. Messrs Les Hatton and Andy Coates of ERM, the Applicant's ornithological consultants.

5.2.5 AMEP will result in effects on qualifying interest shorebirds of the Humber Estuary SPA and Ramsar site and, in particular, BTGs due to the large proportion of the Humber Estuary SPA population of this species that will be affected. Taking due account of the precautionary principle a number of different scenarios, which could arise, have been considered and these are presented in the table below. In reviewing these scenarios, the focus was on the effects of short-term consequences, as sufficient compensation will be provided beyond the short-term once the habitat has matured. Due consideration was given to both the likelihood of a particular scenario occurring and the resulting effects if it does occur, taking account of the available information including about the reversibility of the effect.

5.2.6 A revised construction programme for the works, together with a brief explanation of the constraints taken into account, is included in Annex 5.2 of this report.



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF**  
**COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
1	Black-tailed godwits (BTGs) not disturbed, continue to use NKHP roost; Sufficient feeding resource remains, all LSE species continue to feed on remaining NKM foreshore.	No increased energy expended to forage by BTGs; Other species not displaced from feeding resource.	Noise levels will be restricted by requirements set out within the Development Consent Order (DCO) to avoid disturbance effects to NKHP. Visual intrusion will also be limited by requirements set out in the DCO to avoid disturbance effects on NKHP. Previous development has occurred around NKHP over the past 10 years, however, BTG populations have increased (Percival, 2011). NKHP will retain an estuary frontage. BTGs have previously used NKHP as a roost while foraging on the north bank (Mander & Cutts, 2005; Catley, 2009). Annex 10.1 of the ES (Benthic and Fish Surveys Report) indicates that feeding resources are unevenly distributed across the foreshore. Whilst transect 3 (in the most used count sectors C and D) had the highest abundance of <i>Hediste</i> and <i>Macoma</i> , these species are present in similar numbers on transects 8 and 12 ( <i>Hediste</i> ) and 1, 11 and 12 ( <i>Macoma</i> ). Areas 11 and 12 are outside the AMEP footprint and 8 is likely to have reduced levels of impacts from AMEP. <i>Corophium</i> levels are high on transects 9-12 outside the AMEP footprint.	It is highly likely that the BTGs or at least a proportion of them will continue to use the NKHP. The reduction in foraging resource makes it highly likely that resources will be depleted earlier and be subject to higher competition. Birds may respond by: <ul style="list-style-type: none"> <li>• extending the time spent feeding; and/or</li> <li>• exploiting additional food resources within or adjacent to the estuary.</li> </ul> <p>In this scenario it is likely there will be increased energy expenditure. It is likely there will be displacement both temporally (i.e. birds will move sooner) and spatially (birds will exploit other areas).</p>



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF**  
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**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
		No increased energy expended to forage by BTGs; All or a proportion of other species displaced from feeding resource.		Although the evidence indicates that remaining areas at NKM contain patches of suitable prey items at suitable densities, it is unlikely this will be sufficient for all bird species. Therefore, increased energy expenditure and displacement is likely to occur.
	SUMMARY:	Highly likely that NKHP will continue to be used, but likely that increased energy costs will arise. Low risk of birds being displaced through disturbance.		



**ABLE MARINE ENERGY PARK**

**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF  
COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
2	<p>BTGs not disturbed, continue to use NKHP roost; <b>BTGs feed elsewhere in estuary. Other LSE species continue to use NKM foreshore.</b></p>	<p>Increased energy expended to forage by BTGs; No displacement of other species from feeding resource elsewhere in estuary. Increased energy expended to forage by BTGs. All or a proportion of other species displaced from feeding resource elsewhere in estuary.</p>	<p>Evidence for non-disturbance of the roost as above; visual and noise disturbances will be controlled and hence the roost will remain viable. Catley (2009) and BTO Trends report (Austin <i>et al</i> 2008) indicate that alternative feeding sites are used by BTGs within the Humber Estuary. These areas are accessed either from NKHP, or "new" managed re-alignment sites. Current suite of birds using NKM foreshore largely feed on different range of species (see EX28.3: Part 2, Baseline), and therefore there is limited competition between species. Chapter 11 of ES notes a discrepancy between numbers roosting at NKHP and those feeding at NKM in some months (i.e. more birds roost at NKHP than feed at NKM). Accretion predicted north of AMEP quay (EX 8.8 and 8.7A). Given the history of NKM since HIT, it is likely this will improve the feeding resource to the north of AMEP, but this is a long-term effect.</p>	<p>Highly likely BTGs will continue to use NKHP, as strong evidence base from Catley that they also exploit other sites from this roost. Possible that other species may continue to use NKM, but more likely a proportion will move to other sites including area immediately north of AMEP in response to accretion.</p>
	SUMMARY:	<p>Highly likely that NKHP will continue to be used but that increased energy costs will arise. Some birds may remain to feed at NKM, but others likely to be displaced. Moderate risk of BTGs and other LSE species being displaced to other feeding sites in estuary</p>		



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF**  
**COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
3	All LSE <sup>2</sup> species disturbed, all or a proportion of BTGs seek roosting elsewhere in estuary; BTGs feed elsewhere in estuary. Other LSE species continue to feed on NKM foreshore.	Increased energy expended by BTGs to feed and roost; Other species displaced from roosts elsewhere in estuary; Roosting capacity freed up at NKHP (potentially not utilisable).	See above Carrying capacity of the Humber Estuary is unknown and those papers that have addressed issue indicate up 2%-8% of estuary mudflat (total c.10 000 ha) needs to be lost before survival rates are likely to fall (Stillman <i>et al</i> , 2005) WeBS counts show high variability between years (Holt <i>et al</i> , 2012) suggesting flexibility in capacity of the Humber Estuary to absorb birds. Ability of Humber Estuary to absorb over 5,000 BTGs between 1996-2010 has been shown (Catley 2009; Percival 2011). There is no evidence of the capacity limits being reached at NKHP. Catley (2009) indicates ongoing problems with the NKHP roost in terms of water management and sparrowhawk attacks from increasingly dense vegetation. This may limit bird use of the NKHP roost in long term.	Highly unlikely species will be disturbed from roost as disturbance controlled. Likely that a proportion of both BTG and LSE species will remain to feed on remaining habitat at NKM and area north of AMEP, particularly if area upstream of AMEP accretes to some degree as predicted (EX11.24) Likely that a proportion of birds will feed elsewhere on estuary. Likely that both BTG and LSE species that stay and those that are displaced will expend more energy.

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<sup>(2)</sup> Bird species for which a Likely Significant Effect was agreed as reported in the Statement of Common Ground for the Shadow Habitats Regulations Assessment of AMEP (24 August 2012)



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF**  
**COMPENSATORY MEASURES**

**OCT 2013**

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		<p>Increased energy expended by BTGs to feed and roost;            Other species displaced from roosts elsewhere in estuary;            Roosting capacity freed up at NKHP (potentially not utilisable).            All or a proportion of other species displaced from feeding resource elsewhere on estuary.</p>		<p>Unlikely birds from other roost in Humber Estuary sites will be displaced.            Unlikely additional roosting will take place at NKHP.            Low risk that all of species will be displaced from the Humber Estuary.            Unlikely significant (i.e. &gt;1%) numbers of LSE species will be displaced from other roost sites.            Unlikely that BTGs or other species will be displaced from Humber Estuary given that there is no evidence, or reason to believe, carrying capacity has been reached.</p>
	SUMMARY:	<p>Highly likely that NKHP will continue to be used as a roost but that increased energy costs will arise. Some birds (BTG and LSE) may remain to feed at NKM but others likely to be displaced elsewhere within the Humber. Unlikely other species will be displaced from roosts. Low risk that birds will be displaced from the Humber Estuary as a whole.</p>		



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF**  
**COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
4	BTGs not disturbed, continue to use NKHP roost; <b>BTGs feed elsewhere in estuary. Other LSE species cease to use NKM foreshore.</b>	Increased energy expended to forage by BTGs; No displacement of other species from feeding resource elsewhere in estuary.	See Above	Highly likely BTGs will continue to use NKHP as strong evidence base from Catley reports that they exploit other sites in the Humber Estuary from this roost. Likely that a proportion of BTGs will feed elsewhere within Humber Estuary, although a proportion are likely to remain at NKM and in its immediate vicinity.
		Increased energy expended to forage by BTGs and other LSE species; All or a proportion of other species displaced from feeding resource elsewhere in estuary.		Likely that BTG and LSE species that stay, and those that are displaced, will expend more energy. Unlikely all, or a proportion of species, will be displaced given what evidence there is does not indicate carrying capacity has been reached.
	SUMMARY:	Unlikely NKHP roost will be abandoned. Very low risk that there will be a complete cessation of feeding at NKM but likely there will be displacement of both BTGs and LSE species to other parts of estuary.		





**ABLE MARINE ENERGY PARK**

**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
5	All LSE species disturbed, all or a proportion of BTGs seek roosting elsewhere in estuary; BTGs feed elsewhere in estuary. Other LSE species cease to feed on NKM foreshore.	Increased energy expended by BTGs and other LSE species to feed and roost; Other species displaced from roosts elsewhere in estuary; Roosting capacity freed up at NKHP (potentially not utilisable).	See above Allen (2006) indicates that there are high levels of abundance of the main prey items for the birds particularly around Cherry Cobb Sands and Stone Creek, where previous roost sites have become unsuitable due to a lack of management.	Highly likely BTGs and LSE species will continue to roost at NKHP. Unlikely other species will be displaced from roosts elsewhere in Humber Estuary. Unlikely additional use will be made of NKHP
		Increased energy expended by BTGs and other LSE species to feed and roost; Other species displaced from roosts elsewhere in estuary; Roosting capacity freed up at NKHP (potentially not utilisable). All or a proportion of other species displaced from feeding resource elsewhere on estuary.		Likely that energy costs will rise for BTGs and LSE species. Likely that a proportion of BTGs will feed elsewhere in Humber Estuary as they have done in past. Unlikely all LSE species will cease to use what is left of NKM.
	SUMMARY:	Unlikely roost disturbance will occur. Likely that proportion of BTGs will feed elsewhere in Humber Estuary. Low risk that all birds will abandon NKM.		



**ABLE MARINE ENERGY PARK**

**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF  
COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
6	Insufficient roosting / feeding resource remains, all or a proportion of BTGs abandon estuary for another Natura 2000 site.	Population decline of BTGs in Humber Estuary. No displacement of other species within Humber Estuary. Displacement of BTGs or other species elsewhere.	As above. The Cardiff Bay study (Burton <i>et al</i> , 2003) indicated displacement for range of estuarine species but this was after complete loss of the site and without any compensation. Survival rates (birds were assumed to be dead if they were not re-sighted) for redshank declined from 0.846-0.778 over three years). However it should be noted that redshank numbers on the Severn as a whole have increased since barrage closure in 1999, this despite a general downward national trend, with the 5 year peak mean for the Severn now 2,926 (Holt <i>et al</i> , 2012) It is expected that both the RTE and CCSWG will develop functionality over time. The wet roost site will provide improved access to feeding resources elsewhere on the estuary. There has been a decline in use of a roost site on north shore near to CCS due to lack of management.	Unlikely there would be a population decline of BTGs within the Humber Estuary although possible interim declines could occur whilst functionality of the compensation package develops. It is unlikely increased use of other parts of Humber by BTG will displace other species given natural variability in numbers. It is possible, but unlikely, that a proportion of BTGs will be displaced from the Humber Estuary and use alternative sites such as the Wash when populations of waders are high (good breeding success) and resources low (poor invertebrate recruitment). Displacement could, therefore, occur in the interim whilst the compensation package develops full functionality.
SUMMARY:		Moderate risk that some BTGs will go to other regional resources (e.g. Wash).		



**ABLE MARINE ENERGY PARK**

**RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
7	Insufficient feeding or roosting resource to be found elsewhere in Natura 2000 network.	Population decline of BTGs globally. No displacement of other species within Humber Estuary. No displacement of BTGs or other species elsewhere.	<p>The Humber Estuary supports a peak of approximately 7% of Natura 2000 network during the autumn/winter period (based on an assumed 61,000 flyway population and 5 year peak mean for the Humber Estuary of 4,351 (Holt <i>et al</i>, 2012). AMEP affects 2,566 foraging BTG (4.2%) Non-breeding population of BTGs (<i>islandica</i>) is continuing to increase throughout its range including in the UK (Holt <i>et al</i>, 2012; Jensen <i>et al</i>, 2008; Gill <i>et al</i>, 2007; EC, 2007). Iberian population includes both continental and Icelandic sub-species. As the continental sub-species is declining, it is likely that there will be an overall increase in Iberia, due to an increase in numbers of the Icelandic sub-species. UK population is increasing despite considerable inter variation in numbers at individual sites, and has increased again on the Humber Estuary since 2008 / 2009 after decreases in the two preceding years (Holt <i>et al</i>, 2012). BTGs are a long-lived species that even in poorer quality breeding habitat are replacing themselves at a greater than 1:1 ratio (Gunnarsson <i>et al</i> 2005). The Icelandic sub-species has demonstrated its ability to expand .into new areas in large numbers (e.g. c10% increase in UK population through expansion into E and NW England).</p>	Likely that any short term displacement effects within the wider Natura 2000 network will be low and reversible.

	<b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
---	--	-----------------

Ref	POTENTIAL OUTCOME	SHORT TERM CONSEQUENCE (2014-2018)	EVIDENCE BASE	LIKELIHOOD
	SUMMARY:	Short-term effects on the population of the BTGs within Humber Estuary SPA cannot be excluded but if they do occur there can be confidence that the effects are reversible. Long term, effects on the coherence of the network are not likely. The Icelandic sub-species population is continuing to increase throughout its range and there is no suggestion that carrying capacity has been reached. This sub-species has demonstrated an ability to expand into new areas in significant numbers.		

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ABLE MARINE ENERGY PARK

RESPONSE TO DEPARTMENT FOR TRANSPORT'S 'MINDED TO APPROVE' LETTER IN RESPECT OF  
COMPENSATORY MEASURES

OCT 2013

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	<b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR TRANSPORT'S</b> <b>'MINDED TO APPROVE' LETTER IN RESPECT OF</b> <b>COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
---	--	-----------------

### **5.3 Issue 3 – The value of the further overcompensation at East Halton**

- 5.3.1 The Panel concluded at paragraph 10.163 of their report to the SoS that overcompensation at East Halton *'should be included within the scheme'*. This land was not included in the DCO and is not included in the legal agreement between the Applicant and NE. In NE's 16 November submission they did accept that, if pastureland was included, *'some, but fairly limited, additional confidence may be derived'*. Since the Examination was completed the Applicant did engage consultants to develop proposals for the creation of pastureland at East Halton Marshes.
- 5.3.2 Notwithstanding the design work already undertaken, the Applicant has had regard to the SoS's request that they consider what *'reasonable additional measures'* might be implemented to reduce the ecological risks. As a result the Applicant proposes to enhance proposals for the further overcompensation site and has set these proposals out in a separate report, *'Applicant's Proposals for the Enhancement of a Further Overcompensation Site At Halton Marshes'*, (Able, 2013), which accompanies this document.
- 5.3.3 The broad aim of the enhanced proposals is to provide 20 ha of temporary wet grassland foraging habitat that would benefit Black-tailed godwit through the autumn and winter. This would provide additional contingency against the residual risk that the compensatory mudflat could have less functionality than the design intent. It would become an area of 'banked' mitigation once the compensation site met its overall objective and was no longer required as a contingency, (an approach supported by current DEFRA guidance).

### **5.4 Issue 4 – The Depth of the Compensatory Mudflat**

- 5.4.1 The RTE fields will initially be allowed to 'warp up' by leaving the sluice gates fully open and this period is designed to maximise the sediment supply into the RTE fields. This means that at a level of +2m OD the fields will remain dry for periods of 3 to 4 days over the neap tide periods, similar to any other mudflat lying above the neap tide level. It is considered that such prolonged drying may not be beneficial for the optimal evolution of the benthos in the RTE fields. Hence a trade off has been proposed whereby once the RTE fields have accreted to an average depth of about 100mm the mode of operation of the sluices is adjusted so that impoundment of one of the fields on spring tides to form a reservoir is undertaken so as to provide water to all fields over the neap tide period. This will promote the wet character of the accreting mudflat habitat. Accretion will still continue albeit at a slower rate and the developing benthos will not be subject to any significant desiccation during neap tide periods. Over the following years the fields will continue to accrete and eventually a depth of 150mm of functional mud will arise and be maintained.
- 5.4.2 The principal prey species for black-tailed godwit are the ragworm *Hediste diversicolor* and the bivalve mollusc *Macoma balthica*. *Macoma balthica* has an average burial depth of a few centimetres (Budd and Rayment, 2001; Beukema, 1995; Brafield & Newell, 1961) with very few burying beneath 7.5 cm within the intertidal zone of The Wash (Reading and McGrorty, 1978). *H.diversicolor* has a deeper average burial depth of 5-10 cm (Esselink & Zwarts, 1989; Kristensen & Mikkelsen, 2003; Davey, 1994). The maximum burial depth of *H.diversicolor* is seen to be at 10-13cm to avoid predation,

but the greatest density is most frequently recorded from 5-7 cm depth (Duport, et al 2006).

- 5.4.3 The results of the literature review reveal that whilst a depth of >10 cm is occasionally recorded for *Hediste diversicolor* (synonym *Nereis diversicolor*) this is recognised as being beyond the reach of most predators and a seasonal reflex to extremes in temperature. The minimum burial depth of 100mm was therefore considered to be an appropriate minimum, recognising that the nature of the mudflat will be such that there will be areas deeper than this.

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- 5.4.4 There are clearly divergent views on the depth of mud that is needed for invertebrates to establish effectively, this is essentially an issue that relates to site management and, in particular, the timing of the start of water management operations. However, this is a matter that could be resolved through the monitoring programme but will impact on the start of management measures to reduce bed levels, bringing the start of those



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

operations earlier in the management programme. The Applicant believes that 100mm is an adequate depth, but is equally prepared to delay water management operations until 150mm of mud has accreted, if Natural England consider that to be a necessary and justified requirement which reduces the ecological risk, and reduces the timescale for functional development.

## **5.5 Issue 5 – Baseline Invertebrate Data**

- 5.5.1 There has been extensive discussion between the Applicant and NE about the benthic quality of the existing NKM foreshore and whether it has any enhanced value compared to any other area of mudflat within the Middle Estuary. Indeed in their 16 November 2012 submission NE stated that their position *'has consistently been that NKM mudflat is of a **particularly high quality** for Black-tailed Godwit feeding'* (paragraph 9, emphasis added). This was a matter of dispute between the Applicant and NE as our consultants IECS and ERM did not find anything to support such an hypothesis in historic survey evidence. Nevertheless, it is a factor that has clearly been taken into account in NE's assessment of risk; in other words that a particularly *'exceptional'* mudflat needed to be replicated in this instance.
- 5.5.2 A significant difficulty at the time of the Examination, and the principal cause of the dispute regarding the *'exceptional'* nature of the mudflat, related to NE's concerns in relation to the reliability of the existing benthic survey obtained for the purposes of EIA (**Issue 5** of the 9 November Note). Since then, the Applicant has undertaken further benthic sampling along the foreshore of both North Killingholme Marshes and Cherry Cobb Sands. Surveys were undertaken in May/June 2013 and in early September 2013; both surveys were in accordance with the MEMMP. Processing of the later survey is partially complete. All available results are reported in, *'Intertidal Benthic Invertebrate Survey at North Killingholme (Spring 2013): Survey Report and interim Results from the Autumn Killingholme Survey and the Spring Cherry Cobb Sands Survey'*, (Precision Marine, September 2013), which accompanies this report.
- 5.5.3 An interpretation of the results has also been undertaken by GoBe Consultants and is reported separately in, *'Able Marine Energy Park 2013 Data Review and Target Setting'*, (GoBe Consultants, October 2013), which accompanies this report. In short, the objective survey evidence justifies concluding that there is no substantial risk that NKM is of such exceptional quality that a compensation site would not be able to meet its biomass and abundance targets.
- 5.5.4 In contrast to this, NE assert in their letter of 11 October 2013 that:  
*'(f)or the area of mudflat that will be lost, the 2013 benthic invertebrate surveys show much greater concentrations of key invertebrate prey than shown by the 2010 survey increasing certainty about the quality of the existing habitat'*
- 5.5.5 NE give no basis for their assertion, and it is not clear whether they are comparing the Spring and Autumn surveys, which would be expected to be different. The Applicant's own statistical analysis is presented in the report by GoBe Consultants referenced above. In brief, the analysis shows that the the Spring 2010 and Spring 2013 survey datasets are statistically indistinguishable. In summary the Applicant's scientific analysis of the benthic survey is that,





**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

*'the area within which it is proposed to construct the Able Marine Energy Park contains areas of high abundance and biomass when compared to the immediate area but that the levels are comparable to those found further north-west in the area used as the NKM control sites (North). Further to this the mean levels found are comparable to those found during the autumn benthic surveys at Paull Home Strays. Finally the **levels of abundance and biomass are lower at North Killingholme Marsh in the autumn than those recorded at Cherry Cobb Sands during the spring**; this is of particular relevance as it is reasonable to predict that the levels at Cherry Cobb Sands will increase seasonally in much the same way as was recorded at North Killingholme Marsh', (emphasis added, p 15-16).*

5.5.6 In other words, NE's assertions do not seem to be underpinned by any of the evidence.

5.5.7 Since the completion of the hearing, the British Trust for Ornithology (BTO) has published, 'Research Report No. 642, Humber Estuary Low Tide Programme 2011/12', ('RR642', May 2013) in which the following evidence is included:-

*'The Low Tide Counts again showed the importance of the **Pyewipe** and **North Killingholme Haven Pits** for this species. In the winter, by far the largest numbers of Black-tailed Godwits were on the **Pyewipe** section, where there was a peak count of 1,800 (5.86 b/ha) in December which was 91% of all the birds recorded on the estuary in that month. This reliance on the **Pyewipe** section by the majority of the wintering population was also noted in the previous sets of Low Tide Counts. Elsewhere on the Lincolnshire coast, **North Killingholme Haven** had a peak of 219 birds (3.08 b/ha) and **Horseshoe Point** had a peak of just 16 birds (0.05 b/ha), both in March. The other main wintering area was on the inner estuary at **South Ferriby** where there was a peak of 119 birds (1.78 b/ha), though nearby **Read's Island** and **Alkborough Flats** also both held numbers of birds, with peak counts of 72 and 48 respectively', (Emphasis on site names added). (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Section 3.1.16, 2<sup>nd</sup> paragraph).*

And,

*'During the autumn, the Lincolnshire coast was again the key area, with **Pyewipe** and **North Killingholme Haven** again the key sites for feeding birds and **North Killingholme Haven Pits** for roosting and loafing birds. The peak autumn counts were 2,034 (6.63 b/ha) at **Pyewipe** in October and 2,000 (100 b/ha) on **North Killingholme Haven Pits** in August. Up to 816 birds (11.49 b/ha) were also feeding on North Killingholme Haven mudflats in July. The 2003/04 Low Tide Counts identified **Paull Holme Strays** as key site for Black-tailed Godwits, especially on autumn passage, yet on the 2011/12 counts, there were just two records from there with a peak count of 6 birds in October, though 336 were on the adjacent mudflats in July. Away from the Lincolnshire coast and Paull Holme Sands, the only other notable count was of 123 birds (0.36 b/ha) at Alkborough Flats in August.' (Emphasis on site names added). (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Section 3.1.16, final paragraph).*



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR**  
**TRANSPORT'S 'MINDED TO APPROVE' LETTER**  
**IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

5.5.8 Thus whilst it is not disputed that North Killingholme Haven (NKH) is an important low tide site, it is not an exclusive site for Black-tailed godwits and is by no means the largest site: Pyewipe (sub-sector CH019) provides 307 ha of intertidal habitat, whilst NKH (sub-sector CH066) provides just 66 ha (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Table 1). Pyewipe is also used far more intensively than NKH as evidenced in the autumn and winter counts for both sectors which are reproduced from RR642 in Figure 5.2 below.

**Sub-sector CH066. Autumn monthly counts and densities**

Sector	Sector Name	Species	Monthly Count				Seasonal Total	Seasonal Average	Seasonal Density
			July	August	September	October			
CH066	North Killingholme Haven	Black-tailed Godwit	816	1	21	530	1,368	342.00	1.36
CH066	North Killingholme Haven	Curlew	106	88	42	22	258	64.50	0.26
CH066	North Killingholme Haven	Dunlin	0	0	71	289	360	90.00	0.36
CH066	North Killingholme Haven	Golden Plover	2	0	0	0	2	0.50	0.00
CH066	North Killingholme Haven	Lapwing	0	0	3	0	3	0.75	0.00
CH066	North Killingholme Haven	Mallard	0	10	5	0	15	3.75	0.01
CH066	North Killingholme Haven	Oystercatcher	9	5	0	0	14	3.50	0.01
CH066	North Killingholme Haven	Redshank	23	3	17	33	76	19.00	0.08
CH066	North Killingholme Haven	Shelduck	54	51	72	120	297	74.25	0.30
CH066	North Killingholme Haven	Turnstone	0	1	0	0	1	0.25	0.00

**Sub-sector CH066. Winter monthly counts and densities**

Sector	Sector Name	Species	Monthly Count					Seasonal Total	Seasonal Average	Seasonal Density
			November	December	January	February	March			
CH066	North Killingholme Haven	Avocet	N/C	N/C	N/C	N/C	8	8	8.00	0.03
CH066	North Killingholme Haven	Bar-tailed Godwit	N/C	N/C	N/C	N/C	35	35	35.00	0.14
CH066	North Killingholme Haven	Black-tailed Godwit	N/C	N/C	N/C	N/C	219	219	219.00	0.87
CH066	North Killingholme Haven	Curlew	N/C	N/C	N/C	N/C	109	109	109.00	0.43
CH066	North Killingholme Haven	Mallard	N/C	N/C	N/C	N/C	8	8	8.00	0.03
CH066	North Killingholme Haven	Oystercatcher	N/C	N/C	N/C	N/C	8	8	8.00	0.03
CH066	North Killingholme Haven	Redshank	N/C	N/C	N/C	N/C	38	38	38.00	0.15
CH066	North Killingholme Haven	Ringed Plover	N/C	N/C	N/C	N/C	2	2	2.00	0.01
CH066	North Killingholme Haven	Shelduck	N/C	N/C	N/C	N/C	89	89	89.00	0.35
CH066	North Killingholme Haven	Teal	N/C	N/C	N/C	N/C	6	6	6.00	0.02

**Sub-sector CH019. Autumn monthly counts and densities**

Sector	Sector Name	Species	Monthly Count				Seasonal Total	Seasonal Average	Seasonal Density
			July	August	September	October			
CH019	Pyewipe	Bar-tailed Godwit	0	1	44	3	48	12.00	0.02
CH019	Pyewipe	Black-tailed Godwit	0	5	14	2,034	2,053	513.25	0.81
CH019	Pyewipe	Curlew	370	337	187	190	1,084	271.00	0.43
CH019	Pyewipe	Dunlin	0	481	317	793	1,591	397.75	0.63
CH019	Pyewipe	Golden Plover	0	23	0	28	51	12.75	0.02
CH019	Pyewipe	Grey Plover	0	47	6	10	63	15.75	0.02
CH019	Pyewipe	Knot	0	2	0	24	26	6.50	0.01
CH019	Pyewipe	Lapwing	0	0	0	8	8	2.00	0.00
CH019	Pyewipe	Oystercatcher	8	24	8	0	40	10.00	0.02
CH019	Pyewipe	Redshank	36	205	206	112	559	139.75	0.22
CH019	Pyewipe	Ringed Plover	0	76	164	0	240	60.00	0.10
CH019	Pyewipe	Shelduck	425	610	588	331	1,954	488.50	0.77

**Sub-sector CH019. Winter monthly counts and densities**

Sector	Sector Name	Species	Monthly Count					Seasonal Total	Seasonal Average	Seasonal Density
			November	December	January	February	March			
CH019	Pyewipe	Avocet	0	0	0	2	0	2	0.40	0.00
CH019	Pyewipe	Bar-tailed Godwit	0	183	204	450	73	910	182.00	0.29
CH019	Pyewipe	Black-tailed Godwit	1,753	1,800	801	400	0	4,754	950.80	1.51
CH019	Pyewipe	Curlew	48	23	140	157	359	727	145.40	0.23
CH019	Pyewipe	Dunlin	220	1,800	2,000	2,000	1,070	7,090	1,418.00	2.25
CH019	Pyewipe	Golden Plover	150	4,500	2,300	350	0	7,300	1,460.00	2.31
CH019	Pyewipe	Grey Plover	0	19	43	65	38	165	33.00	0.05
CH019	Pyewipe	Knot	0	1	0	6	0	7	1.40	0.00
CH019	Pyewipe	Lapwing	486	1,500	480	0	0	2,466	493.20	0.78
CH019	Pyewipe	Mallard	0	7	7	4	0	18	3.60	0.01
CH019	Pyewipe	Oystercatcher	0	0	3	5	16	24	4.80	0.01
CH019	Pyewipe	Redshank	20	80	237	150	250	737	147.40	0.23
CH019	Pyewipe	Shelduck	415	200	554	447	299	1,915	383.00	0.61
CH019	Pyewipe	Teal	0	0	0	4	0	4	0.80	0.00
CH019	Pyewipe	Turnstone	0	10	8	3	2	23	4.60	0.01

Figure 5.2: Abstracts from BTO Research Report 642

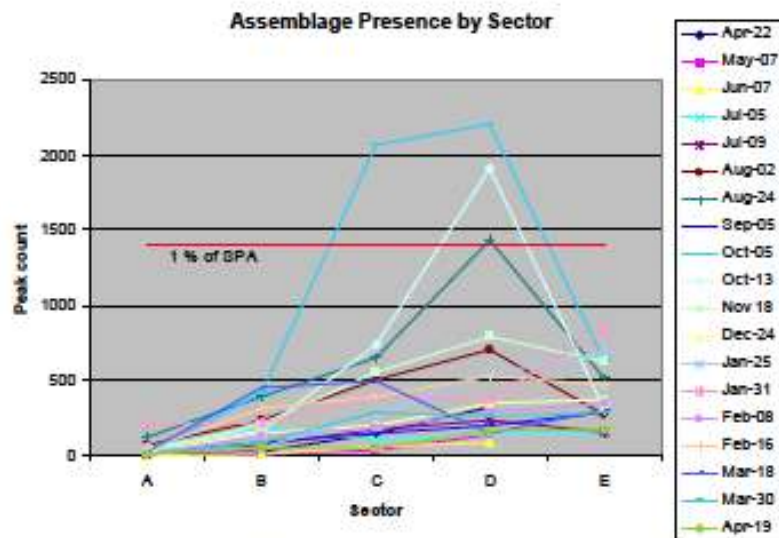
[www.bto.org/sites/default/files/u196/downloads/rr642.pdf](http://www.bto.org/sites/default/files/u196/downloads/rr642.pdf)

5.5.9 Although something of an aside, in their letter dated 11 October NE state that:

*'The area of mudflat at Killingholme Marshes is important for more than 5,000 SPA/Ramsar waterbirds thereby demonstrating exceptional ecological functionality in terms of its ability to attract and support high numbers of foraging birds. In particular, the mudflat supports internationally important numbers of black-tailed godwits (peak count 2,566 representing 66% of the entire Humber Estuary SPA/Ramsar population) in addition to large numbers of seven other species of SPA/Ramsar waterbirds. The high numbers of black-tailed godwits feeding at Killingholme Marshes means that this one area of mudflat meets the qualifying criteria for SPA status in its own right', (paragraph 4).*

The source of NE's understanding that the NKM foreshore is 'important for more than 5,000 SPA/Ramsar waterbirds', is not stated but it may be that they have derived an exaggerated understanding of the bird count data presented in the ES. At paragraph 11.5.73 of the ES, the peak bird count at any time is recorded to be 3 766 during 'one hour of (the Through The Tide) survey on the 5 October 2012 for all sectors'; somewhat less than the figure of 5 000 quoted by NE. It may be that the higher figure quoted derives from a misunderstanding of ES Figure 11.5 which is reproduced below. Whilst the graph shows the peak counts in each sector, those peaks occur at different times of the 6 hour survey as the flocks move around on the foreshore. The peak counts for each sector are not therefore additive; that would double count the number of birds present.

**Figure 11.5 Surveys Showing Bird Assemblage Presence at Killingholme Marshes Foreshore Across Each Sector from April 2010 – April 2011**



Source: Data provided by TTTC Waterbird Surveys April 2010 – April 2011.

## **5.6 Issue 6 – RTE Management Measures**

- 5.6.1 Two principal parameters have to be managed in order to make the RTE function optimally. The first of these is the water level within the sites, the second is the average bed level within the fields. The Environmental Management and Monitoring Plan for the compensation works ('the CEMMP') includes Objectives COMP 1, 2, 3 and 4 which relate to the management and monitoring of these aspects.
- 5.6.2 With sluice operation, the RTE fields will fully inundate under spring tide conditions and will remain dry under neap tide conditions. In order to keep the fields wet over the neap tide periods it is necessary to retain a reservoir of water in one of the fields and to use this to feed water into the other fields over the neap tide period.
- 5.6.3 Objective COMP 1 requires that each RTE field is to be 18ha in size with the internal ponds and channel areas comprising about 1.5ha per field. This makes an approximate mudflat area in each field of 16.5ha. Each field will have operational sluices to enable impoundment and drainage of a field at near peak spring tide level and additional operational sluices to enable drainage of impounded water from one field to another adjacent field.
- 5.6.4 Objective COMP 1 has a further target that leakage of water from a fully impounded field into underlying soils is to be less than 200mm over a 10 day period. It also states that the RTE fields will be constructed to an initial level of between +1.9m OD and +2.0m OD. The level of the RTE fields is critically dependent upon the tide levels at the site and as part of their review for Natural England, Royal Haskoning has noted that a short period of tidal level measurements directly adjacent to the proposed breach would help improve confidence in the assumptions about the design level and operational mode for the site. It is proposed that such measurements are made to confirm the model predictions that have been used to date as the basis of informing the design.
- 5.6.5 Objective COMP 2 includes for monitoring of levels within the RTE fields. This will be undertaken through a combination of water level monitoring within the fields and LiDAR or other monitoring techniques. During the warping up period a basic photographic survey of marked stakes will be undertaken once a month to record accretion rates in the fields. LiDAR surveys will be undertaken once every 1 to 3 years.
- 5.6.6 Objective COMP 2 also relates to the warping up phase of the site development. The intent is that initially the fields are left with inlet sluices fully open so as to promote the most rapid build-up of sediment in the fields. Accretion will be monitored on a monthly basis. The target is to achieve about 100mm of accretion within the fields and then to switch the mode of operation of the sluices (though as noted previously this could be increased to 150mm). After the first winter period following breaching (say March/April) the sluices are expected to be managed to avoid extended drying of the mudflat resource over the neap tide period in the summer and to promote evolution of the mudflat benthos.
- 5.6.7 If the rate of warping up is greater than anticipated then the normal operating mode can commence earlier in the winter so extending the period that the fields can be operated before maintenance operations are required. If the rate of warping up is slower, the additional outlet sluices in the fields can be opened up to increase exchange. Additionally the period of warping up could be extended but this may delay the overall development of the site.



**ABLE MARINE ENERGY PARK**  
**RESPONSE TO DEPARTMENT FOR**  
**TRANSPORT'S 'MINDED TO APPROVE' LETTER**  
**IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

- 5.6.8 Objective COMP 3 provides that an Operating Manual for water level management by site managers will be prepared within 6 months of the site being breached. This Manual will be based upon trials of sluice operation, impoundment and flushing during the warping up phase. Water levels will be monitored within the fields at this time and the sluice settings will be recorded. The Operating Manual will be reviewed after 18-24 months when some operational experience has been gained after completion of the warping up phase. Thereafter the manual will be reviewed every 24 months and any modifications to operating procedures adopted.
- 5.6.9 Objective COMP 4 requires the development and implementation of a sediment management plan for the RTE fields. Through observation of the initial rates and patterns of accretion in the RTE fields, plans for redistribution and removal of sediment will be developed. Monitoring will include for particle size distribution and density of the accumulating material. The plan will be developed 24-36 months after the site has been breached. Initial trials for removing material by flushing, bed levelling and excavation/dredging will be undertaken with the plan being fully implemented some 5-10 years after breaching of the site depending upon the actual observed rates of accretion in the fields. Based on the results of trials and success of the implementation the sediment management plan will be reviewed every 24 months. The plans for water level management and sediment management will be reviewed at the same time.

**5.7 Issue 7 – Development of The MR Site**

- 5.7.1 Royal Haskoning raised a concern in their Peer Review for Natural England that accretion within the managed realignment part of the site could eventually develop to such an extent that it affects the filling or emptying of the RTE sites. Objective COMP 5 includes for monitoring outside of the RTE fields. There will be a survey of the area by LiDAR once every 1 to 3 years and photographic surveys will also be made of the realignment site. In conjunction with knowledge of water levels in the RTE fields and records of settings of the sluices it will be possible to identify whether there is any change in the rate of filling or emptying of the fields as evolution of the managed realignment part of the site proceeds.
- 5.7.2 In essence it will be the main creek of the realignment part of the site that conveys water to and from the sluices. The evolution of this creek will be influenced by various processes over time. In the long term the managed realignment part of the site will accrete and is predicted to develop as salt marsh over the medium term. Thus the tidal volume exchanged within this part of the site will gradually reduce over time leading to the potential for accretion of the main channel. During the warping up phase of the RTE fields the tidal volumes changing with the RTE fields will be a maximum. When the switch is made to a managed mode, the tidal volumes regularly being exchanged will reduce and the volumes of water being conveyed through the creek will reduce resulting in a potential for accretion. Over time the bed levels in the RTE fields will increase as a result of accretion and the tidal volumes exchanged will further reduce. Eventually a near steady state will arise in the site with salt marsh extent stabilised in the realignment part of the site and sediment management measures in the RTE fields broadly maintaining a stable tidal prism.
- 5.7.3 Occasional flushing of the RTE fields to assist in removal of sediment from the fields may also impact the creek. Indeed flushing of the RTE fields could



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**


**OCT 2013**

be undertaken so as to deliberately maintain the creek rather than remove sediment from the RTE fields. Over time methods to optimise sediment management in the RTE fields and through the creek if required will evolve. It should be noted that the potential volume of water that can be stored in the four RTE fields for flushing of the creek is very large compared to the size of the creek so it is reasonable to consider that appropriately timed flushing (at a selected tidal state) should be a reliable method of maintaining the cross-section in the creek.

- 5.7.4 Whilst not anticipated by the modelling, should the creek erode unacceptably over time with a risk of impacting the RTE structures then mechanisms to prevent ongoing erosion could include direct placement of some of the material removed from the RTE fields and the possible introduction of stakes and poldering to retain the material

**5.8 Issue 8 – The Design of CCS Wet Grassland**

- 5.8.1 Since the Examination was completed, the Applicant has obtained planning permission from East Riding of Yorkshire Council (ERYC) for the development of wet grassland and a wet roost at Cherry Cobb Sands, ERYC planning reference DC/12/04154/STPLF/STRAT.
- 5.8.2 Further design details for this element of the compensation measures are provided in a separate report, '*Cherry Cobb Sands Wet Grassland Detailed Design*', (Thomson Ecology, July 2013).
- 5.8.3 The key uncertainty in the design of this element was the quality of the water source. In short, the Applicant has undertaken extensive investigation into the suitability of Keyingham Drain to provide a back-up water supply where there is insufficient rainfall in any one year. In late June/early July 2013 data loggers were installed in the Drain adjacent to the site, to establish its salinity on a continuous period over a three-week period. That data identified a highly variable range of salinity within the Drain of 4 - 25 PSU's (Practical Salinity Units), with an average of 12, and tidal influence is very evident. However, in reviewing the methodology used in that survey, it became apparent that the data loggers actually measured water conductivity and that there were a range of electrolytes, other than those present in seawater, which might have influenced the readings. Given the extensive use of chemicals on agricultural land the possibility that polluted surface water run-off from the catchment area was affecting the results, needed to be excluded. Accordingly, six water samples were taken along the length of the Drain between the outfall and up to 4km upstream of the outfall. The results showed elevated levels of both sodium and chloride, confirming that the Drain is contaminated with estuarine waters. We also commissioned the Institute of Estuarine and Coastal Studies (IECS), to undertake a botanical and invertebrate survey of the Drain to understand the existing local ecosystem more thoroughly along the same length of Drain. The conclusion of that study is that the Drain hosts a number of plants that are all tolerant of saline conditions. More freshwater conditions may pertain upstream of the CCSWG site however. The IECS surveyors also observed intrusion of estuarine waters at the outfall that was migrating upstream.
- 5.8.4 Having undertaken an extensive soil investigation earlier this year, it is also possible to exclude saline groundwater as being responsible for the conditions in the Drain. Accordingly, there is a high level of certainty that the saline conditions in the Drain result from an existing fault at the outfall,

	<b>ABLE MARINE ENERGY PARK          RESPONSE TO DEPARTMENT FOR          TRANSPORT'S '<i>MINDED TO APPROVE</i>' LETTER          IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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whereby the tidal gates do not provide a sufficiently tight seal at high tide and that this is, in fact, the only cause of the salinity in the Drain.

- 5.8.5 Further details are included in an accompanying report, '*CCSWG Keyingham Drain Salinity Studies*', (Able, 2013).

## **6 APPLICANT'S RESPONSE TO PARAGRAPHS 6 AND 7 OF NE'S 16-11-12**

### **6.1 Paragraph 6 – Inconsistencies Identified by RSPB**

6.1.1 The RSPB have flagged a number of inconsistencies in the text of Report EX28:Part 3. Many of these arise because the modelling work described in the earlier Chapters of the report relates to an earlier design of the RTEs which had a smaller total field area than that referred to in Chapter 7 which refers to the areas that would arise following the final design process. The descriptions of the site provided in Chapter 8 of the document also relate to the final proposed scheme.

6.1.2 Regarding ongoing siltation rates in the fields the expectation is that the fields will begin to require the adoption of management measures to remove sediment from the fields within 5 years of the fields becoming operational. These techniques will be adapted and optimised over time. The lower the level of the fields when they become operational the longer the period before the full measures for maintaining depths in the fields.

6.1.3 In respect of the quantity of mudflat that the fields can provide the intent is that each field will be about 18ha in size and will be able to provide 15ha of functional mudflat resource. This is illustrated in Annex 5.1. The reduction in area for each field from 18ha to 15ha is because about 1.5ha of each field will comprise energy dissipation areas, drainage creeks and ponds. A further 1.5ha per field (on average) is expected not to be fully functional, once the management measures have been refined, because of recent maintenance activity. The areas shown in Tables 9.1, 9.2 and 9.4 of Report EX28:Part 3 did not include for this reduction of 1.5ha per field arising from recent maintenance activity.

6.1.4 For the purposes of the assessment of the RTE function mudflat in the RTE fields is assumed to be areas below +2.5m OD. The water level regime in the RTE fields is different to that in the main estuary or the managed realignment part of the site. In these areas saltmarsh would be expected to become established at levels above +1.9m OD. However in the RTE fields regular inundation will prevent salt marsh development. The driver for removing accretion in the fields is to both facilitate keeping the fields wet, and also to prevent the fields having an environment where saltmarsh can develop.

6.1.5 The depth of inundation in the fields will be greatest during the warping up phase but will in any case be adaptively managed through control of the sluice gates. Any periods of peak inundation in the fields during the operational period will be short lived (as illustrated in Annex 5.1).

6.1.6 The approach to the warping up phase has been described in Section 5.6 above.

### **6.2 Paragraph 7 – Miscellaneous Issues**

#### Time Lag

6.2.1 This issue is addressed in Section 5.2 above.

#### Quantum of Mudflat

6.2.2 This issue is addressed in Section 5.1 above



Equivalence of Food Resources to be Lost

6.2.3 This issue is addressed in Section 5.5 above

'Open-ness' of the Compensatory Mudflat

6.2.4 Concern has been expressed by NE that the enclosed nature of the RTE fields would be such that the target species, in particular black-tailed godwits, would be inhibited from using the compensation site. The RTE will consist of four RTE cells averaging 18ha in extent, of open habitat, each with the shortest distance between cell walls being approximately 200m, and the longest being in excess of 500m. In addition there will be a managed re-alignment component where the longest views will be almost three kilometres. The total site will be over 4.5km long.

6.2.5 The evidence base within the scientific literature for wading birds being inhibited from foraging by artificial structures and enclosed wetlands is limited. Most of the data relating to waders avoiding edges and requiring open views appears to be derived from work on breeding waders. In particular, proximity to trees has been linked to predator cover and perches in studies both in the UK<sup>3</sup> and Netherlands<sup>4</sup> that contribute to wader breeding failure. Evidence of similar winter responses by waders to structures has not been found, although in sites with high levels of predation segregation of juveniles into those areas with the highest predation risk can occur<sup>5</sup>.

6.2.6 A recent comprehensive study of managing wetlands for waterfowl indicated that species that forage close to the shore were generally "area-independent", that is the size of the waterbody was not a constraint on use and such species would persist even in small ponds<sup>6</sup>. Black-tailed godwit can and do occur on small waterbodies, often coming close to artificial structures such as hides. In a recent (2/8/13) reserve blog from Blacktoft Sands RSPB reserve it was reported that "*Today, all 146 of the Black-tailed godwits present at Blacktoft Sands have been on our smallest lagoon marshland. When I went down this morning, many of these stunning birds were directly in front of the hide*". This lagoon is barely a hectare in size (including the large island) with the longest uninterrupted view being approximately 110m.

6.2.7 Evidence within the scientific literature of use of artificial wetlands is high, and such habitats can play a major role in supporting the bird populations of

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<sup>3</sup>Amar, A., Grant, M., Buchanan, G., Sim, I., Wilson, J, Pearce Higgins, J.W., & Redpath S. 2011. Exploring the relationships between wader declines and current land use in the British uplands. Bird Study Vol. 58, Iss. 1.

<sup>4</sup>Melman, T.C.P, Schotman, A.G.M, Hunink, S. & de Snoo, G.R. 2008. Evaluation of meadow bird management, especially black-tailed godwit (*Limosa limosa* L.), in the Netherlands. Journal for Nature Conservation 16: 88-95

<sup>5</sup>Cresswell, W. and Whitfield, D. P. (1994), The effects of raptor predation on wintering wader populations at the Tynningharnie estuary, southeast Scotland. Ibis, 136: 223-232

<sup>6</sup>Ma, Z., Cai, Y., Li, B. & Chen, J. 2010. Managing Wetland Habitats for Waterbirds: An International Perspective. Wetlands. Volume 30, Issue 1, pp 15-27

designated areas<sup>7</sup>, both in the UK and globally. Many such wetlands are highly modified structures such as the Fen Drayton gravel pits (a site supporting international numbers of black-tailed godwits). Others such as the imposing engineering structures of the Musselburgh Ash Lagoons form part of the Firth of Forth Special Protection Area due to their importance for waders and wildfowl.

- 6.2.8 On the Humber, the artificial North Killingholme Haven Pits play an important role in supporting roosting black-tailed godwit that use the estuary, with a peak Through the Tide Count (TTTC) of 3 800 in August 2010. According to the SSSI notification the site totals 20.61 hectares in total, it is subdivided into three smaller lagoons and the margins of the lagoons contain extensive areas of reed and club rush giving a very enclosed environment. Tall hawthorn scrub surrounds much of the lagoon area, whilst to the west there is an imposing sea wall carrying a road and footpath. Sight lines for black-tailed godwits and other waders using this site are therefore usually short (approximately 290m diagonally across in the largest lagoon but generally ranging between 40m-200m), and surrounded by high vegetation.
- 6.2.9 In addition, black-tailed godwits on the NKM foreshore are recorded to regularly use the area between the Immingham Gas Jetty (IGJ) and South Killingholme Oil Jetty (SKOJ), both substantial structures which have large vessels arriving and departing on a daily basis. This enclosed area measures approximately 400m between jetty structures and 350m from the sea wall to the low water mark, or around 14 ha overall, less than the size of the RTE Fields that are proposed. Yet within this area, Black tailed godwits and many other species are frequently present (ES, Annex 11.9). This part of the foreshore is shown in Figures 6.1 and 6.2.
- 6.2.10 Perhaps the most compelling evidence that BTGs will not be discouraged from using the RTE fields by the mere presence of the dividing bunds, is that the BTGs most intense use of the NKM foreshore is during the highest part of the tidal cycle (Figure 6.3). During this period they are confined between the tidal edge and the existing flood defences and occupy a sliver of foreshore no more than 90m wide (refer to Figure 5.1). During a site visit in October 2013, the footprints of foraging birds were clearly evident adjacent to the flood defence wall (Figure 6.4).
- 6.2.11 Recent photographs of black-tailed godwits feeding on an enclosed mudflat at Salinas Del Duque in Spain, are also presented in Figures 6.5 and 6.6, showing conclusively that such environments do not deter this species.
- 6.2.12 NE's concerns regarding waders' reactions to the artificial nature of the compensation site are understandable, but there is little evidence in the scientific literature, or by reference to BTG behaviour on the NKM foreshore, or by their behaviour in similar undisturbed environments to support this view. There is considerable evidence from global, UK and Humber sites that waders will use artificial sites, including sites smaller than that proposed within the compensation site and with significantly shorter views.
- 6.2.13 It is noted that NE's letter dated 11 October 2013 agrees that '*that there is little empirical evidence*' to support their concerns.

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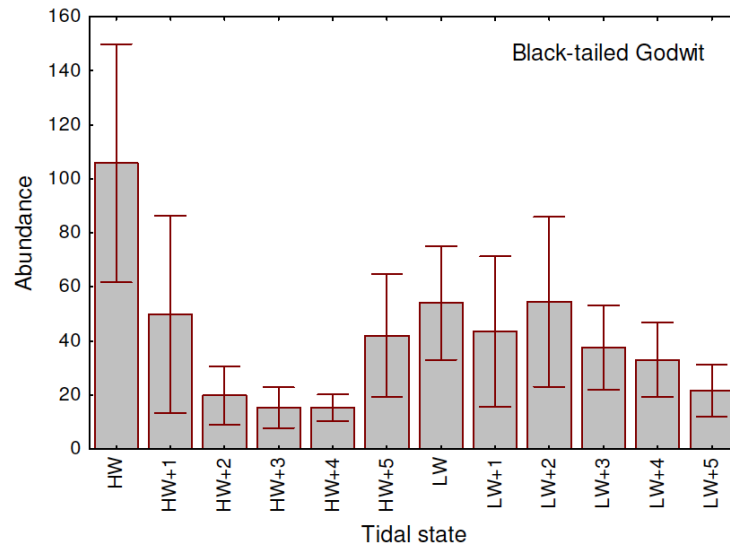
<sup>7</sup>Kloskowski, J., Green, A. J., Polak, M., Bustamante, J. and Krogulec, J. (2009), Complementary use of natural and artificial wetlands by waterbirds wintering in Doñana, south-west Spain. Aquatic Conserv: Mar. Freshw. Ecosyst., 19: 815-826



**Figure 6.1:** NKM Foreshore between IGJ and SKOJ (with vessel present)



**Figure 6.2:** Flood Defence Wall along NKM Foreshore



**Figure 35:** Tidal variation in the mean numbers of Black-tailed Godwit on the intertidal zone ( $\bar{x} \pm SE$ )

**Figure 6.3 :** BTG Presence on the NKM Foreshore During the Tidal Cycle (Abstract from ES, Annex 11.9)



**Figure 6.4:** Footprints Adjacent to the flood Defence Wall along NKM Foreshore (October 2013)



Figure 6.5: BTG's foraging on enclosed mudflats, Salinas Del Duque, Spain, 2013



Figure 6.6: BTG's foraging on enclosed mudflats, Salinas Del Duque, Spain, 2013

Disturbance to Mudflat during Management Operations

- 6.2.14 Two forms of disturbance will arise during the operation of the compensation site: regular daily operation and monitoring of the infrastructure, and periodic RTE field management.
- 6.2.15 Daily management will be required over about half of the spring-neap cycle. On one day of the spring tide period, water will be required to be impounded in one of the RTE fields. As the neap tide period is approached daily management will be required to ensure that the fields sequentially retain, drain and refill until during the subsequent rising tides, the tide levels are sufficient for this to happen without alteration of the sluices. Daily management will involve two staff in a vehicle stopping at each of the sluices during the tide cycles that require adjustment. The sluices are clustered, with four structures within 200m of each other, two further structures together and a single outlier along the main crossbank. With an average area of 18ha, all cells and the managed realignment area would have space to accommodate birds displaced assuming a worst case scenario of 275m adopted for construction disturbance at Killingholme Marsh. In practice it is unlikely that disturbance would be as extensive as this, as species such as black-tailed godwit and small waders such as dunlin have a higher threshold of disturbance<sup>8</sup> and the sluices provide some screening. In addition, closing and opening of sluices is required when sufficient water has entered the cell and birds will naturally be feeding at the distal portion of the water's edge furthest from the sluice gates. The cross bunding between cells would also reduce disturbance by providing screening from the operators. Daily disturbance levels would therefore be considerably less than those currently experienced.
- 6.2.16 Management of the RTE will be undertaken using flushing via the sluices during spring tide conditions but it is anticipated that within 1-3 years bed levelling would be required. After 5-10 years dredging may be required to reduce sediment levels. The process is discussed in EX28.3:Part 3. Removal of sediment from the fields by bed levelling and dredging/excavation may be carried out by land based or water borne plant. Land based plant will require the field to be largely drained for their operations. Water borne plant will require the field to be inundated to a maximum level.
- 6.2.17 Bed levelling would be concentrated around sluice areas to aid flushing of sediments out of the system. Bed levelling would be undertaken in each field on successive periods of spring tides during the April-May period. Disturbance effects would be confined to only a single cell on each occasion. If water borne plant is used it is unlikely that wading birds would be using the cell undergoing levelling as the work would be carried out at a high impounded level. If land based plant is used wading birds would have access to those parts of the cell where disturbance was at an acceptable level. The timing of the works corresponds with the period when the target species utilising the compensation site are present in lower numbers, and avoids the peak autumn black-tailed godwit period. The peak count recorded in April during the Through the Tide Counts clearly indicate that the species for which the compensation site is provided are present in significantly lower

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<sup>8</sup> Cutts, N., Phelps, A. & Burden, D. 2009. Construction and waterfowl: defining sensitivity, response, impacts and guidance. Report to Humber INCA. Institute of Estuarine and Coastal Studies, University of Hull



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

numbers than the target levels set for the compensation site. For example the peak April black-tailed godwit population was just 136 birds.

- 6.2.18 Dredging would be undertaken during April-June by either land based or water borne plant. Dredging would be focused on the drainage channel and pond areas around the perimeter of the field. Material would be removed by dredge pump and discharged with water via a pipeline into the managed realignment part of the site. The cell would require to be impounded during the dredging period. If water borne plant is used within the field then the impounded level would need to be at a maximum. If land based plant is used then the water level would only need to be at a sufficient level to enable the dredge pumps to operate. It may therefore be practical for some of the cell to be available as a feeding resource during land based operations. Three other cells would remain operational and available for use by birds. The work is estimated to take 50 hours and would be confined to daylight ebb tides. Disturbance from dredging noise and activity would be screened by the presence of the cross bunds. As with bed levelling the number of birds requiring access to the compensation site will be considerably lower than the autumn and winter period.
- 6.2.19 With only three cells operating during dredging and levelling operations functional disturbance could potentially have a more significant effect. Construction disturbance distances of 275m adopted within the Habitats Regulation Assessment were based on the most sensitive receptor (curlew) and used as a proxy for all species. However, during spring it is known that black-tailed godwit move to wet grassland areas to feed. The wet grassland component of the compensation site will be fully functional and long-billed waders will have a further feeding buffer to disturbance available. Short legged waders are known to be much less susceptible to disturbance with dunlin having a construction disturbance distance of 120m (Cutts et al 2008). The functional disturbance acting on the compensation target species, which are known to be present in lower numbers during this period, would therefore be buffered by alternative feeding options for the most sensitive species, reductions in noise and visual disturbance due to the presence of bunding between cells, and restricted periods of working over daylight spring ebbs only.
- 6.2.20 The level of disturbance to the mudflat resource that occurs during management operations will be one of the factors taken into account during refinement and adaption of the management measures. If sediment removal can be accomplished with land based plant then it will be possible to undertake the work more selectively minimizing the total area of the RTE field being disturbed. It would also not be necessary to fully impound the field for the period of management works that would be required if water borne plant were used for the works.

The EMMPs

- 6.2.21 Following completion of the Examination, the Applicant undertook extensive consultation with NE in order to complete three Environmental Management and Monitoring Plans, one of which relates to the compensation measures. They are legally enforceable by NE through an Agreement signed with the Applicant. NE confirms in their letter of 11 October 2013 that, '*completion of a detailed CEMMP and legal agreement gives a high level of certainty and low risk in the delivery of compensation measures*'.

## **7        A NOVEL DESIGN?**

### **7.1        Natural England's Concern**

7.1.1        Paragraph 8 of NE's submission of 16 November to the Panel stated that:

*'(i)t is right to acknowledge that much work has been put into developing (albeit at a very late stage) interesting and apparently workable plans for mudflat habitat at Cherry Cobb Sands. **The proposal is however novel, and the environment in which it is located is challenging. It is possible that the compensatory measures will succeed, however there is a substantial risk that they will not. It is acknowledged that there will always be doubts in relation to compensation proposals, however the doubts in this case are amplified by a combination of the points noted above: time lag, limited extent, questionable quality and uncertain implementation. The remainder of this summary will elaborate on some of these points'***, (emphasis added).

7.1.2        In their letter dated 11 October 2013, NE recorded at paragraph 9 that,

*'Put simply, the "substantial risk" relates mainly to the **unproven potential for an untested system** of regulated tidal exchange (RTE) cells to provide the compensatory mudflat habitat necessary to support an internationally-important population of black-tailed godwits as well as large populations of seven other SPA/Ramsar waterbirds'*, (emphasis added).

And at paragraph 11 that,

*'given that the RTE is a novel approach untested at this scale in the UK (and **never trialled on the Humber**), it is our view that the level of uncertainty regarding the success of the compensation measures is greater in this case'*, (emphasis added).

7.1.3        On the face of it, these are quite precisely framed concerns, and of course it will always be possible for any party to develop ever more precise concerns that are, simply due to their very precision, increasingly difficult for the Applicant to address. For example had previous RTE schemes been demonstrated to be sustainable on the Humber Estuary, then a precedent would exist, but that precedent might then be questioned because it was in a different stretch of the estuary, or at a different elevation, or because of any other potential difference. The fact is however that RTE is not in itself novel, as explained later in Section 8 of this report. The Applicant's design is based on well-known engineering principles for water management, a sound understanding of the underlying ecological sciences and is supported by experience from other tidal exchange schemes used to create particular intertidal habitats.

7.1.4        In short, if NE's 'novelty argument' were to be accepted as sufficient grounds for concern, then the compensation scheme for Immingham Outer Harbour could not have been consented. In the verbatim words of the legal Agreement signed by the Statutory Nature Conservation Body at the time (English Nature), as well as others, the associated compensatory measures comprised, '**a new design never tried before**'. It cannot therefore be a sufficient argument in itself that the design has never been tried before on the Humber Estuary and this also becomes evident on review of the available guidance.



## **7.2 EU Guidance On Article 6(4) Of The Habitats Directive**

7.2.1 EU Guidance, '*Clarification Of The Concepts Of: Alternative Solutions, Imperative Reasons Of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion Of The Commission*' (EC, 2012), provides wide ranging guidance on both the derogation tests associated with Article 6(4) and also on determining the appropriateness of any compensatory measures. Specifically, Section 1.5 details the criteria for designing compensatory measures. In short, the measures must be: targeted to address the damage; technically feasible; sufficient in scale; appropriately located; delivered within an appropriate timescale and (ideally) enforceable through binding agreements.

7.2.2 At Section 1.5.2, the guidance states that:

*'(m)asures for which there is no reasonable guarantee of success should not be considered',*

The monitoring of previous intertidal habitat creation sites on the Humber has cast doubt on the sustainability of any managed realignment scheme within the turbid environment of that estuary. So, it is the existence of these less than successful managed realignment schemes that has driven the development of a design that now has a '*reasonable guarantee of success*', even though it has not been trialled on the Humber before. Using information from one of these previous schemes (Paull Holme Strays), the Applicant's design has been calibrated to be as precise as possible at this moment in time. The 'novel' design has thus been developed to ensure that there is a '*reasonable guarantee of success*'; it has certainly not arisen from any intent to skimp on the compensatory measures, it is a far more costly solution than managed realignment.

7.2.3 The Applicant has demonstrably addressed the risk of operational failure proportionately by proceeding through an iterative and very detailed design process to identify the most ecologically effective design option in the particular circumstances of this case. This is borne out by NE's own engineering consultant whose Peer Review:

*'agree(s) with the approach of using RTE given the (prescriptive) requirement for mudflat habitat. Breach MR alone would be likely to result in quite notable salt marsh development over time, rather than the desired mudflat extent', ('AMEP CCS Compensation Site Peer Review', p4, Royal Haskoning, 2012).*

Furthermore NE's engineering consultant confirmed that the level of design detail developed for the scheme is '*good .... given the stage of the scheme*', ('AMEP CCS Compensation Site Peer Review', p5, Royal Haskoning, 2012). It should be noted that NE's engineering consultant is responsible for the design of the compensation measures at Bathside Bay and is therefore suitably experienced to make such judgements.

7.2.4 The design risk was further addressed post-examination by agreeing a detailed Environmental Monitoring and Management Plan for the compensation site and entering into a legal Agreement with Natural England to ensure its delivery to the satisfaction of a Steering Group with representatives of the major stakeholders.

7.2.5 On the matter of technical feasibility, the guidance states that:

*'According to current knowledge, it is highly unlikely that the ecological structure and function as well as the related habitats and species populations can be reinstated up to the status they had before the damage by a plan or project. To overcome the intrinsic difficulties standing in the way of full success for the reinstatement of ecological conditions, compensatory measures must be designed:*

- Following scientific criteria and evaluation in accordance with best scientific knowledge,*
- and taking into account specific requirements of the ecological features to be reinstated (e.g. soil, humidity, exposure, genetic pool, existing threats and other conditions critical to the success of reinstatement).'*

7.2.6 In response to that, it is evidenced in the material submitted to the Panel, and confirmed by NE's Peer Review, that the Applicant has undertaken a comprehensive design process using the best scientific knowledge which was pointedly informed by published monitoring of a nearby habitat creation scheme on the Humber Estuary, Paull Holme Strays.

### **7.3 EU Guidance on 'The Implementation of the Birds and Habitats Directive in Estuaries and Coastal Zones'**

7.3.1 In 2011, the EC produced sector specific guidance on the implementation of the Birds and Habitats Directives in estuaries and coastal zones. With regard to addressing residual uncertainty the guidance states:

*'Compensatory measures must be feasible and operational in protecting the overall coherence of the Natura 2000 network. The estimated timescale and any maintenance action required to enhance performance should be specified as early as possible in the project. Once the compensation scheme is agreed, the permits granted and a monitoring programme in place, unforeseen uncertainties should in principle not significantly hamper the core of a plan or project. Such possible new uncertainties should, however, trigger targeted investigations and if necessary extended monitoring and adaptive or corrective measures', (Section 3.3.4).*

*'An adaptive approach for the implementation of a plan or project or a compensation scheme may be particularly useful to address cases where, due to uncertainty associated with different contributory factors (location, confidence, unexpected delays), it is impossible to define all the effects of the plan or project or of a compensation scheme in sufficient details and if such uncertainty cannot be factored in through increased ratios. In such a situation, a rigorous monitoring scheme and a pre-defined validated package of appropriated corrective measures must be foreseen. Such measures must allow to adjust mitigation and/or compensatory measures to the reality of the impacts and by that way, make sure that the initially unforeseen adverse effects are being neutralized', (Section 3.4).*

7.3.2 It can be seen therefore that, overall, the guidance supports an adaptive management process to addressing residual uncertainty and pragmatically recognises the impossibility of trying to address all risks at the outset. This is precisely what the Applicant proposes.

#### **7.4 DEFRA'S 2012 Guidance**

7.4.1 In December 2012, DEFRA issued, 'Habitats and Wild Birds Directives: guidance on the application of article 6(4): Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures', (December 2012). This guidance document provides, inter alia, advice on the nature of compensatory measures, stating:

*'The competent authority ... must have confidence that the compensatory measure will be sufficient to offset the harm. This can be a complex judgement and requires consideration of factors including*

- *The technical feasibility of the compensatory measures as assessed based on robust scientific evidence. Measures for which there is no reasonable expectation of success should not be considered.*
- *Whether there is a clear plan for undertaking the compensation, with the necessary provision of management and objectives for the duration over which compensation will be needed.*
- *Distance from the affected site. In general compensation close to the original site will be preferable, but there may be instances where a site further away will be better suited, in which case it should be selected. This judgement must be based solely on the contribution of the compensatory measures to the coherence of the network of European sites.*
- *Time to establish the compensatory measures to the required quality.*
- *Whether the creation, re-creation, or restoration methodology is technically proven or considered reasonable, (paragraph 31, underline added).*

7.4.2 Thus the DEFRA guidance is clear, that in the absence of a proven precedent, the relevant consideration should be whether the proposals are '*considered reasonable*'. The Applicant can only reiterate that the design process has been undertaken by a team of suitably qualified and experienced engineers and ecologists, has had regard to available monitoring data of key sites, other RTE schemes and is substantially supported by the Peer Review commissioned by Natural England. In the absence of a precedent '*trilled on the Humber*', the Applicant could not have approached the problem in any other way.

## 8 CASE STUDIES OF REGULATED TIDAL EXCHANGE

### 8.1 General

8.1.1 In the Applicant's comments on the Written Representations, a report is included at Appendix WR21.1, which provides an overview of Regulated Tidal Exchange. In brief, RTE is **not** an experimental solution, but has been used on many projects. Over 10 years ago, the Environment Agency (EA) and the RSPB jointly contracted Haycock Associates to review existing RTE schemes, and subsequently they published, '*Regulated Tidal Exchange: An Inter-tidal Habitat Creation Technique*', (EA, April 2003). The publication notes that the study had identified 'over 60' locations, with schemes up to 600 ha in extent; refer to Table 8.1 below. In all cases involving tidal control structures, the ecological success of the reported schemes is recorded as 'good'.

Type of Structure	Engineering Sluice or Tide Gate System (no pipe)	Pipe Through Sea Wall	Spillway System	Artesian Well System
Examples	Thousand Acre Marsh, Wellfleet, USA	Barn Island Marshes USA, Gwent Levels UK, Tees Estuary UK	Saltram, Plymouth, UK	Schouwen, Netherlands
<b>Critical Requirements</b>				
Ecological Success	Good	Good	Good	Moderate
Typical area, ha	120-600	5-150	5	40
Seawall or permanent impoundment	✓	✓	✓	✓
Water entry point	✓	✓	✓	
Water exit point	✓	✓	✓	✓
Impervious upper strata or marsh base	✓	✓	✓	✓
Permeable sub-strata or marsh base				✓
High differential tidal pressure needed to achieve sufficient saline ground water flow				✓
Freshwater source to prevent hyper-salinity				✓
Controlled inundation	✓	✓	✓	✓
Installation	Complex	Simple	Simple	Complex
Risk of breaching sea defences	Moderate	Low	Moderate	None
Area inundated	Larger	Limited	Larger	Limited
Cost	High	Low	Moderate	Low
Tidal Flow Rate	High	Low	High	Low
Risk of Hyper-salinity		✓		✓
Silting and bio-fouling	✓	✓		
Accretion rate	Low-High	Low	Low-High	Low

**Table 8.1:** Abstract from '*Regulated Tidal Exchange: An Inter-tidal Habitat Creation Technique*', (EA, April 2003)

## **8.2 Case Studies**

### **Teesmouth National Nature Reserve, 1993 (9 ha)**

8.2.1 The joint RSPB/EA publication noted above, identified a 9 ha RTE site on the coastal margin of the north-east of England as a 'good example ... of (a) project ... to provide feeding ground for wading birds'. Specifically it stated:

*'A good example of the recreation of mudflats by Regulated Tidal Exchange is proved by Teesmouth National Nature Reserve. The aims of the project were to provide feeding ground for wading birds during high tides, to maximise the water margin and movement of this margin across the mud surface and to ensure a high site coverage during the highest monthly tides to prevent the spread of vegetation. The nine hectare site was opened to tidal influences September, 1993 by the installation of a 60m long, 1.05m diameter pipe and no living animals were found in any of the ten cores taken from the site just before inundation began. The colonisation of the site by marine invertebrates was studied and found that:-*

- *The mud snail (*Hydrobia ulvae*) took about one year to start to colonise the site.*
- *The ragworm (*Nereis diversicolor*) an important food of large shorebirds took about two years to colonise the site.*
- *The crustacean (*Corophium volutator*) an important food for several smaller shorebird species took about three years to colonise the site.*

*Within three years, seven species of shorebird had fed or roosted on the site. Teal and Redshank fed regularly at low tide whilst Curlew, Ringed Plover, Grey Plover, Shelduck and Dunlin fed on the site mainly two hours before high water in August and September or when populations marine invertebrates had developed some two years after inundation. The study concluded that it takes at least three years for mudflats to develop a permanent population of marine invertebrates and successful feeding ground for shorebirds'*

8.2.2 The scientific study of the scheme noted above was undertaken from April 1993 to August 1997. The delay in successful colonization by *Nereis* and *Corophium* was considered to be attributable in part to the compaction of the intertidal muds caused by the earthmoving equipment used to contour the site. The slow increase in *Hydrobia* density was reported to be a possible consequence of low organic content of the mud. Bird use was concentrated chiefly during the hours when the adjacent estuarine mudflats (with unrestricted tidal flow) are covered by the tide, since the site provides a supplementary feeding area. Peak daytime usage occurred during the migratory passage periods when birds need to feed for longer periods than usual, in order to refuel for their migrations; high usage was also anticipated in cold winters.

(Reference, 'Creation of Temperate-Climate Intertidal Mudflats: Factors Affecting Colonisation and Use by Benthic Invertebrates and their Bird Predators.' Evans, P. R., Ward, R. M., Bone, M. and Leaky, M. Marine Pollution Bulletin, Vol. 37, Nos. 8-12 pp. 535-545, 1998).

**Lippenbroek, Belgium, (c. 10 ha)**

- 8.2.3 In northwestern Europe, the Schelde Estuary is one of the largest riverine openings on the North Sea coast. At the continental scale, despite a small river catchment of 21 863 km<sup>2</sup>, the estuary extends on a relatively large surface area of 3 872 km<sup>2</sup> stretched along 235 km of the main river and its tributaries, encompassing 44 km<sup>2</sup> of tidal freshwater surface.
- 8.2.4 The current intertidal habitats on the Schelde strongly contrast to those a century ago. Given the essential nature of the water sediment processes in the whole ecosystem functioning, the restoration of intertidal habitats was considered imperative. In 2006, a form of RTE technique was proposed with the specific aim of restoring tidal marshes on lower sites in the Belgian part of the Schelde estuary. The controlled reduced tide system (CRT) developed allowed the implementation of an **adaptable** restricted tidal regime with neap and spring tides by the use of high inlet culverts and low outlet valves. It also provides storm flood protection. As part of a wider project to combine flood protection and ecological development, over 1500 ha of tidal marsh along the whole Schelde Estuary are proposed to be created. It was hypothesised that the CRT-technique could successfully restore tidal marsh habitats on a rural site and a pilot CRT site was built at Lippenbroek, which allowed inundation in the freshwater tidal zone of the estuary. The completed scheme is illustrated in Figure 8.1 below.

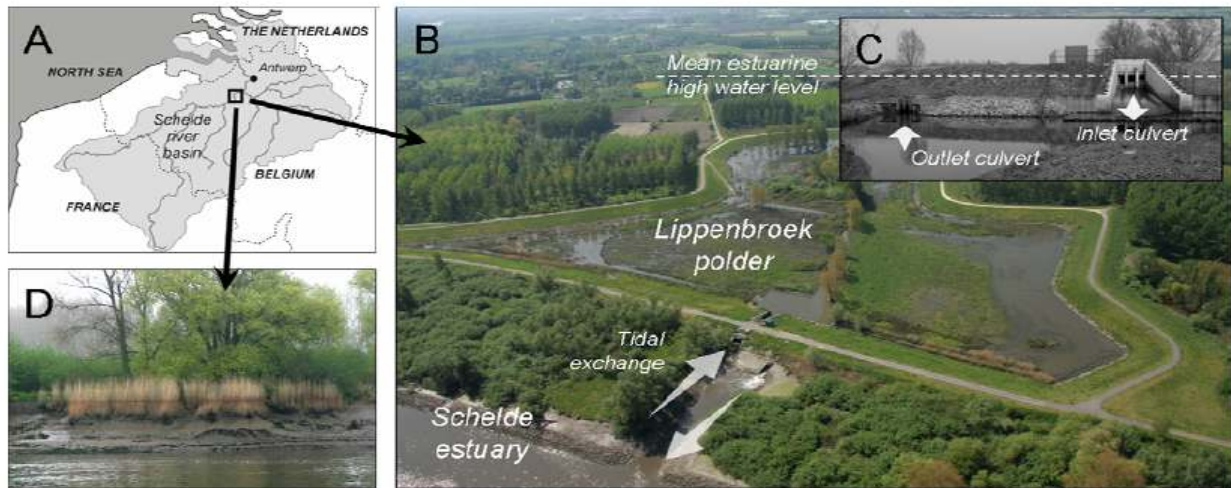


Fig. 1. A) Study area. B) The polder of the pilot project. C) View of the water exchange system, from inside the polder towards the estuary. D) Typical intertidal gradient in the freshwater zone of the Schelde estuary; the severe erosion limits pioneer marsh development.

**Figure 8.1:** Views of Lippenbroek CRT Site  
 (image abstracted from [www.vliz.be/imisdocs/publications/235952.pdf](http://www.vliz.be/imisdocs/publications/235952.pdf))

- 8.2.5 The project included tidal gates that could be adapted to enable inundation regimes to be varied, just as proposed for the intertidal compensation site for AMEP. Figure 8.2 shows the adaptable sluice gates in operation.



*Figure 3. Left: Inlet culvert construction (as seen from within the pilot restoration site), consisting of three inlet culverts, each 1 m wide, with adjustable thresholds at different heights. Right: Close-up of the inlet culverts at spring tide flooding (as seen from within the pilot restoration site).*

**Figure 8.2:** Tidal Gates at Lippenbroek (image abstracted from <http://www.tide-toolbox.eu/pdf/measures/Lippenbroek.pdf>)

- 8.2.6 After construction, different ecosystem compartments were studied within the first four years following tidal regime implementation: hydrology, sediment physicochemical characteristics, invertebrate communities, bioturbation and bird communities. The tidal characteristics generated by the CRT system were suitable with a clear reproduction of the spring-neap tidal cycle. The benign hydrology led to the formation of a fine-grained estuarine sedimentary substrate in the most frequently flooded zones, contrasting with estuarine sand flats which experience higher shear stress. Bio-geochemical services such as sediment trapping and nutrient burial were demonstrated. These new environmental conditions were shown to be more appropriate to invertebrate community development than those in reference sites from the adjacent estuary. CRT habitats displayed enriched community functioning, especially with epibenthic organisms, and for which bioturbative intensities were found to be similar to those registered in natural estuaries. Additionally, rich and stable wetland bird communities were encountered as soon as the second year, hence confirming the functionality of CRT habitats at the highest ecosystem level. Globally, the studied compartments exhibited non-random patterns structured along ecological gradients as typically observed in estuarine environment.

- 8.2.7 The studies are extensively reported in 'Tidal freshwater habitat restoration through controlled reduced tide system: a multi-level assessment', (Prof. Dr. Patrick Meir, 2012). The report records that:

*'(t)his study clearly demonstrates a significant CRT habitat occupancy by avifauna, dominantly represented by wetland specialist species. The*

*functional coherence observed and reference species pools on the one hand, and the strong correspondence between communities and habitats across seasons on the other hand, support the suitability of CRT habitats for marsh bird communities, at least for the completion of species life cycle. Moreover, the high diversity of species, among which one third exhibits ecological importance or concern at local and/or international scale, adds a strong conservation value to CRT habitats', (page 73).*

And,

*'The results emerging from this work provide evidence for the potential of the CRT technique in rapidly creating a diversified tidal freshwater ecosystem. Implementing the CRT system in brackish zones would likely result in rapid successful habitat creation given the apparent similar restoration delay in salt and freshwater zones', (page 84).*

The similarity between CRT and RTE is quite clear; they are both means of controlling tidal inundations to create a new intertidal site.

- 8.2.8 Of key importance in terms of the results of the study is that when compared to observations in the freshwater part of the estuary, there was no noticeable difference in the composition of the macro-invertebrate communities occurring on the tidal flat. This would indicate that the fauna present on the surrounding tidal flats are providing larvae and migrating directly into the CRT scheme.
- 8.2.9 Although there are fundamental differences between freshwater and salt marshes, certain features are analogous. The authors report that a rapid emergence of estuarine features was observed in the pilot CRT as soon as one year after the opening of the exchange culverts. This illustrates the ability of a CRT (or RTE) to enable larval transport of benthic invertebrates and, as evidenced by the presence of fish species, direct migration from the surrounding estuary into the RTE.
- 8.2.10 The success of this pilot project has led to the implementation of a 600 ha tidal exchange site on the Schelde, known as Kruikeke-Bazel-Rupelmonde, which is designed to provide a range of intertidal habitats.



## **9 CONTINGENCY**

### **9.1 DEFRA Guidance**

9.1.1 The DEFRA guidance, *'Habitats and Wild Birds Directives: guidance on the application of article 6(4): Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures'*, states that:

*'32 Competent authorities should not require more compensation than is needed to ensure the integrity of the network of European sites is maintained.*

*33 In designing compensation requirements competent authorities and SNCBs should ensure the requirements are flexible enough to ensure adequate compensation without going further than necessary. This recognises that in some cases compensation requirements will need to cater for uncertainty over the harm that might be caused by a proposal or the effectiveness of compensation measures, or to account for any time lag before compensatory habitat becomes established. For example:*

- If there is uncertainty about the success of the proposed measures, the compensation area might need to be to be larger than the area damaged*
- Potential actions may be required as a condition of consent in case compensation proves to be less successful than anticipated*
- It may be that anticipated harm to a site proves to be less than anticipated, or compensation measures are more successful than expected. Where feasible, compensation requirements should be sufficiently flexible to scale back the compensation required in such cases. Habitats legislation should not be used to force applicants to over-compensate'*

### **9.2 Natural England's Advice**

9.2.1 NE's letter dated 11 October 2013, concluded with the following:

*'it is Natural England's advice that as a minimum requirement Able UK should identify suitable contingency measures in the event of a failure of the RTE scheme', (paragraph 29).*

9.2.2 No example is provided as to what a 'contingency' might be in practice. However, the concern again focuses on the possibility that the RTE scheme fails to some degree, and whether totally or partially is not clear but it is inferred from paragraph 28 of the letter to be a total failure, as that states:

*'The key residual risk is a consequence of the large scale of impact and the RTE scheme being a novel approach, untested before on this scale in the UK, and requiring extensive intervention management and monitoring. In this respect the proposed RTE is experimental and the associated risk, in our opinion, is not comparable with other compensation schemes implemented in the UK. Thus **there is a residual risk that the RTE scheme does not deliver the required compensatory habitat for black-tailed godwits,** which it may not be possible to resolve through adaptive management', (emphasis added).*

- 9.2.3 So the precise concern appears to be a total failure of the site that cannot be addressed by adaptive management, meaning that the site must be replaced in its entirety. But the same generic concern could have been voiced for the compensation schemes for Immingham Outer Harbour or Bathside Bay, the latter of which impacts on an even greater percentage of the features of the Stour and Orwell Estuaries SPA than AMEP does on the Humber Estuary SPA. Moreover, if the risk is seen as credible on an optimal site such as that chosen at Cherry Cobb Sands, surely the same risk applies to the contingency site too? Logically it must, so a contingent site must be identified for first contingency site – and so on and so forth.
- 9.2.4 So far as the Applicant is concerned, there is no reason to consider the total ecological failure of the RTE site to be a **credible** risk. As explained in Section 8 above, RTE is a proven means of developing functional habitat; the RSPB/EA publication from 2003 showed that in all cases involving tidal control structures, the ecological success of such schemes is recorded as 'good'. Given the extensive design work has been undertaken and there is simply no justification for postulating such a risk at this time.
- 9.2.5 The Applicant invites the decision-maker to give due weight to the following contingencies that have been provided within the compensatory measures to secure the coherence of the Natura 2000 network should AMEP be consented.

### **9.3 Contingency 1: The Compensation Ratio**

- 9.3.1 A fundamental requirement for compensatory habitat is that the habitat created should be, equivalent to the habitat lost; it should be 'like for like'. The habitats that would be damaged if AMEP were constructed are: mudflat (H1140); saltmarsh (H1310/1330) and Estuary (H1130). More generically it is simply ecologically functioning intertidal and subtidal habitat, and the intertidal compensation site is designed to provide replacement habitat on the same 'like for like' basis. The Statement of Common Ground between the Applicant, NE and the MMO (sHRA SoCG), prepared at a time when an RTE scheme was being developed, states that,

*'(a) compensation site of 101.5 ha of intertidal habitat on the north bank of the Humber Estuary at CCS will be sufficient to compensate for the estuarine habitats which will be lost for AMEP' (page 29).*

The site finally proposed at the end of the Examination is larger, at 105 ha, in accordance with the final compensation proposals set out in Report EX28.

- 9.3.2 It is therefore evidenced in the sHRA SoCG that the spatial extent of the Applicant's proposals for 'like for like' intertidal compensatory habitat is adequate. Moreover, the compensation ratio significantly exceeds that provided to address uncertainty of functional intertidal habitat creation on other comparator sites, as detailed in Tables 4.1 and 4.2 above; thus there is a proportionately greater contingency in the design for AMEP's compensatory measures (compared to similar schemes) from the outset.

### **9.4 Contingency 2: The EMMP's**

- 9.4.1 As evidenced in Section 7 of this report, European and national guidance on compensatory measures give clear direction that residual uncertainty is most appropriately addressed through robust monitoring and management plans. Such a plan (the CEMMP) has been developed in consultation with NE and

represents the starting position; it is appended to the legal agreement between the Applicant and NE. The CEMMP will be an evolving document with management action informed by the monitoring results.

- 9.4.2 In short, the RTE scheme will be monitored to record its development. Records will be maintained of how the site has been operated (gate settings, water levels approximate rates of accretion) and there will be information about the use of the sites by birds and of the food resources. If physical performance of the mudflat is not considered acceptable management of the water control structures can be modified (possibly trialling one RTE field in contrast to the others, etc.) It will be possible to identify which fields (or part of a field) seem to function best as mudflat habitat and as a result take practical steps to modify operation or levels to improve food resources in less functional fields. This is all part of a pragmatic contingency plan.
- 9.4.3 It will always be possible to consider larger scale adaption of operation in the future as part of this contingency measures, albeit that major intervention is not foreseeable at this time. Through paragraph 8.3 of the legal Agreement relating to the CEMMP, the Applicant is committed to any necessary measures that are '*reasonable, practicable and achievable*'.
- 9.4.4 In their letter dated 11 October, NE state that this provides '*a high level of certainty and low risk in the delivery of compensation measures*'.

### **9.5 Contingency 3: The Wet Roost**

- 9.5.1 Black tailed godwits (BTGs) that overwinter on the Humber Estuary favour North Killingholme Haven Pits as a high tide roost site. That roost site will not be damaged or disturbed should AMEP be consented, as appropriate mitigation measures to avoid such an eventuality have been agreed with NE and are included in Schedule 11 of the draft DCO. Nevertheless, the Applicant has made provision for a new wet roost at Cherry Cobb Sands. This roost has a dual potential benefit. Initially it will provide an alternative roost on the north bank of the estuary that BTGs can utilise to forage on Cherry Cobb Sands foreshore, helping to safeguard their status in the short term. In time however it will provide a roost that will complement the new foraging resource within the RTE site.
- 9.5.2 Whilst it is entirely possible that BTGs will continue to favour NKHP and still return to it despite foraging elsewhere, as they do now, this additional roost site is a contingency provision which will be monitored and will also link to the wet grassland site.

### **9.6 Contingency 4: The Wet Grassland at Cheery Cobb Sands**

- 9.6.1 The compensation measures include a substantial area of wet grassland habitat which has a known guarantee of success, given the extent of such habitat successfully created in the past.
- 9.6.2 It was originally agreed with NE that there would be overcompensation provision of wet grassland habitat to offset the time lag associated with the intertidal site becoming functional. Specifically, the sHRA SoCG records:

*'The benthic communities on the intertidal compensation site will take approximately three years to mature and hence there is a need for further overcompensation for black-tailed godwit to supplement their foraging whilst the intertidal site matures', (sHRA SoCG, page 29).*



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

Accordingly, the Applicant has undertaken to provide compensatory measures that are additional to those required to compensate on a 'like for like' basis. They are to be provided until such time as the Steering Group (established under the Deed with NE dated 29 April 2013) advises it is no longer required. NE acknowledges that *'there is ample experience of wet grassland creation to give confidence that it is possible to create habitat suitable for black-tailed godwits'*, (NE letter 11 October 2013).

- 9.6.3 The wet grassland provision will therefore provide a contingency buffer against the mudflat not achieving the level of functionality intended and it is asserted by the Applicant to be the most rational approach to providing a contingency and increasing confidence.

**9.7 Contingency 5: The Wet Grassland at East Halton**

- 9.7.1 In seeking to add confidence to the proposals for compensatory habitat through the provision of *'reasonable additional measures'*, the Applicant has sought to improve the ecological functionality of the original proposal for pasture land at East Halton. These improvements are detailed in an accompanying document, drafts of which were issued to NE during October. Final details are included in an accompanying report, *'Applicant's Proposals for the Enhancement of a Further Overcompensation Site At Halton Marshes'*, (Able, 2013).

- 9.7.2 Essentially, the revised proposals provide for additional managed wet grassland similar to that at Cherry Cobb Sands and are therefore more suited to the requirements of BTGs and provide further contingency habitat.

**9.8 Summary**

- 9.8.1 As intimated throughout this report, the Applicant's analysis of the particular circumstances of both the IOH and Bathside Bay projects, including: the particular features that were affected; the time lag permitted, and the risk associated with an 'un-proven' design, lead them to conclude that, when benchmarked against those projects the compensation proposals for AMEP present less risk than those previously accepted. Accordingly, the Applicant asserts that the contingency measures recorded above are, or certainly should be, sufficient to ensure a requisite degree of confidence in the ecological impact being adequately compensated, and that AMEP presents no greater residual ecological risk to the Natura 2000 Network than that accepted for other compensation schemes.



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

**10        RESPONSE TO PARAGRAPH 6 OF THE 'MINDED TO APPROVE' LETTER**

**10.1        General**

10.1.1        The Secretary of State sought satisfactory evidence from the Applicant either that reasonable measures can be implemented to reduce the 'substantial risk' the compensation measures might not work, or, alternatively, of developments that mean that NE no longer consider the risk to be substantial. The Applicant provides evidence on both of these alternatives below.

**10.2        Paragraph 6(1)(a)**

10.2.1        The Secretary of State sought confirmation from the Applicant that reasonable additional measures can be implemented to reduce the risk that the ecological compensation measures will not work.

10.2.2        It is the Applicant's view that the compensation proposals for a Regulated Tidal Exchange Site at Cherry Cobb Sands have a reasonable guarantee of success. In the absence of a pilot RTE project on the Humber Estuary, that guarantee is underpinned by the extensive design work undertaken so far, which conclusively demonstrates the technical and ecological soundness of the measures proposed.

10.2.3        The Compensation Management and Monitoring Plan provides a commitment by the Applicant to implement any additional measures that are '*reasonable, practicable and achievable*', but the exact nature of those measures can only be determined from data gathered during the monitoring programme set out in the CEMMP that has been agreed between the Applicant and NE.

**10.3        Paragraph 6(1)(b)**

10.3.1        The Secretary of State sought confirmation from the Applicant that developments since the Panel examination have increased Natural England's confidence in the effectiveness of the compensation proposals such that they no longer consider the risk to be '*substantial*'. The Applicant has provided additional information to Natural England since 28 August 2013, and their most recent advice to the Applicant, received on 11 October 2013, is included in Annex 3.1 of this report. The letter shows that NE have indeed reduced their assessment from a substantial risk to a residual risk based on developments since the examination and further arguments presented by the Applicant. Specifically, at paragraph 27, Natural England state,


*'(o)verall, the compensation proposals appear workable and Natural England has increased confidence in the proposals, based on the increased level of certainty in the technical design and operation of the compensation measures and in their implementation. There is also an increased level of confidence in the establishment of functioning wet grassland habitat and a roost at Cherry Cobb Sands. It is also our view that the success or failure of the compensation measures hinges on the ability to recreate equivalent functioning mudflat habitat; the preferred feeding habitat for the internationally-important population of black-tailed godwits'*



**ABLE MARINE ENERGY PARK  
RESPONSE TO DEPARTMENT FOR  
TRANSPORT'S 'MINDED TO APPROVE' LETTER  
IN RESPECT OF COMPENSATORY MEASURES**

**OCT 2013**

- 10.3.2 To address the residual risk Natural England advised the Applicant to 'identify suitable contingency measures in the event of a failure of the RTE scheme', (paragraph 29).
- 10.3.3 The Applicant has considered Natural England's advice but does not consider that the total failure of the RTE site is a credible risk given the assurance that can, or should be, be derived from the extensive design work undertaken already and also from Natural England's own Peer Review. If, in the alternative, further contingency measures are considered necessary, the Applicant reiterates that the precise nature of those measures can only realistically be determined from data gathered during the monitoring programme. In other words, it depends on the nature of the failure, and it would be impractical to anticipate all possible eventualities now. The monitoring programme that is required to be in place will last a minimum of 10 years and potentially up to 15 years, and that is in the Applicant's view, robust enough to address any failures. That is consistent with the approach taken in comparable schemes, and is the approach promoted through European and national guidance.

	<b>ABLE MARINE ENERGY PARK          RESPONSE TO DEPARTMENT FOR          TRANSPORT'S 'MINDED TO APPROVE' LETTER          IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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**11      LIST OF ACCOMPANYING DOCUMENTS**


*'Applicant's Proposals for the Enhancement of a Further Overcompensation Site At Halton Marshes', (Able, 2013).*

*'Intertidal Benthic Invertebrate Survey at North Killingholme (Spring 2013): Survey Report and interim Results from the Autumn Killingholme Survey and the Spring Cherry Cobb Sands Survey', (Precision Marine, September 2013).*

*'Able Marine Energy Park; 2013 Data Review and Target Setting', (GoBe Consultants, October 2013)*

*'Cherry Cobb Sands Wet Grassland Detailed Design', (Thomson Ecology, July 2013).*

*'CCSWG Keyingham Drain Salinity Studies', (Able, 2013)*

 <p>amep able marine energy park</p>	<p><b>ABLE MARINE ENERGY PARK RESPONSE TO DEPARTMENT FOR TRANSPORT'S '<i>MINDED TO APPROVE</i>' LETTER IN RESPECT OF COMPENSATORY MEASURES</b></p>	<p><b>OCT 2013</b></p>
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Annex 3.1

Correspondence between ABLE and Natural England, 28 August onwards

Letter Able to NE 4 September 2013  
Letter NE to Able 6 September 2013  
Letter Able to NE 12 September 2013  
Letter NE to Able 24 September 2013  
Letter Able to NE 1 October 2013  
Letter NE to Able 11 October 2013





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Our Ref: RC.KJ.A.L13-0788

Date: 4<sup>th</sup> September 2013

By Email

For the attention of: Mr Andrew Hearle  
Principal Adviser – Casework Solutions Team

Dear Andrew

### **ABLE MARINE ENERGY PARK** **Compensation Proposals**

1. We refer to the 'minded to approve' letter from the Department for Transport (DfT) dated 28<sup>th</sup> August 2013, regarding the above, reference TWA8/1/4, as well as recent discussions between Andrew Hearle (Natural England) and Richard Cram (Able UK). We thought it would be of mutual benefit to set out the origin of the compensation issue expressed in the letter and upon which the Secretary of State would like further evidence; our understanding of the issue, and what we propose that we each do in terms of producing and considering evidence.
2. At paragraph 6 of the DfT's letter the author states:-
  6. For the reasons explained at paragraphs 17 to 23 and 40 in this letter, the Secretary of State considers that he is not yet in a position to decide whether to accept the Panel's recommendation. He is, nevertheless, minded to agree with the Panel that he should make an Order granting development consent for the project, subject to receiving satisfactory evidence of the following:
    - (1) in relation to the "substantial risk" identified by Natural England that the ecological compensation measures will not work, confirmation from the applicant that:
      - (a) reasonable additional measures can be implemented to reduce that risk, or
      - (b) developments since the Panel examination have increased Natural England's confidence in the effectiveness of the compensation proposals such that they no longer consider the risk to be "substantial"; and
3. The source of the Secretary of State's (SoS's) understanding that Natural England (NE) has identified a 'substantial risk' that the compensation measures may not work is stated in paragraph 23 of his letter to be, 'submissions put to the Panel'. At paragraph 19 the author further refers to the fact that NE's 'acceptance of the legal agreement (the Deed in Relation to the Able Marine Energy Park dated 29<sup>th</sup> April 2013) was without prejudice to its advice on the uncertainties and risks over the effectiveness of the compensation proposals explained in the evidence to the Panel'. This latter observation is taken from NE's letter to the DfT dated 1<sup>st</sup> May 2013 which records:

Cont/d...2



*'(w)e are satisfied that the (legal agreement referenced above) provides .. a robust legal mechanism for the delivery of the Measures described within it. It is important to make clear that Natural England's acceptance of the legal agreement and accompanying EMMPs is without prejudice to Natural England's advice on the uncertainties and risks over the effectiveness of the proposals themselves. **These concerns are set out in detail in our 9<sup>th</sup> November submission and in paras. 6 to 8 of Natural England's 16<sup>th</sup> November submission** and are matters which the Secretary of State will need to take into account in deciding whether to grant the order for the development consent', (emphasis added).*

4. Your correspondence dated 9<sup>th</sup> November 2012 includes a document titled 'Outline of Natural England's position and Key Points of Concern', which provides substantive information regarding your concerns at that particular time. Specifically, on the first and second page of that document, you list eight 'key points', which for completeness are reproduced below.

*'For the purposes of this summary, Natural England's key points are:-*

- The combined managed realignment and regulated tidal exchange (RTE) proposal provides the minimum amount of compensatory mudflat - 88.1ha of mudflat, decreasing to a minimum of 45.2ha. Limited adjustments will be possible at the detailed design stage. This leaves very little scope for underperformance of the mudflat habitat. **(Issue 1)***
- There is a significant time lag in the provision of functional compensatory habitat: the mudflat will not be functional for up to 7 years after habitat loss (by the end of 2019); the compensatory wet grassland will not be functional until 3-4 years after habitat loss (by 2015/6). It is highly unlikely that this will be able to provide sufficient habitat for the number of birds displaced from Killingholme Marshes. **(Issue 2)***
- The risk posed by the time lag cannot simply be overcome by additional compensatory provision. Natural England has doubts over the further area of habitat proposed at East Halton Marshes (see EX28.3 pt 8). It is provisionally suggested that the land be managed as pasture/grassland, although little detail is provided. It is therefore not clear how it will compensate for the species affected by the proposal rather than provide terrestrial habitat for species such as golden plover and lapwing. It also forms part of the land for the Able Logistics Park (ALP) development, so as Natural England understands it, would not be available in any event. This needs explaining. **(Issue 3)***
- Clarity is required on the sources of and robustness of the quality features for mudflat set out, for example, at para.1.13.2 of EX28.3 Pt 2, in particular, why a minimum depth of 100mm is suitable, contrary to the advice of the RSPB. **(Issue 4)***
- The invertebrate data relied upon to assess the quality of the new mudflat should reflect surveys carried out at Killingholme Marshes foreshore; the Applicant's consultant has acknowledged that there appears to be some errors in the interpretation of the survey data for benthic invertebrates. If this cannot be resolved, Natural England advises that new baseline data will need to be collected at the correct time of year. **(Issue 5)***

- *The RTE proposal is heavily engineered and relies greatly on operational management in order for the objectives to be met. Some quite major interventions are proposed, such as maintenance dredging. There needs to be more information on monitoring and the thresholds that will be applied before such management measures are engaged (see Royal Haskoning review). (Issue 6)*
- *Information and further clarity is required as to how the adjacent managed realignment site will develop and the extent to which that will affect the intake, discharge and conveyance of water to and around the RTE site (see Royal Haskoning review). (Issue 7)*
- *With regards to the area of wet grassland proposed at Cherry Cobb Sands, Natural England notes that there are a number of gaps, as follows:-*
  - *No survey of underground utilities has been carried out.*
  - *There has not been detailed modelling based on topographical and hydrological data to confirm the functionality of the site, the statements regarding water volumes appear to be based on a number of assumptions.*
  - *There is no explanation of the timescale for creating the open water area for the wet roost, or as to how that will be achieved.*
  - *The appropriate timescale for the establishment of sufficient invertebrate biomass is at least 3-4 years, not 2-4 years (as confirmed by the Applicant's consultant in personal communication with Richard Saunders) (Issue 8)'.*

*Plainly it is never possible to say that compensation will definitely work. There is always a level of risk and a possibility of failure. To some extent this can be addressed by monitoring and management. However, even taking into account the possibility of adaptive management, at present it is clear that the level of risk in this case is substantial,' (issue references added).*

5. We understand the '16<sup>th</sup> November submission' referred to in your letter dated 1<sup>st</sup> May 2013, to be your 'Written Summary of Oral Representations' which records your position subsequent to the Hearing held on 12<sup>th</sup> and 13<sup>th</sup> November 2012 which dealt with the compensation proposals. Paragraphs 6 to 8 of that document provide contemporaneous comments on the effectiveness of the RTE/MR site at Cherry Cobb Sands. Paragraph 8 contains the reference to 'substantial risk' and, again for completeness, is reproduced below.

*'It is right to acknowledge that much work has been put into developing (albeit at a very late stage) interesting and **apparently workable plans for mudflat habitat** at Cherry Cobb Sands. The **proposal is however novel**, and the environment in which it is located is challenging. It is possible that the compensatory measures will succeed, however there is a **substantial risk** that they will not. It is acknowledged that there will always be doubts in relation to compensation proposals, however the doubts in this case are amplified by a combination of the points noted above: time lag, limited extent, questionable quality and uncertain implementation', (emphasis added).*

6. Whilst not dwelling overly on the point, we are bound to observe that although our proposals for compensation did evolve during the Examination, it is entirely fair to say that we both entered the process believing the original proposals to be sound.

7. The remainder of your '16<sup>th</sup> November submission' elaborated on the following key points: benthic invertebrates; changes to intertidal habitat at NKM foreshore; operation and management of the RTE; the wet grassland and roost; potential impacts on the foreshore in front of the RTE; overcompensation; time lag; the EMMP's and the conclusion of a legal agreement. However, the reference to 'substantial risk' in paragraphs 6-8 which you identified in your 1<sup>st</sup> May 2013 letter, was clearly principally addressed to the certainty of creating sustainable mudflat habitat.
8. It therefore seems to us that the risks that you considered during the Examination phase are set out in those sections of your documents referenced above, and that the SoS is seeking to understand whether your assessment of those uncertainties and risks changes in the light of information that has emerged since the Examination ended. Of course, it is not entirely clear whether your letter of 1<sup>st</sup> May 2013 was intended to be understood as meaning that your previous risk assessment was unaltered in any way, or that you were simply seeking to remind the decision-maker that residual risks existed, as they are bound to do in any scheme for ecological compensation. Certainly your letter of 1<sup>st</sup> May 2013 did not itself contain the words 'substantial risk'.
9. In any event, your contemporaneous assessment of 'substantial risk' during the Examination, appears as an holistic view that you took at the material time. We think it therefore useful at this point to at least distinguish four generic risk issues, viz.
  - a) The risk that functional habitat only develops after the damage occurs, or the time lag risk (covering NE **Issue 2**).
  - b) The risk that the RTE site fails to deliver the functional habitat for black-tailed godwit, and other species, that it is intended to deliver (covering NE **Issues 1, 4, 5, 6 and 7**).
  - c) The risk that the wet grassland site at Cherry Cobb Sands fails to deliver the functional habitat for black-tailed godwit, and other species, it is intended to deliver (covering NE **Issue 8**).
  - d) The risk that the pasture land proposed as further overcompensation at East Halton fails to be of benefit, either directly or indirectly, to any species affected by AMEP (covering NE **Issue 3**).
10. We address these in turn below and, where relevant, advise what additional information we are seeking to provide to you, and thereafter to the SoS, for the purpose of the additional consultation referred to at paragraph 57 of the DfT's letter.

***Risk a: the risk that the functional habitat only develops after the damage occurs***

11. This was raised as **Issue 2** in your Note of 9<sup>th</sup> November and reiterated extensively in your 16<sup>th</sup> November submission at paragraphs 36-46.
12. Insofar as time lag is concerned, it is not transparent what weight your assessment of 'substantial risk' placed on this issue at the material time, but your submissions clearly discuss the point extensively. The Panel considered the competing views of various parties in their Report at paragraphs 10.178 et seq, before concluding that:-

*'On balance, having considered the texts of both the EU Guidance and the DEFRA draft Guidance carefully, the Panel concurs with the applicant. In our view the test is the coherence of the Natura 2000 network, and this must allow for damage to occur at a given site provided the necessary compensation measures have been secured not necessarily delivered. The two sets of guidance both clearly allow for a possible time lag, although obviously they will not encourage it', (Paragraph 10.187).*

13. The SoS supported the Panel's views that a time lag between creating new habitat and losing existing was permitted, but the Panel also included programming restrictions on the Quay works in the draft Order at Schedule 11, requirement 21, which the SoS has adopted. On this basis, it is perhaps inappropriate to continue to include time lag as an issue within your review of risk.
14. It is also worth noting that the issue of not having certainty that the compensation proposals will work at the time of authorising the main project is common to most large projects of this type that require compensation. As provided as evidence to the examination, other projects have not even specified their compensation proposals at this point, however, whereas there is now certainty as to what the compensation proposals for AMEP are.
15. Notwithstanding the above observations, you may be aware that our response to the Examiner's Rule 17 letter dated 15<sup>th</sup> November 2012 included an ecological risk assessment for the works programme that would be permitted by the draft Order, and we believe it would be helpful if you were to consider that assessment, which is enclosed for ease of reference. It may not be something you took cognisance of before writing your letter dated 1<sup>st</sup> May 2013, and even if you had, you could not have known then what programming restrictions might be applied to the project by the Panel. These can be found at paragraph 25 of the Deemed Marine Licence at Schedule 8 to the DCO.

***Risk b: the risk that the RTE site fails to deliver sufficient functional habitat for black-tailed godwit, and other species, that it is intended to deliver***

16. There are a number of issues within this item, viz. Is the engineering design adequately developed? Will there be sufficient quantum of habitat? Will the habitat be of appropriate quality? Will it be monitored and thus managed effectively?
17. It should first be noted that this issue is now in the context of the overall conclusion of the Panel that there is adequate assurance that the three tests for compensatory measures set out in *Managing Nature 200 Sites*, paragraph 5.4.3 will be met (paragraphs 10.237 and 17.4 of the Panel Report):

*"In order to ensure the overall coherence of Natura 2000, the compensatory measures proposed for a project should therefore: (a) address, in comparable proportions, the habitats and species negatively affected, (b) concern the same biogeographical region in the same Member State; and (c) provide functions comparable to those which had justified the selection criteria of the original site".*

*The Panel concludes that the first and second of these tests are met; and that, with the recognition of the principle of adaptive management and its application through the three EMMPs, there is adequate assurance that the third test will be met.*

*The project can proceed without putting the UK in breach of the Habitats Directive – the coherence of Natura 2000 can be protected through the implementation of the compensation proposals as now developed. The agreement and application of the three EMMPs is critical to this compliance, given the highly complex and dynamic environment in which the project would be developed.'*

18. Furthermore, the Panel, despite recommending that consent should not be withheld if no legal agreement to underpin the compensation proposals were reached between ABLE and Natural England, did accept that such an agreement would add to the level of confidence in the delivery of the compensation proposals (paragraph 10.229 of the its Report). The legal agreement was in fact concluded between the two parties in April 2013 and so confidence should have increased.
19. Natural England now has the benefit of these conclusions and the Panel's own appraisal of the compensation scheme, which are plainly relevant to its own judgment.

*Is the engineering design adequately developed?*

20. Taking the first of these points, by reference to paragraph 7 of your 16<sup>th</sup> November submission, we observe that your own engineering consultant, Royal Haskoning, has reviewed our technical proposals and that they concluded that we had provided '*quite comprehensive engineering detail for this stage of the site's development*'. Also, that as a consequence NE '*is satisfied that the combined RTE scheme and managed realignment should meet the objectives defined in the Black and Veatch Report (para1.2.2)*' subject to certain provisos none of which related to the technical feasibility of the compensation scheme. We understand from this that NE has the requisite level of confidence in the engineering design.
21. Notwithstanding the above we note that **Issues 6 and 7** in your Note of 9<sup>th</sup> November raised two technical issues and for the avoidance of doubt we have asked HR Wallingford to respond to both of those matters and will provide their additional evidence to you before 25<sup>th</sup> September.

*Will there be sufficient quantum of habitat?*

22. Turning to the second point, the quantity of sustainable mudflat was raised in your Note of 9<sup>th</sup> November as **Issue 1** and in paragraph 7 of your 16<sup>th</sup> November submission where you observed that, '*long-term mudflat will be provided only at a ratio of 1:1, and as Dr Dearnaley confirmed at times the amount of available to birds at times be as little as c.15 ha (c.0.333:1) because other fields would need to be impounded during parts of the tidal cycle: even if black-tailed godwit would feed at depths of 100mm water, smaller species would not*'.
23. In the first instance, it should be borne in mind that the immediate direct loss of mudflat at NKM is 31.5 ha. A further 11.5 ha may have reduced functionality due to disturbance, but may not, and will still exist. It is only in the longer term (the 100 year timescale) that the sum of the mudflat loss rises to 44 ha ('*Statement of Common Ground on the sHRA*', 24<sup>th</sup> August 2012). Against this, the compensation scheme will initially deliver a very large area, 101.5 ha, of unmanaged intertidal habitat that will all begin to develop as mudflat, and only over time will it provide a reduced area of managed mudflat. The area of long-term managed mudflat will be 60 ha, with the exposed area and partially inundated areas varying in time, much like the existing foreshore to be lost where the amount of exposed mudflat varies naturally with the tides.

24. The 'artificial' inundation regime of the compensatory habitat, once it becomes managed, is set out in a comprehensive manner in EX28.3, Chapter 7, Tables 9.1, 9.3 and 9.4 (*sic*) for three different scenarios. To assist your understanding of the inundation regime that is proposed, we have instructed HR Wallingford to prepare further illustrations and to explain the mudflat availability over a typical 14 day Spring-Neap cycle. This availability then needs to be set against the availability of tidally inundated mudflats at NKM, as it should be taken into account that the 31.5 ha to be lost directly is not always available in any event whilst the 'disturbed area' will sometimes be utilised.
25. Compared to this, the NKM foreshore lies within a macro-tidal estuary where there are large variations between Spring and Neap tides (MHWS = 3.4mAOD, MLWS = -3mAOD, tidal range of 6.4m; MHWN = 1.9mAOD, MLWN = -1.3mAOD, tidal range of 3.2m). Thus, the 44 ha of tidally inundated mudflat is not available on every day and at all times, so the compensation provision should not be judged too narrowly against that target. At times, all the existing estuarine mudflat habitat will be inundated whilst the mudflat within the managed compensation site will be available.
26. Specific points to be borne in mind are that:-
- 5 ha of the 44 ha of mudflat lost due to AMEP in the long term, arises due to long term geomorphological change within the Middle Estuary and is nothing whatever to do with BTG foraging areas. Moreover, that 5 ha essentially comprises a sliver of land along the MLWS contour and is therefore only rarely available for foraging birds.
  - Another part (c. 30 per cent) of the remaining 40 ha is the width of foreshore lying between MLWN and MLWS, which is completely inundated for long periods during the 14 day Spring-Neap cycle.
  - A further proportion (c. 20 per cent) of the 40 ha, is not inundated at all for long periods during the 14 day Spring-Neap cycle as it lies between the MHWN and MHWS contours.

Again, we have asked HR Wallingford to prepare appropriate evidence regarding the availability of the foraging resource along the existing foreshore so that a proper comparison is possible.

*Will the mudflat be of appropriate quality?*

27. With respect to the third point, the quality of mudflat, this was raised in your Note of 9<sup>th</sup> November as **Issue 1** and in paragraph 7 of your 16<sup>th</sup> November submission wherein you expressed the view that, *'the limited extent of mudflat to be created means that it must be of **exceptional** value to ensure that it serves as functional replacement habitat for black-tailed godwits and other species'*, (emphasis added)
28. There has been extensive discussion between us about the benthic quality of the existing NKM foreshore and whether it has any enhanced value compared to any other area of mudflat within the Middle Estuary. Indeed your 16<sup>th</sup> November submission further stated that *'Natural England's positions has consistently been that NKM mudflat is of a **particularly high quality** for black-tailed godwit feeding'* (paragraph 9, emphasis added). This, of course was a matter of dispute between us, our consultants IECS and ERM did not agree that there was any evidence to support such an hypothesis. However, we must presume that you took this factor into account in your assessment of risk, in other words that a particularly 'exceptional' mudflat needed to be replicated in this instance.

29. A significant difficulty at the time of the Examination, and the principal cause of the dispute noted above, related to your concerns in relation to the reliability of the existing benthic survey (**Issue 5** of your 9<sup>th</sup> November Note). Fortunately, as it transpires, we can advise that in accordance with the agreed MEMMP, we undertook further benthic sampling along the foreshore of both North Killingholme Marshes and Cherry Cobb Sands in May/June this year and we will be able to report those results fully to you this month. Preliminary findings are that the sampling does not support the proposition that NKM is significantly different in character to any other section of the Middle Estuary and we will ask you again to review your previous comments in this regard, once the additional information is made available, and to also give appropriate consideration to the quantum of habitat, as noted above.
30. A further benthic survey is currently being undertaken, again in accordance with the MEMMP, but the processing of that survey is unlikely to be available by 25<sup>th</sup> September.
31. **Issue 4** of your 9<sup>th</sup> November Note, the depth of mud required for functionality to be achieved, is a matter that we addressed in our report EX28.3: Part 2: Paragraph 1.10.2 and it is not clear that you have had regard to the references that we provided to evidence our statements, nor to what extent RSPB has evidenced theirs. We would appreciate your comments on our evidence base and will provide further information as requested.
32. Also to be considered is the environmental quality of the new mudflat, and the absence from disturbance that is assured which is not the case at NKM. In particular, at the time of the Examination it was not certain where the existing footpath along the flood defence at Cherry Cobb Sands would be diverted, as there were competing views on this matter; the Ramblers were supportive of a diversion along the crest of the new flood defence and were supported by ERYC to some degree. However, the Panel has determined that the new footpath '*should be re-aligned .. inland of the new flood defence embankment*', (paragraph 16.12), a matter you may now be certain about which you would not have been during the Examination.
33. In paragraph 7 of your 16<sup>th</sup> November submission, NE also took a negative view of what they perceived to be a lack of 'open aspect' in the RTE site. We question the weight you may be giving to this issue in your assessment of risk; our through-the-tide surveys have shown that hundreds of BTGs will feed on NKM within the area of mudflat enclosed by South Killingholme Oil Jetty, Immingham Gas Jetty and a flood defence wall. This area is less than 15 ha in extent. The BTGs are more populous at high tide in this location as the area is slightly higher in the tidal range than the rest of NKM. On this evidence alone, the 15 ha 'fields' proposed at Cherry Cobb Sands must be seen to be sufficiently 'open' to provide suitable feeding habitat.

*Will the mudflat be monitored and thus managed effectively?*

34. On this final point, we are both aware that considerable effort was made by both parties to agree three EMMP's which were then bound into a legal agreement which we have both entered into. The suite of EMMPs include one specifically for RTE/MR site and the wet grassland at Cherry Cobb Sands; the Compensation EMMP (or CEMMP). We trust that you will agree that this document does provide the requisite level of confidence in the adaptive management proposed for the site in the future.



***Risk c: the risk that the wet grassland site at Cherry Cobb Sands fails to deliver the functional habitat for black-tailed godwit, and other species, it is intended to deliver***

35. **Issue 8** of your 9<sup>th</sup> November Note highlighted a number of concerns in relation to our proposals for wet grassland at Cherry Cobb Sands.
36. At paragraph 10.150 of its report, the Panel concluded:-  
*'There is less concern about the working of the temporary wet grassland, and support from NE and RSPB for the idea that it must be beneficial to have it adjacent to the RTE< although there is concern from those bodies as to when it will become effective as a source of food.'*
37. As you are aware, the purpose of providing wet grassland was, initially, to provide a food resource that would be available before functional mudflat was available and so reduce the time lag effect. Although it was subsequently agreed that this benefit may not be significant, the habitat has been retained in our proposals for the very purpose of addressing the increased uncertainty associated with the necessarily novel RTE scheme that we have proposed (refer to the CEMMP, paragraph 6.2). In essence our proposals for wet grassland must be expected to deliver near certain outcomes in relation to habitat, whether or not it is used as a feeding resource. The permanence of this habitat will be a matter for the Steering Group, established under the Legal Agreement, to consider and advise the applicant accordingly.
38. Since the Examination closed, we have obtained planning permission for the wet grassland proposals and have completed detailed design for the Cherry Cobb Sands wet grassland and roost. We will provide you with full details of this work for you to review. We would be surprised if you still had any significant concerns regarding the development of wet grassland habitat given that there are many examples of such habitat that have been created and that you made no objection to our planning application. In fact, there should, in our view, be a very high level of confidence in this element of our proposals now, and the consequential reduction in overall risk must be significant.
39. Again, we are both aware that considerable effort was made by both parties to agree three EMMP's which were then bound into a legal agreement which we have both entered into. The suite of EMMPs include one specifically for RTE/MR site and the wet grassland at Cherry Cobb Sands; the Compensation EMMP. Again, this document must be seen to provide the requisite level of confidence in the proposals for adaptive management of the wet grassland site which we reiterate, will be available for as long as it is needed to secure the coherence of the Natura 2000 site.
40. You have mentioned a concern relating to the salinity of Keyingham Drain, should it need to be used to irrigate the grassland. We will provide further information on this issue.

***Risk d: the risk that the pasture land proposed as further overcompensation at East Halton fails to be of benefit, either directly or indirectly, to any species affected by AMEP***

41. **Issue 3** of your 9<sup>th</sup> November Note highlighted concerns in relation to our proposals for pasture at East Halton Marshes.
42. You are aware that the Panel concluded at Paragraph 10.163 of his report to the SoS that overcompensation at East Halton *'should be included within the scheme'*.

43. This land was not included in the DCO and is not included in the legal agreement. In your 16<sup>th</sup> November submission you did accept that *'some, but fairly limited, additional confidence may be derived'*. We note that the SoS has not referred to this matter in his letter but the land is under the control of the applicant and has the benefit of planning consent.
44. We would be pleased to hear if your views on the inclusion of this land have changed following the more detailed information that we presented at the meeting with NE/RSPB/NLC/EA and our consultant Thomson Ecology on 24<sup>th</sup> June 2013. Those proposals are for the creation of wet grassland at East Halton Marshes, albeit that it was intended to utilise the site as mitigation for Able Logistics Park. For ease of reference we will resubmit our consultant's Design Report for the site. We will also give an explanation of how what is being offered at this site relates to the south bank mitigation, and compensation for the Able Logistics Park.

### **Other Matters**

45. We finally note that the design of the compensatory measures has taken a highly precautionary approach, being predicated on an assumption that feeding resources for avifauna are at their limit within the Humber Estuary. There is of course, no evidence for this, but we do know that there are around 10,000 ha of mudflat within the Humber Estuary and that the particular prey items favoured by those species currently using the NKM foreshore are widespread throughout the Middle Estuary, including within the extensive areas of mudflat in front of Cherry Cobb Sands. It is of course incumbent on you to fully consider and review the proportionality of the approach we have taken.
46. We trust the above identifies the pertinent issues that need to be considered in any updated risk assessment and summarise below the current actions we propose.
- i. ABLE to provide NE with a further explanation of the timing of loss of the existing mudflat versus establishment of the mitigation and compensation sites. NE to review their concerns regarding time lag in the light of this, the SoS's decision and the safeguards in the draft Order and express how much weight they give to that issue relative to the other issues.
  - ii. HR Wallingford to respond to Issues 6 and 7 of NE's 9<sup>th</sup> November Note.
  - iii. ABLE to provide a report to NE on the recent benthic survey of NKM and NE to review their position on its *'exceptional'* quality.
  - iv. NE to review the scientific evidence provided in respect of mudflat depth required to support benthic invertebrates and advise ABLE if any further information is required.
  - v. HR Wallingford to prepare a note on the temporal availability of mudflat at NKM and the comparable availability at the compensation site, and NE to consider this information in their risk assessment.
  - vi. NE to take into account in their risk assessment the Inspectors' recommendation that the realigned footpath be placed behind the new flood defence at Cherry Cobb Sands rather than on top of it.
  - vii. NE to review the evidence relating to the use of *'enclosed'* mudflat at NKM (and other sites) and the risk of the compensation site being too *'enclosed'* for use by BTGs.

- viii. ABLE to provide signposting as to the required depth of mud in the light of the RSPB 's submissions;
- ix. ABLE to provide, and NE to review, the detailed design proposals for Cherry Cobb Sands wet grassland and roost and address the use of Keyingham Drain and its salinity. NE to consider the additional information in their revised risk assessment.
- x. ABLE to give a clear explanation of what is proposed as compensation and mitigation on the south bank including East Halton Marshes. NE to review Thomson Ecology's Design Report for Halton Marshes wet grassland and advise if it has any material impact on their risk assessment.
- xi. We hope NE will then be able to express its view to ABLE in the light of the Panel's assessment, the further evidence provided and the agreements concluded and permissions obtained since the close of the examination, that there no longer remains a 'substantial risk' that the compensatory measures will not work, for ABLE to submit to the Secretary of State.

We would welcome your views on the above actions and your advice on any further actions you consider appropriate.

Yours sincerely



*RICHARD CRAM*  
Design Director

Date: 6 September 2013  
Our ref: Ltr AMEP Initial Response  
Your ref: RC.KJ.A.L13-0788



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**By email only**

Dear Richard

### **ABLE MARINE ENERGY PARK Compensation Proposals**

Thank you for your letter of 5 September 2013 in which you set out the issues and proposed actions in terms of preparing and considering evidence on the compensation measures for submission to the Secretary of State.

I promised to provide you with Natural England's initial feedback on these matters, particularly in relation to the scope of the issues being considered and the proposed actions. We will provide a more detailed and considered response after we have received the further information set out in your letter. We will ensure that you receive this before the 25 September 2013 being the deadline for submission of evidence referred to in the Department for Transport's (DfT) letter of 28 August 2013. Our initial feedback is as follows:

- We found the overall structure of your letter; the presentation of issues and your analysis of risk helpful, being similar to the approach being undertaken by Natural England.
- Scope of the issues - I can confirm that we agree with the overall scope of the issues under consideration.
- Proposed actions listed under paragraph 46 - I can also confirm that we broadly agree with the actions listed under paragraph 46 of your letter.

Given the specific request by the Secretary of State for evidence on 'developments since the Panel examination' (at para 6 (1) (b) of the Department for Transport's letter of 28 August 2013), and the short timescale within which Able are required to provide this evidence then we suggest it will be most helpful to you for Natural England to advise on those 'developments' which have taken place since the examination and on whether those developments affect Natural England's risk assessment and conclusion of 'substantial risk'.

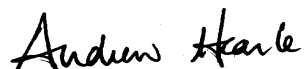
We will of course provide advice on any new information that you are able to provide us although the depth to which we will be able to consider this new information will depend upon how quickly this can be made available. Realistically, this means sending any new information through to us by Wednesday 11 September at the latest.

We have a small number of specific questions and points for clarification on your letter of 5 September 2013:

- i) In paragraph 13 you refer to programming restrictions on the Quay works in the draft Order at Schedule 11, requirement 21. I assume this is requirement 19 in the draft Order version 4 February 2013 which accompanied the Examining Authority's Report, but could you please confirm. In this regard we welcome your proposal to provide a further explanation of the timing of loss versus establishment of the mitigation and compensation site (Action i. paragraph 46); we assume this will be the construction timetable. A simple visual representation of this timeline would be helpful.
- ii) Paragraph 30 refers to a further benthic survey which is currently being undertaken but that the processing of that survey is unlikely to be available by 25 September. Given our previous advice about the critical timing for the survey of the benthic invertebrates being prior to the Autumn usage by black tailed godwits, it would be helpful to have a preliminary view on the findings of this survey if at all possible.
- iii) Paragraphs 42-44 refer to the possibility of including land at East Halton as part of the compensation measures. We are unclear of what exactly you are proposing and welcome your intention to give a clear explanation of what is proposed as compensation and mitigation on the south bank including East Halton Marshes (Action x. Paragraph 46). This should include how these proposals relate to your planning permission to develop this land for the Able Logistics Park. In preparing this explanation we advise it will be important to show clearly how the proposal for land at East Halton is linked to the ecological function that would be lost by the development of the mudflats at North Killingholme.

I hope you find our initial comments helpful. We look forward to receiving the additional information as soon as possible.

Yours sincerely



Andrew Hearle  
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Your Ref: Ltr AMEP Initial Response

Our Ref: JM.AMEP.A.L13/0031

Date: 12<sup>th</sup> September 2013

For the attention of Mr Andrew Hearle

Dear Andrew,

**ABLE MARINE ENERGY PARK**  
**Compensation proposals**

Thank you for your letter of 6<sup>th</sup> September 2013, in which you set out your initial response to our proposals for addressing your residual concerns regarding the compensatory habitat. We are glad that NE agrees with the approach that Able proposes to take to work towards enabling NE to review its assessment that the AMEP compensation proposals carried 'substantial risk'. We note NE's agreement of the scope of issues to be addressed by Able and its consultants, and will define our works and provision of additional information on this basis.

As you stated in your letter, and further explained in our telephone call on 10<sup>th</sup> September 2013, you undertake to provide a full response on materials submitted to you by today's date, 11<sup>th</sup> September, in time for Able to understand that response prior to its submission to the Secretary of State, currently targeted for 25<sup>th</sup> September. As discussed in the telecon held on 4<sup>th</sup> September, the provision of your response is targeted for 23<sup>rd</sup> September. However, as you further explained, you may not be able to respond in full detail to materials received after 11<sup>th</sup> September in time for Able's submission to the SoS.

The information for Able to provide is proposed to be delivered in accordance with the actions set out in Able's letter of 4<sup>th</sup> September. For clarity, these actions and deliverables are set out below, with projected delivery dates attached:

- i. ABLE to provide NE with a further explanation of the timing of loss of the existing mudflat versus establishment of the mitigation and compensation sites. NE to review their concerns regarding time lag in the light of this, the SoS's decision and the safeguards in the draft Order and express how much weight they give to that issue relative to the other issues. *Targeted 16<sup>th</sup> September*
- ii. HR Wallingford to respond to Issues 6 and 7 of NE's 9th November Note. *Targeted 20<sup>th</sup> September*
- iii. ABLE to provide a report to NE on the recent benthic survey of NKM and NE to review their position on its 'exceptional' quality. *Targeted 24<sup>th</sup> September*
- iv. NE to review the scientific evidence provide in respect of mudflat depth required to support benthic invertebrates and advise ABLE if any further information is required. *NE timescale after on delivery of Action viii.*
- v. HR Wallingford to prepare a note on the temporal availability of mudflat at NKM and the comparable availability at the compensation site, and NE to consider this information in their risk assessment. *Targeted 20<sup>th</sup> September*



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Your Ref: Ltr AMEP Initial Response

Our Ref: JM.AMEP.A.L13/0031

Date: 12<sup>th</sup> September 2013

~ 2 ~

- vi. NE to take into account in their risk assessment the Inspectors' recommendation that the realigned footpath be placed behind the new flood defence at Cherry Cobb Sands rather than on top of it. *NE action.*
- vii. NE to review the evidence relating to the use of 'enclosed' mudflat at NKM (and other sites) and the risk of the compensation site being too 'enclosed' for use by BTGs. *Target for provision of this evidence 24<sup>th</sup> September.*
- viii. ABL to provide signposting as to the required depth of mud in the light of the RSPB's submissions. *Attached herewith; see also Action iv.*
- ix. ABL to provide, and NE to review, the detailed design proposals for Cherry Cobb Sands wet grassland and roost and address the use of Keyingham Drain and its salinity. NE to consider the additional information in their revised risk assessment. *Previously provided to NE; also attached herewith.*
- x. ABL to give a clear explanation of what is proposed as compensation and mitigation on the south bank including East Halton Marshes. NE to review Thomson Ecology's Design Report for Halton Marshes wet grassland and advise if it has any material impact on their risk assessment. *Targeted 20<sup>th</sup> September.*
- xi. We hope NE will then be able to express its view to ABL in the light of the Panel's assessment, the further evidence provided and the agreements concluded and permissions obtained since the close of the examination, that there no longer remains a 'substantial risk' that the compensatory measures will not work, for ABL to submit to the Secretary of State. *NE action.*

You have also raised three specific queries in your letter, to which Able responds as follows:

- i. We confirm that the condition referred to in paragraph 13 of Able's letter of 4<sup>th</sup> September is Requirement 21 of Schedule 11 of the DCO as published with the Secretary of State's letter of 28<sup>th</sup> August, not the version attached to the Examiners' Report. For the avoidance of doubt, the correct version of the DCO referred to in Able's letter is attached herewith. For provision of further information regarding the timescale of habitat loss vs establishment of mitigation and compensation, please see Action i. above.
- ii. The sampling for the autumn benthic survey is completed; accordingly, an interim report is in preparation which will present an analysis of a subset of the samples collected, to provide as much indication as possible as early as possible of what the finalised results will be. This is targeted for provision by 20<sup>th</sup> September, with the completed report on all samples due later.
- iii. For clarity on the proposals concerning overcompensation and any interaction between Able's previously stated proposals, please see Action x. above.

I hope you find the timescales and indications of deliverables set out in this letter helpful.

Yours sincerely



Jonathan Monk  
Environmental Scientist

Date: 24 September 2013  
Our ref: 97731  
Your ref: RC.KJ.A.L13-0788



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Dear Richard

### **Able Marine Energy Park; compensation measures**

1. Thank you for your letter on the above dated 04 September 2013 which was received by Natural England on the same date.
2. With regards to the Development Consent Order for the proposed Marine Energy Park at North Killingholme, Natural England understands that the Secretary of State (SoS) is minded to agree with the Examining Authority that *“he should make an Order granting development consent for the project subject to receiving satisfactory evidence of the following:*

*(1) In relation to the substantial risk identified by Natural England that the ecological compensation measures will not work, confirmation from the applicant that:*

- a) reasonable additional measures can be implemented to reduce that risk, or*
- b) developments since the Panel examination have increased Natural England’s confidence in the effectiveness of the compensation proposals such that they no longer consider the risk to be ‘substantial’.*

Able UK have been asked to respond to the SoS by 25 September 2013.

3. Natural England’s position as at the close of the Panel examination, and the baseline for our further advice on the issues raised by the Secretary of State, is set out in our submission to the Examining Authority dated 16 November 2012 in which we state:

*‘It is right to acknowledge that much work has been put into developing (albeit at a very late stage) interesting and apparently workable plans for mudflat habitat at Cherry Cobb Sands. The proposal is however novel, and the environment in which it is located is challenging. It is possible that the compensatory measures will succeed, however there is a substantial risk that they will not. It is acknowledged that there will always be doubts in relation to compensation proposals, however the doubts in this case are amplified by a combination of the points noted above: time lag, limited extent, questionable quality and uncertain implementation’.*

4. In order to help Able UK with the provision of further evidence to the SoS we have agreed the scope of outstanding issues, reflecting Natural England’s position at the close of the Panel examination, and as set out in your letter dated 4 September 2013. We note the timetable for provision of this additional information as set out by Jonathan Monk in his letter dated 12 September 2013. However, as stated in our letter dated 6 September 2013 the depth to which we have been able to consider any new information depended upon how quickly this could be made available to us and we asked that any new information should be sent through to us by Wednesday 11 September at



the latest. However, only very limited information was provided by that date.

5. Natural England will provide detailed comments on its assessment of risk when all the evidence has been submitted by Able UK on the Planning Inspectorate's website. It will do this as part of its consultation response to this information in its capacity as an interested party to this case.
6. Following the approach set out in the SoS's letter, and given that no additional measures have been proposed, Natural England has focused its advice on developments that have occurred since the Panel examination. Natural England has followed the same assessment of risk as set out in your letter of 4 September and have provided detailed comments on our current view of that risk, where possible. We have also indicated where your risk categories (a-d) incorporate the main issues considered in our assessment of 'substantial risk' as stated in our letter of 16 November 2012 i.e. *time lag, limited extent, questionable quality and uncertain implementation*.

### **Risk a – the risk that the functional habitat only develops after the damage occurs**

#### **Natural England concern - Time lag**

##### **Additional information received:**

- Internet link provided to Able's response to the Planning Inspectorate dated 23 November 2012 – 'programme of works'.
- Further explanation to be provided on the timing of loss versus the establishment of the compensation sites.  
Expected 16 September, not yet received

7. Natural England notes the Panel's views on the time lag; that is having considered relevant EU and Defra guidance on compensatory measures, the Panel states that the necessary compensation measures should be '*secured not necessarily delivered*' and that the guidance '*allows for a possible time lag*' between creating new habitat and losing existing.
8. The Panel concludes (at paragraph 10.187) that the [two sets of ] guidance '*clearly allow for a possible time lag; although they will not encourage it*'.
9. We note that the SoS 'agrees with the Panel's approach' on this matter however, our interpretation of the SoS's position as stated in DfT's letter of 28 August 2012 is that he is still seeking advice on the ecological risks associated with a time lag.
10. Natural England has reviewed the programme of works provided to the Panel by Able UK on 23 November 2012 and welcomes the commitment in that programme of works to try and reduce the time lag. We note that the Panel has slightly amended Requirement 19(1) of the DCO to state that Able will take 'all reasonable endeavours' to make the breach within 15 months of the start of construction of the quay. However, Natural England still has concerns regarding the risks associated with the time lag in this case. This is because whilst the time lag has been reduced, it is still considerable.
11. Natural England further notes that there has already been slippage in the timetable for the provision of the wet grassland – creation scheduled for completion in July 2013 – and even if the timetable was adhered to, there would still be a 3 year time lag between the loss of the intertidal habitat and the wet grassland becoming functional. The time before which the RTE will become functional habitat is even greater.
12. As requested in your letter of 4 September 2013, we have reviewed the programme of works document and have considered the timescales accepted for the provision of compensatory habitat for other developments. Whilst Natural England acknowledges that time lags for the provision of functional compensatory habitat have been permitted for other developments, it is our view that the

situations are not comparable with AMEP. As stated in our letter dated 16 November 2012:

*“On the Humber, compensation was proposed with the Immingham Outer Harbour development, although the circumstances there were different.....In that case Natural England was satisfied that the displacement of 603 over-wintering wildfowl (this constitutes 8 times fewer birds than in this case) would not harm the coherence of Natura 2000 where effective compensation was provided within 10 months”.*

We also note that two of the other four developments included in Table 3.1 in the programme of works included a requirement that all or part of the intertidal habitat creation must be provided prior to the start of the development.

13. Natural England acknowledges that in Table 3.1 the Bathside Bay development has a greater time lag than that proposed for AMEP; (it states that “reasonable endeavours that breach is no more than 27 months after start of construction”). In our view it is important to recognise that the circumstances of these two developments are not comparable; the greatest impact at Bathside Bay was on roosting birds (a total of 2,240 waterbirds) which would be able to utilise the newly created managed realignment site for roosting soon after creation.
14. The programme of works document provided by Able UK includes an ecological risk assessment of the time lag. We note this assessment recognises that there may be short term effects on the population of black-tailed godwit on the Humber Estuary but expresses confidence that these effects are reversible.
15. It is Natural England’s view that, in this case, there is a risk associated with the time lag. This is due to the high numbers of birds that will be displaced from North Killingholme Marshes, in particular, the high numbers of foraging birds. Displaced birds may either die (as shown by work on birds displaced from Cardiff Bay) or suffer reduced fitness as a result of increased energetic costs (e.g. due to flying greater distances between foraging areas and roosting sites) and increased competition and interference on the remaining intertidal within the Humber Estuary or elsewhere in the SPA network. Reduced fitness will increase the risk of mortality, especially in hard weather conditions, and/or reduced reproductive success on the breeding grounds. Further comments on the time lag are provided in Annex 1.
16. It is expected that the time lag between habitat loss and the creation of functional replacement habitat will affect the majority of the 5,064<sup>1</sup> birds at North Killingholme Marshes including an internationally important population of black-tailed godwit. It is Natural England’s advice that the risk of a time lag is particularly significant in this case due to the need to provide functional feeding habitat for high numbers of birds.
17. From the information received to date, Natural England’s assessment of risk a remains unchanged from 24 November 2012.

**Risk b – the risk that the RTE fails to deliver sufficient functional habitat for black-tailed godwit and other species**

**Natural England concern - Limited extent  
Questionable quality**

**Additional information received:**

- Able to provide additional references to indicate the suitability of 100mm mudflat depth. Received 12 September.

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<sup>1</sup> Reference: Compensation Environmental Management and Monitoring Plan Table 3

- HR Wallingford to provide further detail on the triggers for intervention management of the RTE site and further information on the development of the managed realignment site. Expected 20 September, not yet received.
- HR Wallingford to provide further detail on the temporal availability of North Killingholme mudflat and the comparable availability at the compensation site. Expected 20 September, not yet received.
- Able to provide new benthic monitoring results from surveys undertaken in May and Aug/September. Expected 24 September, not yet received.
- Able to provide evidence on the enclosed nature of North Killingholme mudflat. Expected 24 September, not yet received.
- Natural England to note that the footpath is routed on the landward toe of the new floodbank.

### **Depth of mudflat**

18. Regarding the issue of mud depth, Able UK's clarification note of 5 September 2013 states that a minimum depth of 100mm is a suitable medium for prey species and foraging birds.
19. Natural England has considered the information in the clarification note and have reviewed the references that Able UK provided at the examination to evidence your statements. Our detailed comments are provided in Annex 2 to this letter.
20. It is evident that the burrowing depth of the two key species varies with season and body size, with individuals burrowing deeper in the winter and larger individuals typically found at greater depth than smaller individuals regardless of season. Although it is not known what effect mud depth restricted to 10cm would have on the growth, survival and depletion rates of prey species and, consequently, the availability of this species to foraging birds, this area of uncertainty would be reduced by increasing the mud depth to at least 15cm. It is our view that a greater minimum depth of mud would reduce potential depletion of prey species by bird predation and allow deeper burrowing in the winter which would be more likely to allow a functional invertebrate community to develop.
21. Given Natural England's assessment of the evidence, it is its advice that a minimum depth of mud of 15cm is required to support the key invertebrate prey species and foraging birds.

### **HR Wallingford work**

22. Whilst Natural England has not yet received the reports from HR Wallingford, we reiterate our previous advice regarding the compensation ratios; i.e. that a ratio of 1:1 is only acceptable if the RTE/ MR site is fully meeting its objectives as set out in the CEMMP. It is unlikely that the managed realignment site will provide long term functional habitat for black-tailed godwits due to the rapid accretion of saltmarsh; therefore we understand 60ha of long term managed mudflat will be provided within the RTE cells. At times less than 60ha of mudflat will be available for foraging birds due to the operational management of the RTE and the necessary impoundment of RTE cells.
23. Given the objectives of the compensation site (as agreed in the CEMMP) in terms of area of sustainable mudflat habitat, elevation of landform (to ensure mudflat rather than saltmarsh), and ecological functionality of habitat, Natural England agrees that an RTE has a higher chance of success than a managed realignment breach solution due to the adaptive management that can be carried out.
24. The risk that our consultants Royal Haskoning flagged up in their report was that whilst it appears technically possible to achieve the proposed RTE design, this does mean that the site is heavily engineered, based essentially on principles of 'water balancing' and 'sediment management', rather than a more natural geomorphologically functioning solution based on full connectivity between the estuary channel, existing intertidal zone and newly inundated parts of the low-lying floodplain. This

design places great reliance on operation and maintenance activities during the whole life of the scheme and as a consequence of this necessary management it is inevitable that there will be RTE cells at different levels of functionality as the invertebrate community re-establishes itself.

25. Natural England's view is that the proposed compensation approach is novel; it has not been tested at this scale in the UK before and will rely heavily on monitoring and maintenance. Whilst we welcome the completion of the CEMMP, it must be noted that this will only enable the proposed management measures to be adjusted if and when required. Adaptive management will not overcome the risk that the novel approach of an RTE in an environment as dynamic and sediment rich as the Humber Estuary may not work.

#### **Results of benthic monitoring**

Not yet received.

#### **Enclosed nature of Killingholme mudflat**

Not yet received.

#### **Route of the new footpath**

26. Natural England welcomes the Panel's view that the public footpath should be routed along the landward toe of the new floodbank. As you will be aware Natural England recommended this approach as it is known from the monitoring work carried out on existing managed realignment sites on the Humber that routing the footpath on top of the new floodbank causes disturbance to waterbirds. Natural England's assessment of risk was based on the assumption that the footpath would follow this route (landward toe of the new floodbank) as this had been previously agreed with Able UK and shown in this location in the submitted documentation. Therefore whilst this confirmation is welcomed, it does not alter Natural England's assessment of risk in respect of this issue.
27. From the information received to date, Natural England's assessment of risk b remains unchanged from 24 November 2012.

#### **Risk c – the risk that Cherry Cobb Sands wet grassland fails to deliver the functional habitat for black-tailed godwit and other species.**

##### **Additional information received:**

- Able UK to provide detailed design proposals for Cherry Cobb Sands wet grassland and roost, and address the use of Keyingham Drain and its salinity. No new information provided; documents previously submitted to East Riding of Yorkshire Council to discharge planning conditions provided. No detail of Keyingham Drain salinity provided.

28. As stated in Able UK's letter of 4 September, the original purpose of the wet grassland habitat was to provide functional feeding habitat whilst the newly created mudflat developed benthic invertebrates. The original location for the wet grassland was at Old Little Humber Farm on land that Able UK already owned. It was therefore assumed that the wet grassland creation could begin as soon as possible<sup>2</sup>. However, more detailed work indicated that Old Little Humber Farm was not suitable for wet grassland creation and the new site, Cherry Cobb Sands was brought forward. As Able UK states in its letter, the ability of Cherry Cobb Sands wet grassland to reduce the time lag is now less significant as the habitat creation works are yet to commence. Natural England still welcomes the provision of this wet grassland habitat as it will contribute to the package of compensation measures; providing additional foraging resources alongside the birds preferred mudflat habitat.

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<sup>2</sup> Works originally planned for completion in Aug/ Sept 2012

29. As you will be aware, Natural England submitted an objection to East Riding of Yorkshire Council regarding the discharge of these planning conditions on 4 September on the grounds that the proposal, as submitted, did not contain sufficient information to determine whether the wet grassland habitat will deliver functional habitat for SPA/ Ramsar waterbirds, in particular black-tailed godwit. Natural England's concerns focused on the accuracy of the figures used in the calculations of water availability, the ability to obtain sufficient water to irrigate the site, the ability of the wind pumps to move water around the site, and the potential for disturbance from people utilising the adjacent public footpath and dogs accessing the site. Natural England believes that most of these concerns should be relatively straightforward to resolve. However, Natural England's key concern, as indicated in its letter to the Council, relates to the ability to maintain the appropriate level of wetness on the site as this is essential to achieving wet grassland functionality. Detailed comments on the water level management plan are provided in Annex 3 to this letter.
30. Black-tailed godwit use of grasslands is dependent on the relative quality of other available foraging habitats, but in general, the best chance of grasslands being utilised as feeding habitat by godwits would be if they have areas of shallow water (ideally with fluctuating water levels) during the period of potential use (i.e. autumn to spring). It is possible that they may forage in grasslands with a high water table but no standing water, but it is likely that they would utilise this sort of habitat less frequently (Dr JA Gill, University of East Anglia, pers. comm.). Godwits tend to use mudflats more frequently than grasslands in autumn possibly because of better resource availability and lowered perceived risk of predation of mudflats (Dr JA Gill, *ibid*) thus any grassland sites that are to be created need to be of extremely high quality. This is typically determined by water levels and prey availability, as godwits forage in soft sediments and roost in areas of shallow floods (Hayhow 2009).
31. Objective 3 of the detailed design plan states that the soil should be moist throughout the months of August to April to concentrate invertebrates at the surface and to ensure that the soil remains soft enough to be probed by waders. Without assurance that there is a source of freshwater which can be used as an additional water supply to the site, and that there is the means to move this water around the site as required, Natural England's current advice is that the wet grassland habitat will not be able to deliver its objectives and provide the moist, wet conditions required.
32. From the information received to date, specifically the detailed design plans, Natural England has an increased level of confidence in the feasibility of creating functional wet grassland at Cherry Cobb Sands but this higher level of confidence is subject to the resolution of the critical issues referred to above. The satisfactory resolution of these issues would enable Natural England to further reduce its assessment of risk for this element of the compensation measures from its assessment as at 24 November 2012.

**Risk d – the risk that the pasture land proposed as ‘overcompensation’ at East Halton fails to be of benefit to any species affected by AMEP.**

**Additional information received:**

- No new information to be provided, although Able UK will clarify the purpose of the different area of wet grassland proposed on the south bank.  
Expected 20 September, not yet received.

33. As stated in Natural England's letter dated 16 November 2012, it is important to understand that if this site is to provide 'overcompensation' then the design must be tailored to the species and impacts for which it is compensating; that is the loss of intertidal foraging habitat for SPA/ Ramsar waterbirds, in particular black-tailed godwits. The proposed design for East Halton however, is tailored to mitigate for the loss of terrestrial habitat utilised by curlew and not for the loss of intertidal foraging habitat.
34. At the current time we have seen no detailed information on a water level management plan for this site and there is no mention of how water levels will be maintained other than by blocking ditches

and holding rainfall on the site. Objective SPA3 of the Terrestrial EMMP does mention that pumping water on to the site is one of the available management options, but without a water level management plan there is no detail provided on the source of this water or how this would be done. Likewise, there are no details provided on how water might be moved around the site.

35. Natural England's concerns with regards the ability to retain site wetness at the Cherry Cobb Sands wet grassland are set out above and it seems that these same issues are likely to apply to the East Halton site. It would seem to us very likely that an external freshwater source would be required in some years to provide the wet grassland habitat required as 'overcompensation'. In addition, Natural England would welcome clarification regarding the creation of wet grassland habitat on the Able Logistics Park which already has planning permission for port related storage.
36. It is Natural England's view that the current design will not allow the creation of a functional area of wet grassland habitat and, therefore, its value as 'overcompensation' for species including black-tailed godwit, bar tailed godwit, dunlin, ringed plover, redshank and lapwing will be minimal.
37. From the information received to date, Natural England's assessment of risk d remains unchanged from 24 November 2012.

#### **Natural England concern - Uncertain implementation**

38. This issue, highlighted in Natural England's letter dated 16 November 2012, has relevance to all risks a-d discussed above and is the element of our assessment of risk which can be described as having been 'developed' most since the examination process ended.
39. As you will be aware Natural England has advised Able UK in the preparation of detailed Environmental Management and Monitoring Plans for the terrestrial and marine environments and for the compensation site (CEMMP). The CEMMP describes the detailed design and operation of the compensation measures and includes specific management objectives for each of the compensation measures along with targets and management actions which support the objectives. The plan also includes a detailed programme of monitoring that will be undertaken to confirm the achievement or otherwise of the objectives for the compensation measures. Limits of acceptable change are defined within the CEMMP as well as remedial action, where this is practically feasible, if these limits are exceeded. The CEMMP along with the Terrestrial EMMP and Marine EMMP are also bound by a legal agreement between Able UK and Natural England.
40. Natural England considers that the CEMMP is well developed and whilst in itself it does not address the uncertainties and risk that the measures contained within it may not work in practice (i.e. by virtue of it being a novel approach, untested before on this scale in the UK, and requiring extensive monitoring and management, as discussed above), the CEMMP together with the legal agreement increases Natural England's confidence that the proposed compensation measures are secured.
41. Natural England considers the risk concerning the implementation of the compensation measures to have been resolved.

#### **Conclusion**

42. As stated above, Natural England has received little further evidence from Able UK. The only documents which Natural England has considered for the purposes of this letter are the programme of works and the new information provided on mudflat depth. For ease of reference, we have provided in Annex 4, a table setting out a summary of our *current* assessment of risk based on this information and other developments that have occurred since the close of the examination.
43. Natural England will provide its full assessment of whether the risks identified in its letter of 16 November 2012 have been reduced when we are given the opportunity to consider all the additional

evidence provided by Able UK as part of the further consultation process for interested parties after 25 September. We will include this letter as an annex to that submission.

44. It will be apparent from our submissions at the examination and our assessment of the further information to date that a key risk remains that 'the proposal is novel and the environment within which it is located is challenging' (Natural England's submission dated 16 November 2012). The letter from the SoS asks whether '*reasonable additional measures can be implemented to reduce that risk*' and Natural England would advise Able UK to give careful consideration to potential options. This could include scaling up the compensation measures e.g. increasing the size of the RTE to reduce the risk that the functionality may not be as predicted.
45. Let me reassure you that Natural England is fully committed to continue working with Able UK to try and address the issues raised by the SoS about the adequacy of the compensation measures as set out in the Department of Transport's 'minded to approve' letter of 28 August 2013.
46. We hope you find our comments and advice helpful. We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us.

Yours sincerely

Andrew Hearle  
Principle Adviser, Casework Solutions Team  
07900 405350

## Annex 1

### Detailed comments on the risks associated with the time lag.

Density-dependence or carrying capacity on the Humber Estuary SPA/Ramsar site is unknown. The work of Stillman *et al.* (2005) is based on data collected in 1999/2000 and is unlikely to be representative of current conditions in the estuary [and was based on modelling rather than an empirical study of bird survival]. It should be noted that the variability of bird numbers in the estuary between years may simply reflect density-dependent changes in habitat and food availability rather than any inherent 'flexibility' in the system. Furthermore, a recent analysis of Humber Estuary Wetland Bird Survey (WeBS) data by the BTO (2013) reports that:

*"Continuing the trend described by Austin and others (2008), populations of most wader species had declined across a wide geographical area, and these declines were particularly marked on the middle and outer parts of the southern shore of the Estuary. There were no count sectors where more species had increased than declined. Ringed plover and lapwing have been particularly badly affected, with substantial declines in the long-, medium- and short-terms" and*

*"Continuing the pattern described by Austin and others (2008), many of these population changes found in this report were in line with regional trends. However, the Humber had decreased in importance in terms of the proportion of the region's species held for redshank, curlew, bar-tailed godwit and ringed plover, indicating factors affecting Humber populations that are absent or less severe more widely in eastern England"*

and specifically on black-tailed godwit:

*"Numbers of this black-tailed godwit on the Humber Estuary have continued to fluctuate, as described in Austin and others (2008). Overall, this has translated into a moderate decline in the medium-term, but a sharp increase in the long-term, following a peak and subsequent decline in the late-1990. These fluctuations are reflected in the Humber's regional importance for this species, as the Estuary has variously accounted for between approximately 3% and 25% of the region's black-tailed godwit during the 15 winters covered by this report" and*

*"There has been a continuing rise in the islandica subspecies of black-tailed godwit in Britain over recent winters (Holt and others 2012). The absence of this trend on the Humber suggests local pressures affecting this species' numbers".*

This indicates that habitat extent may be a limiting factor for some waterbird species on the Humber, including black-tailed godwit.



## Annex 2

### Detailed comments on the minimum depth of mudflat.

Able UK's clarification note of 5 September 2013 states that a minimum depth of 100mm is a suitable medium for prey species and foraging birds. This is justified in the statements:

*"The mollusc Macoma balthica has an average burial depth of a few centimetres (Budd and Rayment, 2001; Beukema, 1995; Brafield & Newell, 1961) with very few burying beneath 7.5cm within the intertidal zone of The Wash (Reading and McGrorty, 1978).*

*The ragworm H. diversicolor has a deeper average burial depth of 5-10 (Esselink & Zwarts, 1989; Kristensen & Mikkelsen, 2003; Davey, 1994). An increased maximum burial depth of H. diversicolor is seen to be at 10-13cm to avoid predation, but the greatest density is most frequently recorded from 5-7cm depth (Duport, et al 2006).*

*The minimum burial depth of 100mm was therefore considered to be an appropriate minimum, recognising that the nature of the mudflat will be such that there will be areas deeper than this".*

Natural England has considered the information in the clarification note and have reviewed the references that Able UK provided at the examination to evidence your statements and advise as follows:

The burrowing depth of the two key species varies with season and body size, with individuals burrowing deeper in the winter and larger individuals typically found at greater depth than smaller individuals regardless of season.

*M. balthica* burrows as deep as 8cm in the autumn and winter and ascends to 2-4cm in February (Zwarts & Wanink 1989, Zwarts & Wanink, 1993, Zwarts *et al.*, 1994). Esselink and Zwarts (1989) show that *H. diversicolor* has mean burrowing depths of 2-13cm (May-September in mud), with some larger individuals burrowing down to 26cm. Only the smaller individuals up to about 4cm long are largely found within 10cm of the surface during the summer. *H. diversicolor* also burrows more deeply depending on season, increasing its depth by between 2-5cm in the winter. Burying depth is associated with sea temperature and *H. diversicolor* has been recorded in deeper burrows of around 40cm in freezing conditions (Esselink and Zwarts 1989).

The available evidence suggests that a mud depth of at least 10cm might be suitable for *M. balthica*. It also suggests that 10cm might be suitable for smaller individuals of *H. diversicolor* (less than 4cm) in the summer but is less likely to be suitable for the larger individuals, especially during the winter.

Possible explanations for the seasonal variation in the burrowing depth of *H. diversicolor* are predation pressure, temperature and feeding method (Esselink and Zwarts 1989). Individuals in shallower mud are more vulnerable to predation by foraging birds and are likely to be more susceptible to cold weather. It is not known what effect mud depth restricted to 10cm would have on the growth, survival and depletion rates of *H. diversicolor* and, consequently, the availability of this species to foraging birds. This area of uncertainty would be reduced by increasing the mud depth to at least 15cm to reduce potential depletion rates by bird predation and to allow deeper burrowing in the winter; this would be more likely to allow a functional invertebrate community to develop.

## Annex 3

### Detailed comments on proposed wet grassland habitat creation at Cherry Cobb Sands (CCSWG)

#### 1. The ability to provide sufficient water to the site

Paragraph 11.1.2 of the CCSWG Water Level Management Plan (WLMP) reports that Keyingham Drain will be used to provide water to the site every other year as without this additional water, the site will be too dry. However, Able's letter to Shirley Ross dated 21 August 2013 states that in fact the salinity of Keyingham Drain is too high and thus it is unsuitable as a water source. This letter goes on to state that even without this water from Keyingham Drain, there should be adequate water to irrigate the site in nearly every year and estimates that water levels may be inadequate in about 1 in every 12 years. This is at odds with what is reported in the WLMP and it is not clear how this revised figure has been reached. Recent communications indicate that the water may only be unsuitability at certain times of year.

It would have been preferable to obtain all the relevant information prior to submission to the local planning authority, including an analysis of water quality throughout the year and how this may affect the ability to achieve a sufficient level of wetness during the key period for black-tailed godwit.

It is clear that there is further work to be done at Keyingham Drain to determine the salinity of the water. At the current time it would appear that without the ability to pump additional water on to the site during dry years, in these years the wet grassland will fail to function as a suitable feeding and roosting area for black-tailed godwit.

#### 2. Uncertainty regarding figures given in WLMP

There is uncertainty regarding the figures given in the WLMP and we believe that many of these are incorrect. In paragraph 11.1.1 it is stated that 24,300m<sup>3</sup> of water will reach the open water storage area directly through run off. This appears to be based on the use of a figure of ~33 ha of wet grassland. However, using the figures given on figure 3 in EX28.3 Pt 4, the three wet grassland areas equate to only 24.56ha. Using the 22% run off figure given, this would provide 18,100m<sup>3</sup> of runoff *i.e.* ~6,000m<sup>3</sup> less water. It is also stated that ~22,688m<sup>3</sup> of rainfall would fall directly into the open water storage area. Again, this figure is inconsistent with the areas given on the map; a 5ha water storage area, as shown on the map, would receive 16,750m<sup>3</sup> (50,000 \* 0.335 = 16,750). The figure quoted in the WLMP of 22,688 would have to come from an area of 6.77ha. Clearly there is an error as 6.77 + 33 = 39.77ha, which is larger than the area of the entire site.

We further question the figure used for the evaporation rate (~2cm per month) as this seems too low and the source of the climate data used is not referenced. Evaporation rates in other areas have been found to be around 8 – 15cm per month (*i.e.* 3.5mm day<sup>-1</sup> on Tadham moor, Acreman *et al* 2003; up to 5.5mm day<sup>-1</sup> on Yarnton Mead, Gardner 1991; 2.6mm day<sup>-1</sup> on North Kent Marshes, Gavin & Agnew 2003). Using a higher and more realistic evaporation rate will have the consequence that the water available is too low to supply the wet grassland.

#### 3. Insufficient ability to move water around site

There is an issue that even with an additional water source, it appears that the capacity of the two wind pumps to move the water around the site is insufficient. It would require between 70 - 90 days of consecutive windy days to move the volumes of water required from the holding lagoons to the wet grassland areas, and it seems highly improbable that there would be this number of windy days at the required time of year. Consideration should be given to alternative means of moving water round the site, such as the use of motorized pumps as back-up.

#### 4. Further specific comments on the detailed design

It is proposed to create an area of open water 5ha in size, with an average depth of 0.7m and a maximum depth of 1.4m. It is important to ensure that there are areas of shallower water within this if the black-tailed godwit are to be able to use this open water as a roost site. Black-tailed godwits have a chest height of around 17-18cm (Alves *et al* 2013); thus a water depth of 5-15cm is suitable for roosting and also replicates the habitat at North Killingholme Haven Pits where they are currently roosting.

It is also proposed to level the site by infilling low spots and removing high spots where these would impede run-off. We recommend that leaving some variation in the natural topography of the site is actually likely to improve the development of the wet grassland habitat as this will allow areas of natural flooding to develop across the site. Surface wetness conditions are extremely important in influencing the spatio-temporal variation in the distribution of both breeding and wintering wetland bird populations. Installation of footdrains or grips to move water onto the fields may also improve the design by creating further areas of surface water, as these are likely to be extremely important for the birds using the site.

## Annex 4

Table to provide an update of Natural England's current assessment of the progress made in reducing the risk based on information provided by Able UK since the close of the examination on 24 November 2012.

Risk: Taken from Able letter dated 4 September 2013	NE concern: Taken from NE letter dated 16 November 2012	NE baseline requirement	Progress made in reducing the risk since the examination
Risk a – the risk that the functional habitat only develops after the damage occurs.	Time lag	Availability of functional compensatory habitat at time of habitat loss	<b>Minor modification</b> of DCO Requirement 19 (1) <i>Able will take 'all reasonable endeavours' to make the breach within 15 months of the start of construction of the quay.</i>
Risk b – the risk that the RTE fails to deliver sufficient functional habitat for BTG and other spp.	Limited extent Questionable quality	Area of sustainable mudflat to be created at a ratio of 2:1. (ie 88ha) A ratio of 1:1 (ie 44ha) is only acceptable if the RTE/MR site is fully meeting its objectives as set out in the CEMMP	Extent of mudflat: <b>No change in area of RTE mudflat</b> (Long term sustainable mudflat proposed at 60ha and sometimes less than 60ha due to operational management of the RTE)  Quality of mudflat: <b>No change in quality of mudflat issues</b> which have either not been addressed or resolved satisfactorily:  i) Minimum depth of mud – to support invertebrates as food resource for birds  ii) Confirmation of benthic invertebrate fauna of NKM and use in target setting for RTE mudflat –quality of food resources to support birds.  iii) Closed aspect of RTE cells – impacts on birds  iv) Regular management disturbance to RTE cells- impacts on invertebrate fauna and birds
Risk c – the risk that CCSWG fails to deliver the	Hydrological uncertainties for the	CCSWG should provide a roost and an area of wet grassland.	<b>Some progress in confirming the quality of roost and wet grassland.</b> The creation of a roost and an

Risk: Taken from Able letter dated 4 September 2013	NE concern: Taken from NE letter dated 16 November 2012	NE baseline requirement	Progress made in reducing the risk since the examination
functional habitat for BTG and other spp.	creation of functional wet grassland		area of wet grassland should be technically feasible. The detailed design for the roost and wet grassland areas give some confidence in the delivery of a functional roost and functional wet grassland habitats. There remain two key issues which must be addressed satisfactorily to reduce the risk of failure 1. Availability of sufficient water for the roost and wet grassland 2. Effective and reliable mechanism for moving water around the site
Risk d – the risk that the pasture land ID'ed as overcompensation at East Halton fails to be of benefit to any spp affected by AMEP.	Minimal benefit as overcompensation	If this site is to provide 'overcompensation' the design must be tailored to the species and impacts for which is it compensating for; ie the loss of intertidal foraging habitat.	<b>No progress in confirming suitability of overcompensation proposal.</b> The proposed design is tailored to mitigate for the loss of terrestrial habitat utilised by curlew and not as a functional area of wet grassland habitat to meet the needs of species displaced as a result of the loss of the NKM mudflat.  The value of the proposed grassland at East Halton Marshes as 'overcompensation' for species displaced from NKM mudflat will be minimal.
Relevant to all risks a-d	Uncertain implementation	The need for robust monitoring and management strategies	<b>The completion of a detailed CEMMP and legal agreement gives significant confidence in delivery of compensation measures.</b> The CEMMP describes the detailed design and operation of the compensation measures. The plan includes specific management objectives and also identifies targets and management actions which support the objectives. The plan also includes details of the monitoring that will be undertaken to confirm progress towards and achievement of the objectives.

## Annex 5

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Our Ref: RC.JD-KJ.A.L13-0902  
Date: 1<sup>st</sup> October 2013

For the attention of Andrew Hearle

Dear Andrew

### **ABLE MARINE ENERGY PARK Compensation Measures**

1. Thank you for your letter dated 24<sup>th</sup> September 2013, regarding the above. Whilst we understand that the correspondence was written before we advised you that the Department for Transport had granted an extension of time to their original deadline of 25<sup>th</sup> September for the submission of additional consultation material, there are a number of matters where we feel your comments require our response. Accordingly, we wish to make the following observation in relation to your comments.
2. We have previously identified, and you have accepted, the four risks that are of most concern to you.

### **Time Lag**

3. We make four points in response to your letter about the first risk, that there is a time lag between the damage occurring to the existing habitat and the compensation becoming functional.
4. First, you agree with us that Immingham Outer Harbour was a project where compensation was provided after the damage occurred, but say that it was 'effective' in 10 months. We show below that that was not in fact the case, at paragraphs 15 to 17.
5. Secondly, you agree that Bathside Bay was another project with a time lag, 27 months in that case, but you say that the main issue to be compensated was loss of roosting rather than feeding habitat, which could be provided more quickly. We provide evidence below that the impact on feeding birds from that project was in fact found to be greater than that on roosting birds, at paragraphs 18 to 23.
6. Thirdly, you cite Cardiff Bay as a comparable project in terms of the effects of displacement. In fact, that project did not compensate with anything close to 'like for like' habitat and so is not comparable, at paragraph 24.

*Cont/d...2*

7. Fourthly, you cite BTO commentary that the national rise in black-tailed godwit numbers has not been repeated in the Humber. We provide more recent BTO commentary that the Humber is similar to the rest of the region and the country as a whole, at paragraphs 25 to 29.

#### **Area of Habitat**

8. We make the following points about the second risk, that area of habitat that is provided is insufficient.
9. We disagree on the depth of mud that needs to be provided, to provide the 150mm you advocate rather than 100mm merely requires the water management to start later. This issue can therefore be overcome if the Secretary of State agrees with your position (paragraph 30).
10. You agree that a ratio of 1:1 (created habitat: lost habitat) is all that need be provided if the mudflat is functioning in accordance with the design intent. You also agree that a Regulated Tidal Exchange (RTE) project has more chance of working than a managed realignment site, due to the ability to intervene. At paragraphs 31 to 38 we demonstrate that English Nature only required a comparable ratio of 0.43:1 at the Welwick and Chowder Ness managed realignment sites and a ratio of 1:1 at the Bathside Bay managed realignment site. Nevertheless, we are having to provide a ratio far in excess of these precedents for a scheme that you say is more likely to work. We ask that we be treated even-handedly with those other projects.
11. We have now provided you with benthic monitoring reports and further comments on the enclosed nature of the existing mudflat.

#### **Cherry Cobb Sands Wet Grassland**

12. On the third risk that the Cherry Cobb Sands wet grassland fails to deliver functional habitat, at paragraphs 44 to 48 we refer to the additional data we have obtained on the cause and level of salinity of Keyingham Drain and how we would mitigate this by replacing the tidal gates and avoiding abstraction whenever the salinity levels rose above an agreed level.

#### **East Halton Further Overcompensation**

13. Finally, on the risk that the East Halton site fails to be of any benefit, we have provided you with further information since your letter and await your comments.
14. We ask that you consider the points we have made in this letter and the further information we have provided to you, and provide a response as to whether you are able to revise your assessment of the risks that you have identified. We ask that you do this by Friday 11<sup>th</sup> October so that we can use the response as part of our submission to the Secretary of State.

#### **The Risk that the Functional habitat only develops after the damage occurs**

15. At paragraph 9 of your letter, you state your understanding that whilst the Secretary of State agrees with the Panel's approach that EC guidance allows time lags between any damage occurring to a European site and compensation becoming functional, you believe *'he is still seeking advice on the ecological risks associated with that time lag'*. Setting aside any uncertainty about what the precise time lag might be in the case of AMEP, after due consideration by the Panel and the Secretary of State of all the evidence, the Development Consent Order dated 28<sup>th</sup> August 2013, does not exclude a time lag from occurring in relation to the provision of functional feeding habitat for SPA species.



16. At paragraph 12, you agree that time lags have been permitted on two other port projects but then claim, that at Immingham Outer Harbour (IOH) the effective compensation was provided '*within 10 months*' and that the impact at Bathside bay was not related to functioning mudflat. We do not agree with either if these assertions.
17. For IOH, the compensation sites were breached (rather than being functionally '*effective*') around 10 months after Immingham Outer Harbour became operational. The legal Agreement between English Nature and others (including the Royal Society for the Protection of Birds (RSPB), and Associated British Ports (ABP)), dated 30<sup>th</sup> June 2003, clearly identifies the following impacts which required compensation at Schedule 1 (emphasis added):-

***'Immingham Outer Harbour...***

*'Function lost: mudflat used by **feeding** water birds in the middle estuary', and,*

*'Total number affected: 603 peak mean'*

***Quay 2005***

*'Function lost: mudflat used by **feeding** water birds in the middle estuary', and,*

*'Total number affected: Peak in Feb 96 = 334*

*Peak in Jan 02 = 97*

*Mean of two peaks = 215*

Further, at Paragraph 2.5 of the Agreement, Objective (a) of the compensation measures is stated to be:-

*'the creation of intertidal habitats with the ability to provide **feeding habitat** for in excess of 800 (peak mean over five years) **feeding waterbirds**', (emphasis added).*

18. With regard to Bathside Bay, at paragraph 13 of your letter you make the following statement in relation to that project:-

*Natural England acknowledges that in Table 3.1 (of the Applicant's response to the Panel's Rule 17 letter dated 15<sup>th</sup> November 2012) the Bathside Bay development has a greater time lag than that proposed for AMEP; (it states that "reasonable endeavours that breach is no more than 27 months after start of construction"). In our view it is important to recognise that the circumstances of these two developments are not comparable; the greatest impact at Bathside Bay was on roosting birds (a total of 2,240 waterbirds) which would be able to utilise the newly created managed realignment site for roosting soon after creation.*

19. We have carefully reviewed the environmental impact assessment for Bathside Bay as recorded in the Environmental Statement for that project, as well as the legal Agreement for the delivery of the compensation measures (as provided to us by Natural England on 3<sup>rd</sup> October 2012 in what is described as its "*near final form*"), correspondence originating from English Nature at the material time, and the Planning Inspectorate's Report. For ease of reference, we provide (necessarily brief) abstracts from these documents below.

## The Environmental Statement

- a) Chapter 4, Section 4.5.7 (*'Analysis of roosting wildfowl population'*), paragraph 4.5.10.4:-

4. Table 4.10 shows that, based on the 5 year mean peak over the winters of 1995/96 to 1999/00, Bathside Bay supported 3.1% of the estuarine wildfowl population during the high water period. As the counts are undertaken during the period approaching, and just after, the time of high water, these birds are likely to be roosting on areas of saltmarsh around the fringes of the Bay, in areas of scrub vegetation on previously reclaimed areas around the perimeter of the Bay and on a sand and gravel spit at the eastern end of the Bay. During site visits to the Bay, shelduck have been observed to be roosting on the water surface over the high tide period.

- b) Chapter 4, Section 4.5.10 (*'Waterfowl usage of Bathside Bay at low water'*), paragraphs 4.5.10.11 – 12:-

11. Table 4.13, therefore, shows that Bathside Bay is a valuable habitat (based on its area) for a number of birds species, including mute swan, dark-bellied Brent goose, shelduck, mallard, ringed plover, knot, dunlin, sanderling, bar-tailed godwit and redshank. This could be due to many factors, such as:

- The presence of a favoured prey item of these species in greater abundance than elsewhere in the system (possibly linked to sediment type);
- The location of the Bay at the mouth of the estuary;
- The proximity of roost sites at high water.

12. In reality, a combination of the above is likely to be the case.

- c) Chapter 4, Section 4.5, paragraph 4.5.11.2

2. The Bathside Bay count sector occupies 2.8% of the total counted area of the estuarine system. Therefore, the fact that the Bay supported between 2.2% and 2.4% of the estuarine waterfowl population in the winters of 1999/2000 and 2000/2001 means that Bathside Bay is of comparable importance overall in terms of total feeding waterfowl population (all species) it supports in relation to the remainder of the estuarine system. This supports the conclusions drawn from the analysis of peak waterfowl populations and peak waterfowl density within the Bay in comparison with other sectors in the Stour and Orwell estuaries.

d) Chapter 10, Table 10.1:

**Table 10.1 Summary of potential impacts (after mitigation) of the Bathside Bay development on favourable condition targets for the Stour and Orwell Estuaries SPA (listed in Tables 4.4 and 4.5)**

PARAMETER	CONSTRUCTION PHASE		OPERATIONAL PHASE	
	IMPACT	Affected objective	IMPACT	Affected objective
Benthic invertebrates (intertidal)	MAJOR ADVERSE	4, 9	NO IMPACT	-
Benthic invertebrates (subtidal)	MODERATE ADVERSE	4,9	MINOR ADVERSE	-
Feeding waterfowl	MAJOR ADVERSE	2, 6, 7, 8, 9, 10, 11, 12	NEGLIGIBLE	-
Roosting waterfowl	MODERATE ADVERSE	2, 5, 6, 7, 8, 11	NEGLIGIBLE	-
Saltmarsh	MODERATE ADVERSE	3, 4, 5, 6, 8, 9, 11, 12	NEGLIGIBLE	-
Grazing marsh	NO IMPACT	-	NO IMPACT	-
Grassland	NO IMPACT	-	NO IMPACT	-

e) Chapter 10, Section 10.5, paragraph 3, as reproduced below:-

3. It is concluded, based on the information provided in Tables 10.2 and 10.3, and given the nature and scale of the tidal works, that the proposed development will have an adverse effect on the integrity of the Stour and Orwell Estuaries SPA due to:

- The loss of intertidal area (and hence feeding habitat for waterfowl) that contributes to the designated status of the SPA;
- The loss of roosting area (saltmarsh and raised sand and gravel areas) that support waterfowl during the high water period; and,
- Through the above two points, the potential for the proposed development to increase pressure for resources (food, space, etc.) within the remainder of the system.

Draft Legal Agreement: Schedule 1, Part 2

1.2 *HIPL shall use reasonable endeavours to ensure that the Compensation Scheme is implemented so that subject to Force Majeure if the Marine Works are commenced:*

1.2.1 *in the period from July to September in any calendar year the Breach shall occur not more than 27 months later;*

and,

3.2 *The targets against which the success of the Compensation Scheme will be assessed in any review following a report in accordance with Schedule 3 hereof are that the Managed Realignment Site should be capable of supporting the following assemblage of water birds:*

- 3.2.1 *An assemblage of roosting water birds comprising, on a 5-year mean peak basis at least 2,240 wildfowl and waders including in particular oystercatcher, ringed plover, knot, dunlin, dark bellied Brent goose, turnstone and shelduck in similar proportions to those supported by Bathside Bay during the winters of 1995/96 to 1999/00; and*
- 3.2.2 *An assemblage of feeding water birds, comprising on a 5-year mean peak basis at least 1560 wildfowl and waders including in particular ringed plover, dark-bellied Brent goose, shelduck, knot and mallard in similar proportions to those supported by Bathside Bay during the winters of 2000/1 to 2003/04. (Underline added).*

English Nature Correspondence to the Department for Transport, Local Government and the Regions

- f) 25 January 2002, pg 4:-

**3.4 Benthic Invertebrate Communities:** it is particularly noteworthy that in all the attributes considered (including species richness, abundance and diversity) the samples from Bathside Bay indicate that it is comparable with, or in some cases, better than other parts of the estuarine system (within the SPA).

English Nature Correspondence to Tendring District Council

- g) 23 May 2003, pg 3, paragraph 3:-

In general, English Nature supports the findings of the ES in respect of nature conservation issues, in identifying the nature of the impacts, the magnitude of those impacts, and in evaluating the significance of those impacts. **Our only fundamental disagreement** is in relation to the impact identified on page 302, the decreased exposure (of some 3ha) of intertidal land within the SPA due to a reduction in tidal range. We do not disagree with the identified nature or scale of this impact, but we cannot agree that this is of only **minor adverse significance**. This represents a loss of productive intertidal area, fundamental to the feeding of waterfowl, and thus the significance of this impact should be scaled up accordingly. We would argue that this should be treated as being of **major adverse significance**.

Planning Inspectorate Report

*'18.149 The site is geographically close to the Stour and Orwell and is adjacent to the Hamford Water SPA. It is local to BB in terms of waterfowl usage, being about 4.5km south of the Stour/Orwell estuary, and was selected and designed to provide a habitat for feeding and roosting to support a similar assemblage of waterfowl', (underline added).*

20. We have also reviewed the Environmental Statement for the compensation site, and the Non-Technical Summary for that states the following at Section 10, page 41:-

16. The site is not expected to experience rapid accretion from naturally available sediment sources.

and,

19. In view of the possibility of overlap between the impact occurring at Bathside Bay and the creation of a valuable feeding habitat within the realignment scheme, it is proposed to create a larger area of intertidal than would be required in a like-for-like situation (i.e. a 1:1 replacement of intertidal area). Hence, the proposal is to create approximately 105ha of intertidal area as opposed to the 69ha that would be lost at Bathside Bay.

21. Thus, it is clearly evidenced that at Bathside Bay:-

- a) The intertidal habitat that will be lost comprises 2.8 per cent of the habitat resources (cf. 0.45 per cent at AMEP).
- b) The intertidal habitat has a rich invertebrate assemblage, of potentially greater functional value than the local average for the habitat type (cf. the recent spring and autumn 2013 benthic surveys show that this is not the case at AMEP);
- c) The invertebrate assemblage supports an important assemblage of feeding SPA species comprising up to 2.4 per cent of the total population (cf. 2.7 per cent at AMEP (ES, paragraph 11.5.73).
- d) The high tide roost that will be lost currently supports 3.1 per cent of the estuarine population (cf. AMEP, North Killingholme Haven Pits roost site will remain undisturbed).
- e) The impact of the development on feeding SPA species was assessed to be '*Major Adverse*', and this finding was supported by English Nature (item (g) above).
- f) The impact of the development on roosting waterfowl was assessed to be '*Moderate Adverse*' (in other words a lesser impact than on feeding SPA species), and this finding was supported by English Nature (item (g) above).
- g) The time lag from between the start of the marine works and the breach of the sea defences could be 27 months (cf. a maximum of 15 months at AMEP).
- h) The managed realignment site for Bathside Bay is not expected to accrete naturally (cf. AMEP which will naturally accrete rapidly); to accelerate functional development 150,000m<sup>3</sup> of dredge arisings will be pumped into parts of the site as soon as the breach is made.

22. In short therefore, having regard to the evidence, we fail to understand how you can justify your statement that, '*the greatest impact at Bathside Bay was on roosting birds*'.

23. Taking account of the above, we also cannot see how, on an objective basis, in other words using the same methodology in each case, the ecological risk of permitting a time-lag at AMEP is greater than that associated with the consented proposals for Bathside Bay. In essence, we believe that the evidence demonstrates NE's argument for discounting Bathside Bay as a relevant precedent to be flawed. It seems to us, a very relevant comparator, against which you can usefully benchmark your ecological risk assessment.

24. At paragraph 15 of your letter you state:-

*'It is Natural England's view that, in this case, there is a risk associated with the time lag. This is due to the high numbers of birds that will be displaced from North Killingholme Marshes, in particular, the high numbers of foraging birds. Displaced birds may either die (as shown by work on birds displaced from Cardiff Bay)'....*

It might be implied from the above that the development and associated compensatory measures provided at Cardiff Bay provide a useful comparator for potential impacts at AMEP, otherwise why would it be mentioned? However, we cannot agree that the Cardiff Bay barrage project (CBBP) and its impacts provide any useful comparison against which to judge AMEP. Briefly, CBBP changed the entire eco-system of Cardiff Bay, converting an estuarine environment into a freshwater lagoon, so inevitably the size and diversity of the estuarine avifaunal species using the site were both reduced significantly, and substantial displacement resulted. The compensatory measures were not proximate to the loss, being over 10 miles from the impact site and were entirely terrestrial rather than estuary related. In contrast, the compensatory proposals for AMEP are far more proximate to the loss and replace lost habitat on a 'like for like' basis. Nevertheless, we note that the compensation site developed for CBBP is now a National Nature Reserve, The Newport Wetlands Reserve, and is currently described on the RSPB's website as a 'haven for wildlife'. The RSPB own and run a major visitor centre there.

25. Also at paragraph 15, you direct us to Annex 1 of your letter. Essentially this Annex concludes with the statement that, *'habitat extent may be a limiting factor for some waterbird species on the Humber, including black-tailed godwit'*. Clearly we have accepted, on a precautionary basis, that habitat extent may be a limiting factor and it is for that very reason that functional mudflat is being provided in this case. Thus, the question as to whether compensatory measures are needed because the habitat loss is significant, is settled. The question to be addressed is now simply whether, in time, the compensatory measures adequately address the loss.

26. Notwithstanding, the relevance or otherwise of Annex 1, we are unable to find the source of the quotations given therein, as it does not appear to be included in the list of references you provide at the end of your letter. You quote the BTO as stating that:-

*'There has been a continuing rise in the islandica subspecies of black-tailed godwit in Britain over recent winters (Holt and other 2012). The absence of this trend on the Humber suggests local pressures affecting this species' numbers'.*

27. You appear to give weight to what the BTO 'suggest'. We have checked BTO's current (2013) alert status for Black tailed godwits on the Humber Estuary and reproduce it in full below:-

*'Numbers of Black-tailed Godwit over-wintering on Humber Estuary SPA have fluctuated throughout the period recorded by WeBS making interpretation of the underlying trend difficult. Accordingly, although Alerts have been triggered for the short-term they should be viewed with caution. Numbers of this species over-wintering within Anglian and North East Regions combined have been increasing long term. Numbers of this species over-wintering in Great Britain have been increasing long term. **The trend on the site appears to be tracking that of the region and British trends.** The increasing proportion of regional numbers supported by this site suggest the environmental conditions remain relatively favourable and also indicates that this site is becoming increasingly important on a regional scale for this species. Therefore, although Alerts have been triggered they cannot be considered meaningful', (underline added).*

Cook, A.S.C.P., Barimore, C., Holt, C.A., Read, W.J. & Austin, G.E. (2013). Wetland Bird Survey Alerts 2009/2010: Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs) and Sites of Special Scientific Interest (SSSIs). BTO Research Report 641. BTO, Thetford. <http://www.bto.org/webs/alerts>

Clearly BTO's reports appear to be providing contradictory information regarding the trend for the Black tailed godwits on the Humber Estuary.

28. Another recent BTO report is the recently published Humber Estuary Low Tide Programme 2011/12 in which the following evidence is included:-

*'The Low Tide Counts again showed the importance of the **Pyewipe** and **North Killingholme Haven Pits** for this species. In the winter, by far the largest numbers of Black-tailed Godwits were on the **Pyewipe** section, where there was a peak count of 1,800 (5.86 b/ha) in December which was 91% of all the birds recorded on the estuary in that month. This reliance on the **Pyewipe** section by the majority of the wintering population was also noted in the previous sets of Low Tide Counts. Elsewhere on the Lincolnshire coast, **North Killingholme Haven** had a peak of 219 birds (3.08 b/ha) and **Horseshoe Point** had a peak of just 16 birds (0.05 b/ha), both in March. The other main wintering area was on the inner estuary at **South Ferriby** where there was a peak of 119 birds (1.78 b/ha), though nearby **Read's Island** and **Alkborough Flats** also both held numbers of birds, with peak counts of 72 and 48 respectively', (Emphasis on site names added). (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Section 3.1.16, 2<sup>nd</sup> paragraph).*

and,

*'During the autumn, the Lincolnshire coast was again the key area, with **Pyewipe** and **North Killingholme Haven** again the key sites for feeding birds and **North Killingholme Haven Pits** for roosting and loafing birds. The peak autumn counts were 2,034 (6.63 b/ha) at **Pyewipe** in October and 2,000 (100 b/ha) on **North Killingholme Haven Pits** in August. Up to 816 birds (11.49 b/ha) were also feeding on North Killingholme Haven mudflats in July. The 2003/04 Low Tide Counts identified **Paull Holme Strays** as key site for Black-tailed Godwits, especially on autumn passage, yet on the 2011/12 counts, there were just two records from there with a peak count of 6 birds in October, though 336 were on the adjacent mudflats in July. Away from the Lincolnshire coast and Paull Holme Sands, the only other notable count was of 123 birds (0.36 b/ha) at Alkborough Flats in August.' (Emphasis on site names added). (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Section 3.1.16, final paragraph).*

29. Thus whilst North Killingholme Haven (NKH) is an important low tide site, it is not an exclusive site for Black-tailed godwits and is by no means the largest or most intensively utilised: Pyewipe provides 307 ha of intertidal habitat, whilst NKH provides just 66 ha (Humber Estuary Low Tide Programme 2011/12, BTO, May 1013, Table 1).

## **The risk that the RTE fails to deliver sufficient functional habitat for black-tailed godwit and other species**

### Depth of Mudflat

30. Whilst there are clearly divergent views on the depth of mud that is needed for invertebrates to establish effectively, this is essentially an issue that relates to site management and, in particular, the timing of the start of water management. It is a matter that could be resolved through the monitoring programme and will also impact on the start of management measures to reduce bed levels, bringing the start of those operations earlier in the management programme. We believe that 100mm is an adequate depth, but are equally prepared to delay water management operations until 150mm of mud is available if Natural England consider that to be a necessary and justified requirement and so reduces the ecological risk and the timescale for functional development.

### HR Wallingford Work

31. We are pleased that NE confirms in paragraphs 22 and 23 of your letter that a habitat compensation ratio for of 1:1 is acceptable if the RTE/MR site is fully meeting its objectives as set out in the CEMMP. Also, that you agree that an RTE site has a higher chance of success than a managed realignment breach solution *'due to the adaptive management that can be carried out'*.
32. Having agreed the above, essentially having agreed that the design process has optimised the solution and thereby reduced the risk of failure to as low as reasonably practicable, your comments in paragraphs 24 and 25 then appear to criticise the level of management required to ensure the mudflat is sustainable. In particular, you note in paragraph 25 that *'the proposed compensation approach is novel'*. You go on to say that, *'(a)adaptive management will not overcome the risk that the novel approach of an RTE in an environment as dynamic and sediment rich as the Humber Estuary may not work'*.
33. To what extent however is this risk exclusive to the compensatory measures proposed for AMEP? We consider this below in relation to IOH and Bathside Bay.
34. Schedule 2 of the legal Agreement between English Nature and others dated 30<sup>th</sup> June 2003 relating to IOH, clearly identifies one risk of the Welwick Managed Realignment Scheme to be that it was, ***'a new design never tried before'***. The same risk is identified for Chowder Ness Managed Realignment Site, which is also providing compensatory habitat for IOH. Moreover, it is clearly implied that it might take longer than 10 years for the site to become fully effective, given that paragraph 6.1 of the Agreement required the relevant Monitoring Plan to be reviewed 5 and 10 years after physical completion of the compensation scheme. The resulting risk and uncertainty was resolved by providing compensation in the overall ratio of 2:1, but analysis of the Agreement shows the ratio of sustainable mudflat compensation was permitted to be as low as 0.43:1 (Creation (7 ha at Welwick + 4.5 ha at Chowder Ness): Loss (27 ha)).
35. Bathside Bay also relies on a managed realignment site and the legal Agreement for that post-dates the Agreement for IOH, but only by around a year. Thus, it is reasonable to conclude that English Nature had, or should have had, the same concerns, at the material time, regarding the risk of that compensation scheme not developing as predicted. In this case, compensation was provided as detailed in Table 2 below.



**Table 1:** Abstract from Table 2 of the Legal Agreement relating to Bathside Bay

Habitat	Loss (ha)	Approximate area (ha)	Objective for compensation (ha)
Intertidal mudflat (including intertidal creek)	69	76	Minimum of 69
Intertidal mudflat/saltmarsh transition	-	19	
Saltmarsh	2.8	10	10 to 20
Sand and shingle	5	5	approx 5
<b>TOTAL</b>	<b>76.8</b>	<b>c. 110</b>	<b>84 - 94</b>

36. The overall compensation ratio for Bathside Bay is therefore 1.43:1 (110 ha : 76.8 ha), but the specific objective for sustainable functional mudflat is 1:1. There is only a 10 per cent 'buffer', presumably for risk and uncertainty. In the circumstances, it is now even less evident to us that AHPL is being treated fairly by Natural England.
37. Overall therefore, with respect to the risk of the RTE site failing to achieve functionality, we consider that the current risk assessment by Natural England has failed to have appropriate regard to precedent and therefore fails to treat AHPL even-handedly. Similar risks have been demonstrably accepted on other projects with less 'buffer' to address risk and uncertainty. Compensation provision for AMEP should not be treated on such a precautionary basis that it, frankly, loses sight of the principle of proportionality and bears no relationship to precedent.
38. We have now provided you with further information demonstrating the availability of compensatory mudflat during the spring-neap cycle and for different bed levels. We would welcome your comments on that additional information and trust you will also have further regard to the precedents noted above.

Results of Benthic Monitoring

39. We have now provided you with a draft Factual Report that covers both the spring and autumn 2013 benthic surveys, together with a draft Interpretative Report produced by GoBe Consultants. We would appreciate your comments on both reports before we submit them to the Secretary of State for the purpose of formal consultation.

Enclosed Nature of Killingholme Mudflat

40. We have now provided you with further comments on this issue.

Route of the new footpath

41. Whilst we accept your comments on this matter, there was in fact no certainty regarding the route of the new footpath until the decision on the application was made.

**The risk that Cherry Cobb Sands wet grassland fails to deliver the functional habitat for black-tailed godwit and other species.**

42. We welcome Natural England's acknowledgement in paragraph 28 of your letter, that the wet grassland at Cherry Cobb Sands will provide '*additional foraging resources alongside the birds preferred mudflat habitat*'. We are also agreed that this resource is not provided to buffer the time lag as the Panel had determined that time lag is not a barrier to consenting the scheme. Instead it provides a buffer to any residual risk that the compensatory mudflat has less functionality than it is expected to achieve. This is a particular feature of our proposals that is absent from both IOH and Bathside Bay despite the fact that, at the material time and as shown above, English Nature believed those compensation schemes to be unproven too.
43. We also welcome the statement that, '*Natural England has an increased level of confidence in the feasibility of creating functional wet grassland at Cherry Cobb Sands*', noting that this higher level of confidence is subject to the resolution of issues relating to the water balance that can be reasonably assured. In particular, you are seeking an assurance that a source of water is available, so that imbalance between rainfall and evapo-transpiration is insufficient, then a reserve water supply is available.
44. We have undertaken extensive investigation into the suitability of Keyingham Drain to provide a back-up water supply where there is insufficient rainfall in any one year. In late June/early July 2013 we installed data loggers in the Drain adjacent to the site, to establish its salinity on a continuous period over a three-week period. That data identified a highly variable range of salinity within the Drain of 4 - 25 PSU's (Practical Salinity Units), with an average of 12, and tidal influence can be inferred. However, in reviewing the methodology used in that survey, it became apparent that the data loggers actually measured water conductivity and that there were a range of electrolytes, other than those present in seawater, which might have influenced the readings. Given the extensive use of chemicals on agricultural land we wished to be certain that polluted surface water run-off from the catchment area was not affecting the results. Accordingly, we took six water samples along the length of the Drain between the outfall and up to 4km upstream of the outfall. The results showed elevated levels of both sodium and chloride, confirming that the Drain is contaminated with estuarine waters. We also commissioned the institute of Estuarine and Coastal Studies to undertake a botanical and invertebrate survey of the Drain to understand the existing local eco-system more thoroughly along the same length of Drain. The conclusion of that study is that the Drain hosts a number of plants that are all tolerant of saline conditions. More freshwater conditions may pertain upstream of the CCSWG site however. The IECS surveyors observed intrusion of estuarine water at the outfall which was migrating upstream.
45. Having undertaken an extensive soil investigation earlier this year, we are also able to exclude the possibility of saline groundwater being responsible for the conditions in the Drain. Accordingly, we can be very confident that the saline conditions in the Drain result from an existing fault at the outfall, whereby the tidal gates do not provide a sufficiently tight seal at high tide and that this is, in fact, the only cause of the salinity in the Drain.

46. Informal discussions with the Environment Agency have been undertaken; replacing tidal gates is a routine activity that can be expected to result in a significant improvement in the water quality within the Drain. The Applicant will commit to undertake such works to ensure that a sufficiently fresh source of back-up water is available for irrigation. In the event of any residual estuarine intrusion, abstraction would be linked to a data logger, preventing abstraction when salinity was elevated. A completely freshwater source is not required, as there will be a certain amount of dilution of the abstracted water from the on-site storage.
47. The Environment Agency confirmed to us by letter dated 4<sup>th</sup> September 2013 that they had no objection in principle to us abstracting water from Keyingham Drain.
48. It may add confidence to the proposals if suitable amendments were made to the existing legal agreement. However, it would be possible to include the works as an additional management requirement within the CEMMP that must be approved by Natural England under Schedule 11, paragraph 19(1) of the draft DCO.

**The risk that the pasture land proposed as 'overcompensation' at East Halton fails to be of benefit to any species affected by AMEP.**

49. Since receipt of your letter we have provided you with the additional information referred to above your paragraph 33 and await your comments.

**Uncertain implementation**

50. We welcome your confirmation in paragraph 41 of your letter that *'the risk concerning the implementation of the compensation measures (has) been resolved'*.

**The Need for 'additional measures'**

51. At paragraph 44 you advise us to give careful consideration to the potential options for the provision of *'reasonable additional measures'*. We have done this and as a consequence we have enhanced our proposals for wet grassland at East Halton so that it is developed in accordance with the objectives for wet grassland set out in the CEMMP. As a consequence our overall compensation proposal is:-

**Table 2:** Summary of AMEP Compensation

Habitat	Loss	Sustainable Compensation	
		RTE	MR
Functional Intertidal mudflat	43.1 ha	45-60	2
Disturbed Intertidal mudflat		12-27	-
Total mudflat		c.74 ha	
Estuary	21.2 ha	-	31 ha
Total Intertidal habitat		105 ha	
Functional wet grassland	None	46 ha	
Wet roost	None	5 ha	

52. Figures for the two comparator schemes are set out in Table 3.

**Table 3:** Summary of IOH and Bathside Bay Compensation

Habitat	Loss	Compensation	Ratio
<b>Immingham Outer Harbour</b>			
Functional Intertidal mudflat	27 ha	7-37 ha (Welwick) 4.5 ha (Chowder Ness)	0.43:1
Saltmarsh	0 ha	8-32 ha	n/a
Grassland	0 ha	9-15 ha	n/a
<b>Bathside Bay</b>			
Functional Intertidal mudflat	69 ha	69 ha	1:1
Saltmarsh	2.8 ha	10-20 ha	3.6:1
Sand and Shingle	5 ha	Approx. 5 ha	c. 1:1

53. As noted throughout this letter, our analysis of the particular circumstances of both the IOH and Bathside Bay projects, including: the particular features that were affected; the time lag permitted, and the risk associated with an 'un-proven' design, lead us to conclude that, when benchmarked against those projects the compensation proposals for AMEP present less risk than those previously accepted. Accordingly, we believe the raft of compensation measures tabulated above is, or certainly should be, sufficient to ensure a requisite degree of confidence in the ecological impact being adequately compensated, and that AMEP presents no greater ecological risk than either IOH or Bathside Bay.

Yours sincerely



*RICHARD CRAM*  
Design Director

Date: 11 October 2013  
Our ref: 99060  
Your ref: RC.JD-KJ.A.L13-0902



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**BY EMAIL ONLY**

Dear Richard

**Able Marine Energy Park – compensation measures**

1. Thank you for Able UK's draft issue responses, received by Natural England on 25 September 2013, the further information received on 8 October 2013 and your letter dated 1 October 2013 which was received by Natural England the following day.
2. Natural England has assessed this additional information and has considered the points raised in your letter of 1 October 2013 in our advice which is given below. Natural England understands that Able UK may use our advice in amending the draft issue responses, where it feels it is appropriate to do so, before submitting them to the Secretary of State. This letter should be read in conjunction with Natural England's previous letter dated 24 September 2013.

**Natural England's assessment of the level of certainty and associated risk at the end of the Panel examination 24 November 2012**

3. At the close of the examination, Natural England's conclusion on its assessment of the ecological compensation measures was that there is a 'substantial risk' that they may not work.

**Scale of ecological impact**

4. The area of mudflat at Killingholme Marshes is important for more than 5,000 SPA/Ramsar waterbirds thereby demonstrating exceptional ecological functionality in terms of its ability to attract and support high numbers of foraging birds. In particular, the mudflat supports *internationally* important numbers of black-tailed godwits (peak count 2,566 representing 66% of the entire Humber Estuary SPA/Ramsar population<sup>1</sup>) in addition to large numbers of seven other species of SPA/Ramsar waterbirds<sup>2</sup>. The high numbers of black-tailed godwits feeding at Killingholme Marshes means that this one area of mudflat meets the qualifying criteria for SPA status in its own right.
5. It is also recognised that the importance of Killingholme Marshes as a foraging resource is linked to its proximity to a secure roosting site at North Killingholme Haven Pits, and this is considered to be particularly important for black-tailed godwits during their Autumn moult. Therefore, whilst this roost site "will remain undisturbed" (as acknowledged in your letter of 1 October 2013), it is agreed by Able UK that its value as a roosting site may be lost once the adjacent intertidal foraging habitat is developed.
6. Thus the scale of impact reflects the exceptional ecological functionality provided by Killingholme

<sup>1</sup> Informal counts of 3,800 black-tailed godwits at North Killingholme Marshes foreshore, September 2012

<sup>2</sup> Two other species – redshank and ringed plover – were present in numbers equating almost 10% of the site population

Marshes and the large numbers of waterbirds, particularly black-tailed godwits, which utilise this area.

#### Level of certainty that the compensation measures will work

7. Natural England's assessment of the level of certainty that the proposed compensation measures will work was made in terms of: i) the technical aspects of the scheme design and operation; and, ii) the ecological certainty of providing 'equivalent functional habitat'. This assessment was made within the context that the regulated tidal exchange (RTE) scheme is novel and is to be 'tested' within the dynamic environment of the Humber Estuary, known for its high sediment content and rapid rates of accretion.
8. During the examination, Natural England confirmed that it had low levels of certainty about several aspects of the proposed measures and expressed these in terms of four main issues, set out in our submission dated 16 November 2012, as follows:

*'The [compensation] proposal is however novel, and the environment in which it is located is challenging. It is possible that the compensatory measures will succeed, however there is a **substantial risk** that they will not. It is acknowledged that there will always be doubts in relation to compensation proposals, however the doubts in this case are amplified by a combination of the points noted above: time lag, limited extent, questionable quality and uncertain implementation'*

9. Thus, at the close of the examination Natural England's conclusion of 'substantial risk' was based on an assessment of the large scale of ecological impact and the low level of certainty about the compensation measures; specifically, time lag, extent of mudflat, quality of mudflat and uncertain implementation.
10. Put simply, the 'substantial risk' relates mainly to the unproven potential for an untested system of regulated tidal exchange (RTE) cells to provide the compensatory mudflat habitat necessary to support an internationally-important population of black-tailed godwits as well as large populations of seven other SPA/Ramsar waterbirds.
11. As you will be aware, the existing managed realignment sites on the Humber Estuary have been monitored extensively and it is known that creating sustainable mudflat habitat is difficult. Natural England agrees that an RTE has a higher chance of success than a managed realignment breach solution due to the adaptive management that can be carried out. However, given that the RTE is a novel approach untested at this scale in the UK (and never trialled on the Humber), it is our view that the level of uncertainty regarding the success of the compensation measures is greater in this case.

#### Further information provided by Able UK since the Panel examination

12. Further work has taken place since the Panel examination, and together with the further information provided by Able UK since 28 August 2013, this gives a greater level of confidence in the certainty around some of these issues. These are summarised in table 1 at the end of this letter.

The key points are as follows:

##### **1. Time lag**

13. Natural England's letter dated 24 September 2013 confirms our view that the Secretary of State's position on the time lag issue, as stated in the Department for Transport's letter of 28 August 2013, is that advice is being requested on the ecological risks associated with a time lag. Our letter also

acknowledged the Examining Panel's view that the relevant EU and Defra guidance on compensatory measures 'allow for a possible timelag; although they will not encourage it'.

14. Able UK has revised the base programme for the AMEP development taking account of programme constraints in the DCO agreed at the end of the Panel examination. These revisions are helpful in clarifying the indicative timelines for the compensation works, although there is some apparent contradiction in the requirements of the DCO schedules 8 and 11 on which we would welcome clarification.
15. The revised base programme gives a start date for quay construction in June 2015 with the wet grassland at Cherry Cobb Sands being constructed in July 2014 becoming fully functional after 4 years in September 2018 and the RTE/MR mudflat habitat becoming fully functional in September 2019. (We acknowledge the intention to create functioning wet grassland habitat at East Halton Marshes but, as indicated in our comments below, consider this will have limited benefit for the birds displaced by the development.
16. The post examination changes to the development schedule are relatively minor.
17. Natural England believes that the time lag, and therefore its associated risk could be further reduced by beginning the construction works for Cherry Cobb Sands wet grassland site as soon as practicably possible. This part of the compensation measures is subject to a separate planning permission and with the design details now amended and agreed in principle by Natural England (see our comments below).

## **2. Extent of compensatory mudflat habitat provision**

18. Able UK has confirmed that the RTE will create c60ha of long-term sustainable mudflat, which will be reduced to c45ha as part of the operational management of the RTE when during neap tide cycles one of the 15ha cells will be impounded. This amounts to a compensation ratio of 1.5:1 (on occasions 1:1) as compared to the 2:1 ratio that was initially proposed by Able UK and agreed by Natural England. Natural England subsequently advised that a ratio of 1:1 is acceptable provided the RTE/MR meets its quality objectives and targets.
19. The additional information submitted acknowledges that at times there may be only 30ha of mudflat available (a compensation ratio of 0.66:1) as a food resource, albeit for a limited period of time "*The area available for birds to feed at the RTE site will almost always be greater than at Immingham because normally only one field would be impounded as a reservoir. An exception to this could occur if it were necessary to undertake maintenance activities (bed levelling and removal of sediment) whilst a field was impounded over spring tides. This would reduce the available area by a further 15ha during the period of impoundment for the maintenance.*"
20. There has been no additional information presented on the extent of compensatory mudflat however, our view remains that a ratio of 1:1 is acceptable provided the RTE/MR meets its quality objectives and targets.

## **3. Quality of compensatory habitat provision**

### **3a Quality of compensatory mudflat habitat provision**

- a) Technical certainty (scheme design and operation)
  - i) Able UK has provided further details and clarification about the RTE and MR management measures which provides more certainty in the design and operation of the proposed scheme.

- ii) Able UK has confirmed they are prepared to adjust the water management operations at the RTE in order to ensure a minimum depth of 150mm of mud is available for the benthic invertebrates, as advised by Natural England.
- iii) For the area of mudflat that will be lost, the 2013 benthic invertebrate surveys show much greater concentrations of key invertebrate prey than shown by the 2010 survey increasing certainty about the quality of the existing habitat. It should be noted however, that Natural England has concerns about the proposed target setting process for the compensation site using this information that will need to be discussed and resolved.

b) Ecological certainty (provision of equivalent functional habitat)

- i) The RTE scheme is novel and untested in the UK at this scale.
- ii) Natural England has expressed concern that the enclosed aspect of the RTE cells may inhibit the use of the RTE by black-tailed godwits, however accepts that there is little empirical evidence to give a conclusive view.
- iii) Able UK has provided further information on disturbance to the RTE during management operations. There is clearly some scope to minimise the level of disturbance through adaptive management but there remain uncertainties about whether the level of disturbance arising from the intensive management operations required to maintain mudflat habitat in the RTE will limit its functional value as feeding habitat for the high numbers of birds displaced by the development.

21. Our view is that the additional information has mitigated the risk, in terms of the technical issues of concern raised by Natural England during the examination, but that given the unproven nature of the RTE in this situation there remains a residual risk that the required functional habitat may not be created. In our view this risk can only be mitigated through planned contingency, which can be delivered if required.

***3b Quality of compensatory roost and wet grassland habitat provision at Cherry Cobb Sands***

a) Technical certainty (scheme design and operation)

- i) Able UK has provided a detailed design for the roost and wet grassland areas which gives an increased level of certainty in the delivery of a functional roost and functional wet grassland habitats.
- ii) Able UK has advised that it has made further assessments of the water quality in Keyingham drain and as a consequence propose works to replace the tidal gates to secure its suitability as a source of water for supplementing water levels in the roost and wet grassland. Confirmation of the details of the proposed scheme of works will increase confidence that the issue of securing an adequate water supply has been addressed. We welcome Able UK's suggestion that the works should be included as a management requirement within the CEMMP.
- iii) Further information on the frequency of wind speeds as recorded at a Met Office station located at Donna Nook, has been presented by Able UK to support their view that the use of wind pumps will be an effective mechanism for moving water around the compensation site. These records are for a site some distance from Cherry



Cobb Sands and may not be representative of wind speeds and their frequency at the compensation site. Nevertheless we suggest this issue can be resolved relatively easily by consideration of alternative means of moving water round the site, such as the use of motorized pumps, as back-up to cover any failure in the effectiveness of the wind pumps. We advise that a commitment to this effect in the CEMMP would increase confidence in these proposals.

b) Ecological certainty (provision of equivalent functional habitat)

- i) There is wide experience from the UK of successfully creating roosts and wet grassland habitats to provide ecologically functioning habitat for wading birds. Whilst the evidence shows that black-tailed godwits will preferentially utilise mudflat habitat for foraging and that their utilisation of wet grassland during the Autumn is not universal, there is ample experience of wet grassland creation to give confidence that it is possible to create habitat suitable for black-tailed godwits. The proximity of the proposed roost as well as the intertidal mudflat at Cherry Cobb Sands gives added weight to this confidence.

Our view is that the additional information has mitigated the risk, in terms of the technical and ecological issues of concern raised by Natural England during the examination.

***3c Quality of wet grassland over-compensation habitat at East Halton Marshes***

a) Technical certainty (scheme design and operation)

- i) Able UK has amended the detailed design for the wet grassland habitats at East Halton Marshes to address the needs of target bird species that will be displaced by the development at North Killingholme Marshes.
- ii) Able UK has provided some limited information to suggest sources of water to sustain wet grassland habitat.

b) Ecological certainty (provision of equivalent functional habitat)

- i) Whilst it is acknowledged that black-tailed godwits have been recorded in very low numbers on terrestrial land and on mudflats close to East Halton Marshes there is a high level of uncertainty that the creation of wet grassland in this location will provide anything other than habitat of modest value to the high numbers of birds that will be displaced by the development.

22. Our view is that the additional information has reduced the risk, in terms of the technical and ecological issues of concern raised by Natural England during the examination.

23. Whilst we have confidence that the proposals for East Halton Marshes can deliver functional habitat for waterbirds, the location of the site being some distance from suitable mudflat habitat is unlikely to be of significant value for the high numbers of birds that will be displaced by the development.

**4. *Implementation of compensation measures***

24. Notwithstanding the proposed additional commitments referred to in our comments above, Natural England's assessment is as stated in our letter of 24 September 2013; that is the completion of a detailed CEMMP and legal agreement gives a high level of certainty and low risk in the delivery of compensation measures.

### **Natural England's assessment of the level of certainty and risk as at 11 October 2013**

25. Progress since the examination has mitigated our view of 16 November 2012 that there was a substantial risk. Nevertheless, some risk remains.
26. The remaining areas of risk can be reduced further by reducing the time lag between the loss of mudflat habitat and the establishment of fully functioning mudflat and wet grassland habitats. For example, and as indicated above, where land is in the ownership or control of Able UK, as at Cherry Cobb Sands and the Able Logistic Park, then we advise that works to establish the proposed wet grassland habitat are begun as soon as practicably possible.
27. Overall, the compensation proposals appear workable and Natural England has increased confidence in the proposals, based on the increased level of certainty in the technical design and operation of the compensation measures and in their implementation. There is also an increased level of confidence in the establishment of functioning wet grassland habitat and a roost at Cherry Cobb Sands. It is also our view that the success or failure of the compensation measures hinges on the ability to recreate equivalent functioning mudflat habitat; the preferred feeding habitat for the internationally-important population of black-tailed godwits.
28. The key residual risk is a consequence of the large scale of impact and the RTE scheme being a novel approach, untested before on this scale in the UK, and requiring extensive intervention management and monitoring. In this respect the proposed RTE is experimental and the associated risk, in our opinion, is not comparable with other compensation schemes implemented in the UK. Thus there is a residual risk that the RTE scheme does not deliver the required compensatory habitat for black-tailed godwits, which it may not be possible to resolve through adaptive management.
29. Natural England recognises that there is already a process agreed within the CEMMP for monitoring and assessing the effectiveness of the compensation measures which includes targets and limits of acceptable change. The CEMMP also identifies a 'last resort' that in the event the compensation measures continue to fail this will be reported by the 'Compensation Site Steering Group' to the Secretary of State. Therefore it is Natural England's advice that as a minimum requirement Able UK should identify suitable contingency measures in the event of a failure of the RTE scheme.

Yours sincerely


Andrew Hearle  
Principal Adviser, Casework Solutions Team  
07900 405350

Table 1

**AMEP – Compensation Measures**

Level of uncertainty and risk as assessed by Natural England based on ‘developments’ and further information provided by Able UK since the Panel examination on 24 November 2012

Compensation Measures – Issues identified as contributing to the assessment of substantial risk at the close of the hearing		Level of certainty and risk as at 11 October 2013
Time lag		Minor change to timetable but no overall change to the risk
Extent of RTE/MR mudflat		No change
Quality of RTE/MR mudflat	<i>Technical certainty (scheme design and operation)</i>	Risk mitigated
	<i>Ecological certainty (provision of equivalent functional habitat)</i>	No change
Quality of roost and wet grassland habitat at Cherry Cobb Sands	<i>Technical certainty (scheme design and operation)</i>	Risk mitigated
	<i>Ecological certainty (provision of equivalent functional habitat)</i>	Risk mitigated
Quality of wet grassland over-compensation habitat at East Halton Marshes	<i>Technical certainty (scheme design and operation)</i>	Risk reduced
	<i>Ecological certainty (provision of equivalent functional habitat)</i>	Risk reduced
Implementation of compensation measures		Risk mitigated

 <p>amep able marine energy park</p>	<p><b>ABLE MARINE ENERGY PARK RESPONSE TO DEPARTMENT FOR TRANSPORT'S '<i>MINDED TO APPROVE</i>' LETTER IN RESPECT OF COMPENSATORY MEASURES</b></p>	<p><b>OCT 2013</b></p>
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Annex 4.1

Legal Agreement in respect of Immingham Outer Harbour between:

Associated British Ports  
English Nature  
The Environment Agency  
Royal Society for the Protection of Birds  
Lincolnshire Wildlife Trust  
Yorkshire Wildlife trust

Dated 30 June 2003

- |   |     |
|---|-----|
| Associated British Ports                  | (1) |
| English Nature                            | (2) |
| The Environment Agency                    | (3) |
| Royal Society for the Protection of Birds | (4) |
| Lincolnshire Wildlife Trust               | (5) |
| and                                       |     |
| Yorkshire Wildlife Trust Limited          | (6) |

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Compensation Agreement for  
Immingham Outer Harbour and Hull Quay  
2005

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1 THIS AGREEMENT is made the 30<sup>th</sup> day of June 2003 between:

- (1) ASSOCIATED BRITISH PORTS of 150 Holborn London EC1N 2LR ("ABP")
- (2) ENGLISH NATURE of Northminster House, Peterborough, Cambs, PE1 1UA ("English Nature")
- (3) ENVIRONMENT AGENCY of Kingfisher House, Goldhay Way, Orton Goldhay, Cambs, PE2 5ZR (the "Agency")
- (4) ROYAL SOCIETY FOR THE PROTECTION OF BIRDS of The Lodge, Sandy, Bedfordshire, SG19 2DL ("RSPB")
- (5) LINCOLNSHIRE WILDLIFE TRUST of Banovallum House, Manor House Street, Horncastle, Lincolnshire, LN9 5HF ("LWT")
- (6) YORKSHIRE WILDLIFE TRUST LIMITED of No. 10 Toft Green, York, YO1 6JT ("YWT")

## 2 Recitals

- 2.1 This Agreement underlines ABP's wish as port operator to play a full part in the long term sustainable management of the Humber Estuary and in particular the Humber Estuary European Sites.
- 2.2 ABP are seeking consent and authorisations under two Harbour Revision Orders ("HRO") made pursuant to Section 14 of the Harbours Act 1964 for
- (a) the Outer Harbour; and
  - (b) Quay 2005
- 2.3 In considering the impact of the proposed construction of the Outer Harbour and Quay 2005 respectively ABP have carried out Appropriate Assessments in accordance with Regulation 48 of the Habitats Regulations and have concluded that:
- (a) the effects of the Harbour Development Works are as identified in ABP's Appropriate Assessments as summarised in Schedule 1 of the Agreement and in particular will lead to an overall loss of 31ha of mudflat used by some 800 feeding and 300 roosting water birds.
  - (b) the Outer Harbour is likely to have an Adverse Effect on the integrity of the combined Phase 1 and Phase 2 Humber Estuary SPA and Ramsar Sites and on the Possible Special Area of Conservation; and
  - (c) taking into account the mitigation proposed by ABP Quay 2005 will not have an Adverse Effect;
- 2.4 In compliance with the Habitats Regulations ABP have identified the following Habitats Schemes as appropriate compensation and/or mitigation for the Harbour Development Works, namely:
- (a) In respect of the Outer Harbour:
    - (i) a managed realignment scheme at Welwick Sunk Island in the outer Humber Estuary designed to create around 45 hectares of intertidal habitat as described in Schedule 2;

- (ii) a managed realignment scheme at Chowder Ness in the inner Humber Estuary designed to create around 11 hectares of new intertidal habitat - 6 hectares of which shall be deemed to constitute mitigation for Quay 2005 as described in Schedule 3; and
- (iii) a habitat enhancement scheme of around 3 ha of inter-tidal mudflat at Doig's Creek, Pyewipe as described in Schedule 4;

all of which is designed to include in aggregate not less than 31 hectares of intertidal mudflat.

(b) In respect of Quay 2005:

- (iv) the creation of replacement roosting areas at Quay 2005 and Queen Elizabeth Dock Extension as described in Schedule 5; together with
- (v) the said 6 hectares at Chowder Ness referred to in clause 2.4(a) (ii) above;

2.5 Subject to clause 6.1 and the terms of this Agreement generally, as at the date of this Agreement, acceptable aggregate objectives to be taken as one of the measures of quality in assessing the effectiveness of the successful implementation and delivery of the Habitats Schemes include-

- (a) The creation of intertidal habitats with the ability to provide feeding habitat for in excess of 800 (peak mean over five years) feeding water birds with typical species in the following relative proportions: 60% dunlin; 20% black-tailed godwit; 10% redshank and 10% other bird species delivered through the creation of inter-tidal habitats at Welwick and Chowder Ness and enhancement of inter-tidal habitat at Doig's Creek;
- (b) Replacement roosting structures to support in excess of 300 (peak mean over five years) roosting water birds with typical species of dunlin; redshank and ringed plover delivered through artificial roosting structures adjacent to Quay 2005 and Queen Elizabeth Dock

2.6 English Nature, the Agency, RSPB, LWT and YWT are satisfied and hereby acknowledge that the delivery of the Habitats Schemes if successfully implemented in accordance with the environmental objectives set out in clauses 2.4 and 2.5 above will meet their concerns in relation to the requirements of the Habitats Regulations in terms of compensation for the Outer Harbour and mitigation for Quay 2005 as set out in the Appropriate Assessments prepared for the Harbour Development Works.

2.7 To the extent that this agreement is made between ABP and English Nature, it shall be construed as a management agreement pursuant to Regulation 16 of the Habitats Regulations.

### 3 Definitions

"Adverse Effect" shall mean Adverse Effect within the terms of Regulation 48 of the Habitats Regulations.

"Appropriate Assessment" shall mean an Appropriate Assessment carried out for the purposes of Regulation 48 of the Habitat Regulations.

"Environmental Statements" shall mean as appropriate -

- (a) the Outer Harbour Environmental Statement dated August 2001 and/or
- (b) the Quay 2005 Environmental Statement dated September 2000 and/or
- (c) the Reclamation East of Queen Elizabeth Dock Environmental Statement dated November 1995

**"ESC"** shall mean the Environmental Steering Committee referred to in clause 5.3 of this Agreement, the membership of which shall comprise ABP's Project Environmental Managers and representatives of the Agency, English Nature, the DfT, CEFAS, the relevant local authorities, RSPB, the YWT and the LWT.

**"Habitats Regulations"** shall mean the Conservation (Natural Habitats etc) Regulations 1994.

**"Habitats Schemes"** shall mean all of those schemes separately identified in clause 2.4 of this Agreement.

**"Harbour Development Works"** shall mean ABP's proposals for the Outer Harbour and Quay 2005.

**"Humber Estuary European Sites"** shall mean those sites identified in the Immingham Outer Harbour Environmental Statement.

**"Implementation Plan"** shall mean the Implementation Plan attached in Schedule 6 to this Agreement as may be amended from time to time with the agreement of the ESC, save that no amendment shall be made which will impact upon the Agency's Flood Defence function other than with the Agency's specific agreement.

**"Monitoring Plan"** shall mean the Monitoring Plan attached as Schedule 7 to this Agreement as may be amended from time to time with the agreement of the ESC.

**"Outer Harbour"** means ABP's proposals to construct a five berth roll on-roll off terminal at the Port of Immingham.

**"Phase 1 and Phase 2 Humber Estuary SPA and Ramsar Sites"** shall mean those sites identified in the Immingham Outer Harbour Environmental Statement.

**"Possible Special Area of Conservation"** shall mean that site identified in the Immingham Outer Harbour Environmental Statement.

**"Quay 2005"** shall mean ABP's proposals to construct riverside berthing at the Port of Hull.

**"Queen Elizabeth Dock Extension"** shall mean that area identified in the Reclamation East of Queen Elizabeth Dock Environmental Statement.

## **4 Effect**

4.1 This Agreement becomes binding upon ABP in respect of:

- (a) those elements of the Habitats Schemes detailed in clause 2.4(i), (ii) and (iii) upon the issue of the HRO for the Outer Harbour in terms satisfactory to ABP and the decision of ABP to implement the Outer Harbour HRO; and
- (b) those elements of the Habitats Schemes detailed in clause 2.4(iv) and (v) upon the issue of the HRO for Quay 2005 in terms satisfactory to ABP and the decision of ABP to implement the Quay 2005 HRO.

4.2 For the avoidance of doubt, this Agreement is not to be construed as prohibiting or limiting ABP's rights to develop the Ports of Immingham and/or Hull pursuant to later consents issued or secured after the date of this Agreement.

4.3 If for any reason a public inquiry is convened to consider ABP's proposals for the Outer Harbour and any of the signatories to this Agreement make representations which are considered by ABP to be contrary to the terms or spirit of this Agreement, then it is accepted by all signatories that



- (a) this Agreement shall not act as a fetter or restriction on the giving of representations at the inquiry by any or all of the parties to this Agreement; and
- (b) this Agreement shall cease to have effect insofar as it relates to the Outer Harbour and those elements of the Habitats Schemes detailed in clause 2.4(i), (ii) and (iii).

4.4 Should for any reason

- (a) an HRO not be issued for the Outer Harbour and/or Quay 2005; or
- (b) an HRO be issued for the Outer Harbour and/or Quay 2005 but not in terms satisfactory to ABP; or
- (c) following issue ABP decide not to implement either or both HROs

then ABP will send written notification to each of the parties to this Agreement informing them that ABP does not intend to implement the Outer Harbour HRO and/or the Quay 2005 HRO whereupon this Agreement shall be of no effect insofar as it relates to the Outer Harbour and those elements of the Habitats Schemes detailed in clause 2.4(i), (ii) and (iii) and/or Quay 2005 and those elements of the Habitats Schemes detailed in clause 2.4(iv) and (v) as the case may be.

**5 ABP hereby covenants:**

5.1 Not to commence the development of the Outer Harbour or Quay 2005 until

- (a) it has sufficient proprietary interest in the relevant land required for either the Outer Harbour or Quay 2005 Habitats Schemes as appropriate to enable it to carry out the works described in the Implementation Plan; and
- (b) any consents which are required for the implementation of the relevant Habitats Schemes have been issued with the exception of the consents required for Chowder Ness which shall be secured by ABP as soon as reasonably practicable.

5.2 To deliver subject to Appropriate Assessment the relevant Habitats Schemes in accordance with the Implementation Plan and the conditions of this Agreement;

5.3 To establish the ESC as soon as may be practicable after execution of this Agreement the terms of reference of which if appropriate shall include:

- (a) the review and approval of the monitoring requirements for the Harbour Development Works and Habitats Schemes to be set out in the Monitoring Plan as summarised in Schedule 7 hereto;
- (b) the review of any environmental information collected by ABP during the life of the management of the Harbour Development Works and Habitats Schemes;
- (c) the review and approval as appropriate of any changes required in the environmental management of the Harbour Development Works and Habitats Schemes;

5.4 To arrange, as far as practicable, that the ESC meets at least twice a year - the ordinary running expenses of the members as appropriate of the ESC (which shall include travel and attendance at meetings) being borne by the respective parties.

5.5 To make available to the ESC such information as may reasonably assist the ESC to fulfil its objectives as stated in clause 5.3 above provided such information would not be prejudicial to ABP's interests and/or its statutory duties as port operator and subject always to commercial confidentiality.

- 5.6 To monitor the impacts of the Harbour Development Works and the performance of the Habitats Schemes in accordance with the Monitoring Plan which will be based on the elements outlined in Schedule 7.

## 6 Review Procedure

- 6.1 The measure of the performance of the Habitats Schemes and the success or otherwise in meeting their objectives including those in clause 2.5 will be a matter for review by the ESC in accordance with the Monitoring Plan at the formal review periods of 5 and 10 years after completion of the construction of the Habitats Schemes all relevant factors and prevailing conditions (including those beyond the control of ABP) having been taken into account.
- 6.2 If the ESC identifies problems in the performance of the Habitats Schemes, ABP working with the ESC will use all reasonable endeavours to overcome the problems in a way which most accurately reflects the original objectives of the schemes including those set out in clauses 2.4 and 2.5.
- 6.3 The obligations set out under clause 5 of this Agreement will continue in force for a period of ten years, or if at the expiry of that period problems have been identified with the performance of the Habitats Schemes, until such later date as it becomes clear that the said schemes are performing satisfactorily according to the ESC.

## 7 Covenants

- 7.1 In relation to the Outer Harbour: -
- (a) English Nature, the Agency, RSPB and the LWT hereby covenant to withdraw their objections to the Outer Harbour HRO within 21 days of the date of this Agreement, such withdrawal to be made in writing to the Secretary of State and copied to ABP
- 7.2 In respect of Quay 2005:-
- (a) English Nature, RSPB and the YWT hereby covenant to withdraw their objections to the Quay 2005 HRO within 21 days of the date of this Agreement, such withdrawal to be made in writing to the Secretary of State and copied to ABP

## 8 Generally

- 8.1 Nothing in this Agreement shall be construed as prejudicing English Nature's independent and separate power or obligation to discharge its functions and English Nature shall remain entitled to apply all requirements of the Habitats Regulations any statutory re-enactment thereof and any further legislation that English Nature is now responsible for discharging or that it may become responsible for discharging in the future.
- 8.2 Nothing in this Agreement shall be construed as prejudicing or affecting the exercise of any statutory ~~duties~~ *functions* of the Agency.
- 8.3 Any dispute or difference arising out of or in connection with this Agreement (including without limitation any questions regarding its existence, validity, interpretation, performance or termination) shall be referred to and finally resolved by arbitration under the rules of the London Court of International Arbitration which are deemed to be incorporated by reference into this clause. The number of arbitrators shall be one.

IN WITNESS whereof the parties hereto have executed and delivered the Agreement as a Deed the day and year first above written.

## Schedule 1

### Summary of the effects of the Harbour Development Works

Further to clause 2.3 of this Agreement, a summary of the effects of the proposed construction of the Harbour Development Works are as follows:

#### Immingham Outer Harbour

Direct habitat loss = 22ha inside pSPA

Indirect losses= 5ha estimated

Function lost: mudflat used by feeding water birds in middle estuary

Typical species affected: shelduck, teal, ringed plover, lapwing, black-tailed godwit (126), curlew, redshank, and dunlin.

Total number affected: 603 peak mean (279 average)

Source of information; record of Appropriate Assessment April 2002.

#### Quay 2005

Direct habitat loss = 4ha outside SPA

Function lost: mudflat used by feeding water birds in middle estuary

Typical species: ringed plover, curlew, redshank, and dunlin

Total number affected: Peak in Feb 96 = 334

Peak in Jan 02 = 97

Mean of two peaks = 215

Function lost: loss of high tide roosting structures:

Typical species: dunlin, redshank and ringed plover

Total number affected: Peak in March 1996 = 376

Peak in Sept 2001 = 277

Mean of two peaks = 326

Source of information: Appropriate Assessment September 2002

## Schedule 2 Welwick Managed Realignment Scheme

A managed realignment scheme will be undertaken on around 50ha of agricultural land at Outstray Farm, Sunk Island. The scheme will involve the following elements:

- Removal of existing flood bank and the reconstruction of new flood defences to the rear of the site. The new defences will be constructed with a minimum crest width of 4m and a minimum height of 5.6m above ODN, in line with the Agency guidance and to the Agency's reasonable satisfaction.
- Reprofiling of the site by between 0 to 1m resulting in the relocation of 94,000m<sup>3</sup> of material which will be retained on site and incorporated into the new flood defences.
- Construction of appropriate breaches through the existing saltmarsh fronting the site.
- Re-routing of overhead power cables along the trackway to the east of the site.
- Provision of a footpath along the crest of the new defences to the rear of the site.
- Ploughing of the site prior to inundation to mitigate for any over-consolidation of sediment.

After 10 years, the scheme is predicted to create between 7-37ha of intertidal mudflat, 8-32ha of saltmarsh and 9-15ha of grassland, over a total area of 54ha.

Risks associated with the scheme some of which may be addressed through scheme design are:

- New design never tried before
- Compaction due to movement of heavy equipment may result in poor quality mudflat
- Poor quality saltmarsh due to the presence of rubble at the bank at the foot of the new sea wall

### Schedule 3

## Chowder Ness Managed Realignment Scheme

A managed realignment scheme will be undertaken on 13.6ha of agricultural land at Chowder Ness, Barton-on-Humber. The scheme will involve the following elements:

- Removal of existing flood bank and the reconstruction of new flood defences to the rear of the site, where required. The new defences will be constructed with a minimum crest width of 4m and a minimum height of 5.9m above ODN, in line with the Agency guidance and to the Agency's reasonable satisfaction.
- Reprofiling of the site by between 0 to 1m resulting in the relocation of 48,000m<sup>3</sup> of material which will be retained on site and incorporated into the new flood defences.
- Provision of a footpath along the crest of the new defences to the rear of the site.
- Ploughing of the site prior to inundation to mitigate for any over-consolidation of sediment.

After 10 years, the scheme is predicted to create around 10.5ha of intertidal mudflat, 0.8ha of saltmarsh and 2.3ha of grassland.

Risks associated with the scheme some of which may be addressed through scheme design are:

- New design never tried before
- Compaction due to movement of heavy equipment may result in poor quality mudflat
- Disturbance from footpath may reduce potential bird usage of site

## Schedule 4 Doig's Creek Habitat Enhancement Scheme

A habitat enhancement scheme will be undertaken on 4ha of existing intertidal area at Doig's Creek, Pyewipe. The scheme will involve the following elements:

- Closure of Doig's Sluice
- Construction of a new sluice of the face of the existing Grimsby Dock gates

The closure of the existing sluice will permit natural infilling of Doig's Creek with estuary sediment and lead to increases in the abundance and diversity of invertebrate species in the area. After 10 years, the scheme is predicted to enhance between 2-4ha of intertidal mudflat.

## Schedule 5

### Provision of Roosting Areas at Quay 2005 and Queen Elizabeth Dock Extension

An appropriately designed roost site will be installed at the western end of Quay 2005 to accommodate roosting birds displaced by the demolition of the West Wharf pier. The roost site will be separated from operational areas by an acoustic screen.

The Queen Elizabeth Dock Extension will be fronted with rock armour to provide some new long-term roosting habitat. Once these works have been completed, the existing footpath will be managed to minimise disturbance to roosting birds.

A risk associated with the scheme which may be addressed through scheme design is that the design of roosting structures may not attract the species affected by the development.

Compliance with the provisions set out in Section 4 of the Appropriate Assessment which mitigate the potential impacts of construction.

## **Schedule 6 Implementation Plan**

The implementation plan provides details of the general mitigation measures and sets out the planned sequence of construction and timetables for the Habitats Schemes. Detailed timings will depend on the timings of consent approvals.

### **General Mitigation Measures During Construction**

- A Code of Practice to be agreed by the ESC will be established for construction workers to ensure that they are aware of the particular sensitivities of the estuarine environment;
- Construction work will be required to adhere to the Agency's Pollution Prevention Guidelines for working on construction sites (PPG6) and other relevant Agency guidelines;
- Construction work will be suspended for any period during which there is a severe weather ban on wildfowling in force on the estuary;

### **Welwick Managed Realignment Scheme**

It is proposed to construct the scheme over a period of two years in a number of stages. Construction works will be limited to the period April to August to avoid disturbance to over wintering waterfowl.

#### **Year 1**

- Construction of new sea defences to rear of the site using material from temporary borrow pits or from site reprofiling;
- Reprofiling of site to desired levels
- The front face of the embankment will be seeded with fast growing grass mix to promote stabilisation;
- The rear face of the embankment will be seeded with grass mix, supplemented with mowings from an area of high plant diversity from elsewhere on the North Humber bank;
- Translocation of rare plant species to new embankment from existing embankment.

#### **Year 2**

- Removal of existing sea defences in stages;
- Removal of fronting saltmarsh to create breaches;
- Ploughing of site to mitigate for any over-consolidation.

### **Chowder Ness Managed Realignment Scheme**

It is proposed to construct the scheme over a period of two years in a number of stages. Construction works will be limited to the period June to October to avoid disturbance to bittern and minimise disturbance to over-wintering waterfowl.



### Year 1

- Construction of new sea defences to rear of the site using material from temporary borrow pits or from site reprofiling;
- Reprofiling of site to desired levels
- The front face of the embankment will be seeded with fast growing grass mix to promote stabilisation;
- The rear face of the embankment will be seeded with grass mix, supplemented with mowings from an area of high plant diversity typical of the area;

### Year 2

- Removal of existing sea defences in stages;
- Ploughing of site to mitigate for any over-consolidation.

### **Doig's Creek Habitat Enhancement**

Construction of new sluices on the Grimsby dock gates can be completed within 12 months. Thereafter the existing Doig's Sluice can be closed. Sediment will then accrete naturally in Doig's Creek over a period of years until the area reaches an equivalent elevation to adjacent mudflat.

### **Creation of Replacement Roosting Areas at Quay 2005, and Queen Elizabeth Dock Extension**

The rock armour wall for the Queen Elizabeth Dock Extension will be constructed following discussions with English Nature about the after use for this area. The construction of Quay 2005 is anticipated to require around 2 years. The roosting site will be constructed towards the end of this period.

## **Schedule 7 Monitoring Plan**

The monitoring plan provides details of the generic environmental monitoring that will be undertaken for the Harbour Development Works and Habitats Schemes. Detailed monitoring requirements will be agreed by the ESC.

### **Immingham Outer Harbour**

- Disturbance to waterfowl adjacent to the development;
- Suspended sediment concentrations in the vicinity of the dredging works;
- Deposition of sediment on intertidal areas in the vicinity of the dredging works;
- Deposition of sediment at and in the vicinity of the sediment placement sites;
- Deposition of sediment on intertidal areas adjacent to the sediment placement sites;
- Changes to intertidal profile upstream and downstream of Immingham Outer Harbour;
- Changes to intertidal invertebrates upstream and downstream of Immingham Outer Harbour;
- Changes in bird usage on intertidal areas adjacent to Immingham Outer Harbour;
- Monitoring of maintenance dredging disposal.

### **Quay 2005**

- Concentrations of contaminants in the water column in the vicinity of the dredging works;
- Changes to intertidal profile upstream and downstream of Quay 2005;
- Changes in intertidal invertebrates upstream and downstream of Quay 2005;
- Changes in bird usage on intertidal areas upstream and downstream of Quay 2005

### **Welwick Managed Realignment Scheme**

- Changes in intertidal profile within and in the vicinity of the Scheme;
- Changes in saltmarsh within, fronting and in the vicinity of the Scheme;
- Changes to intertidal invertebrates within, fronting and in the vicinity of the Scheme;
- Changes to waterfowl usage of intertidal areas within, fronting and in the vicinity of the Scheme;
- Changes to waterfowl usage of roosting areas in the vicinity of the Scheme;
- Monitoring of grassland habitats created in the Scheme;
- Monitoring of saline pools created in the Scheme;
- Monitoring of bird usage of grassland habitats created in the Scheme.

#### **Chowder Ness Managed Realignment Scheme**

- Changes in intertidal profile within and in the vicinity of the Scheme;
- Changes in saltmarsh within, fronting and in the vicinity of the Scheme;
- Changes to intertidal invertebrates within, fronting and in the vicinity of the Scheme;
- Changes to waterfowl usage of intertidal areas within, fronting and in the vicinity of the Scheme;
- Changes to waterfowl usage of roosting areas in the vicinity of the Scheme;
- Monitoring of grassland habitats created in the Scheme;
- Monitoring of bird usage of grassland habitats created in the Scheme.

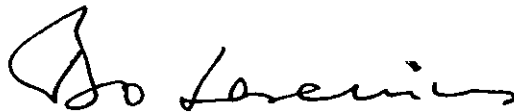
#### **Doig's Creek Habitat Enhancement Scheme**

- Changes in intertidal profile at the site;
- Changes in intertidal invertebrates at the site;
- Changes in bird usage at the site.

#### **Provision of Roosting Areas at Quay 2005 and Queen Elizabeth Dock Extension**

- Monitoring of bird usage of roosting areas at Quay 2005 and Queen Elizabeth Dock Extension.


Executed as a Deed on behalf of  
Associated British Ports by



Executed as a Deed on behalf of  
English Nature by



Executed as a Deed on behalf of the  
Environment Agency by



\_\_\_\_\_

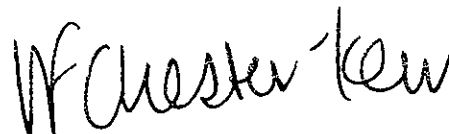
Executed as a Deed on behalf of the  
Royal Society for the Protection of Birds by

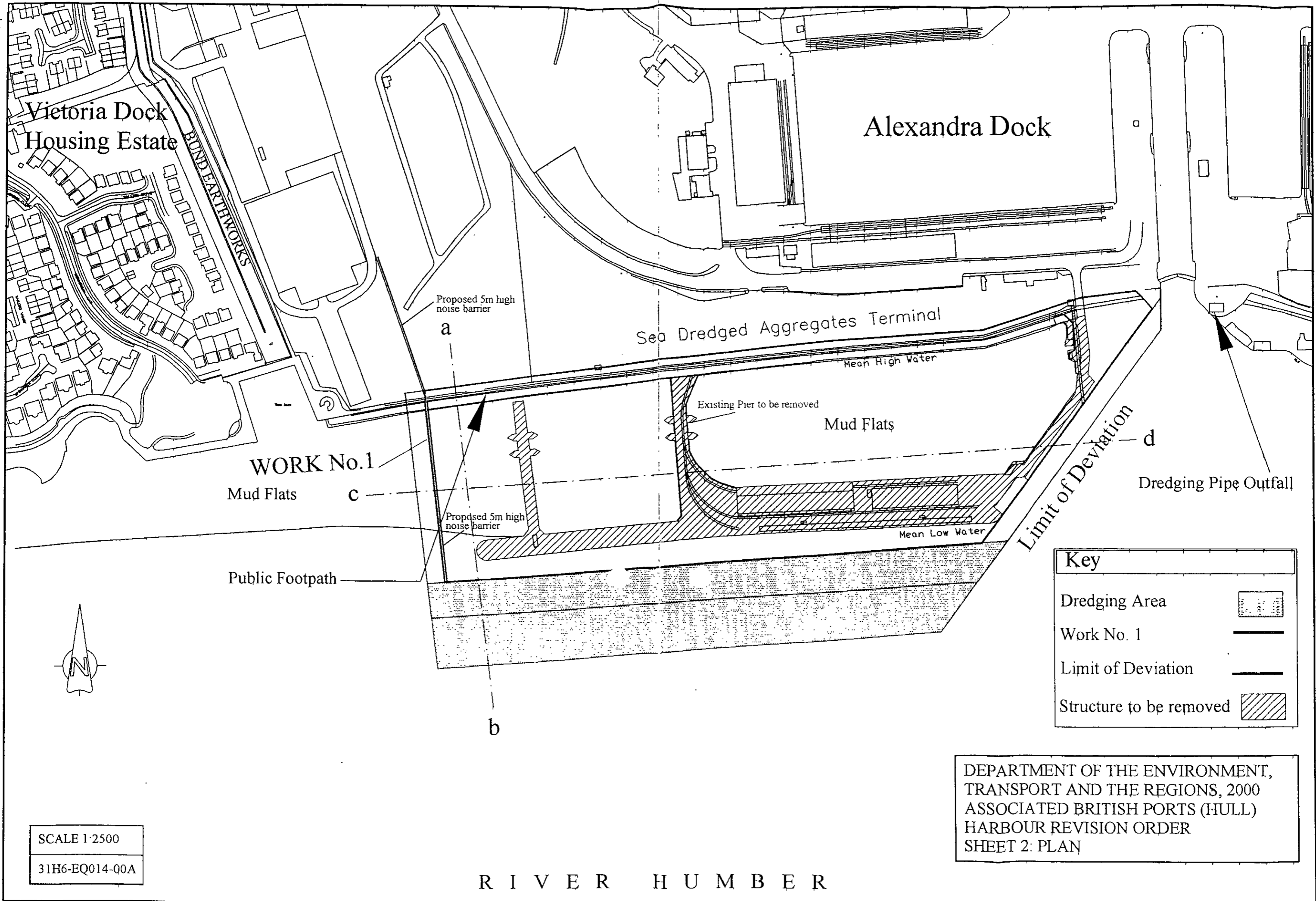


Executed as a Deed on behalf of the  
Lincolnshire Wildlife Trust by



Executed as a Deed on behalf of the  
Yorkshire Wildlife Trust Limited by

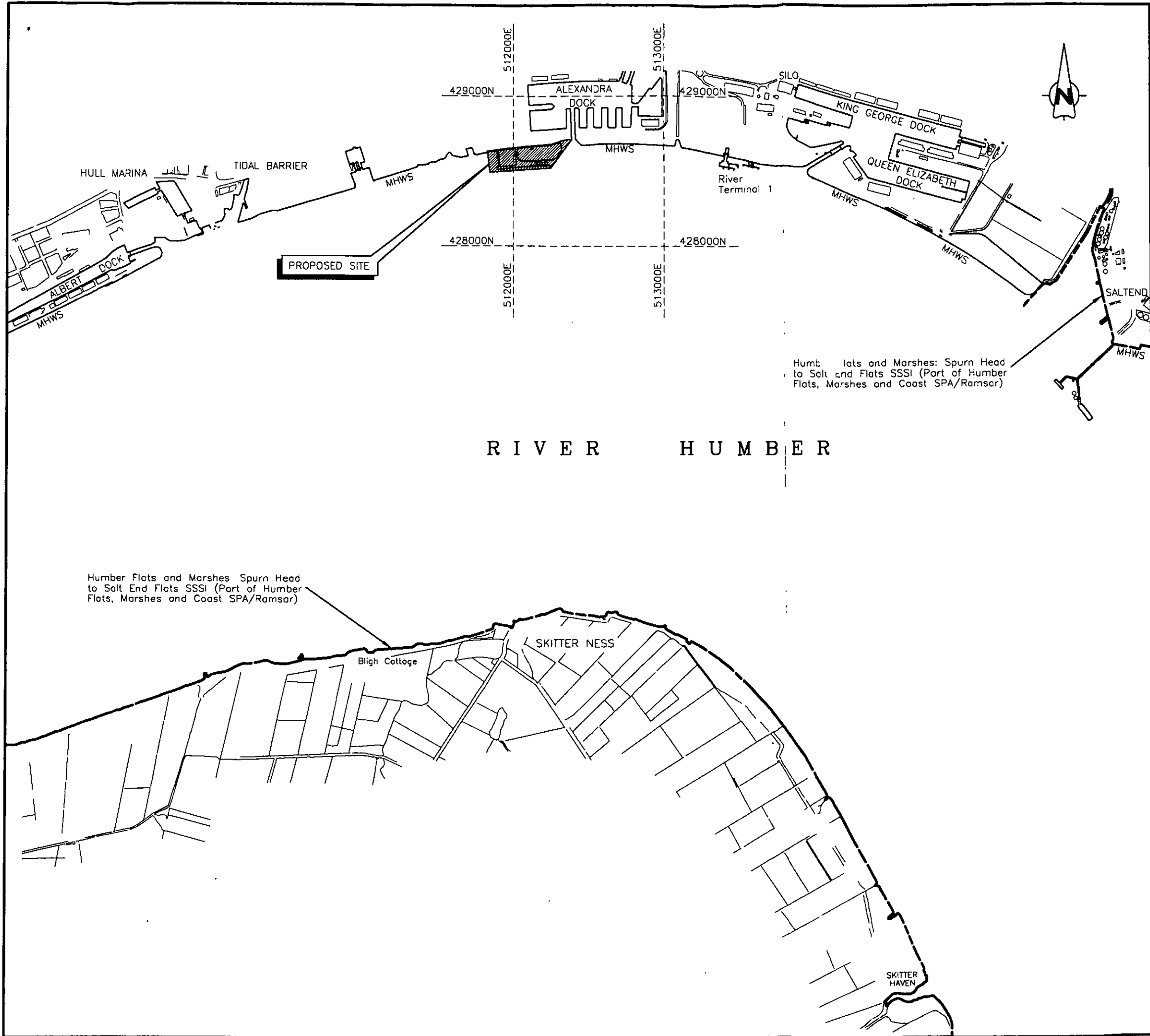




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31H6-EQ014-Q0A

DEPARTMENT OF THE ENVIRONMENT,  
TRANSPORT AND THE REGIONS, 2000  
ASSOCIATED BRITISH PORTS (HULL)  
HARBOUR REVISION ORDER  
SHEET 2: PLAN

R I V E R   H U M B E R



Notes

UNCONTROLLED  
COPY

A	Adjustable shore ramp remove	29/10/03	G Jacklin
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Rev.	Description	Date	Drawn
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**ABP ASSOCIATED**  
**BRITISH PORTS**  
 NORTH-EAST REGION Engineering Department

Title  
**ALEXANDRA DOCK**  
**QUAY 2005**  
**LOCATION PLAN AND**  
**SURROUNDING AREA**

Location  
 Port of Hull

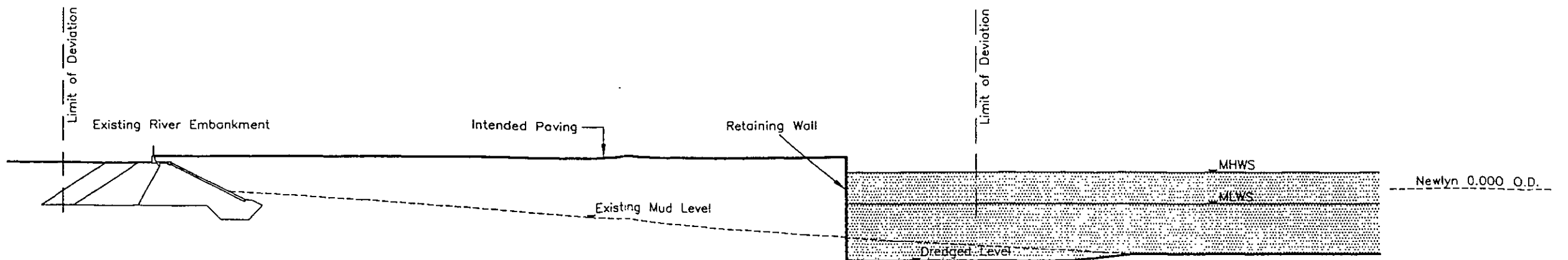
Drawn <b>Graham Jacklin</b>	Date <b>Feb.2002</b>
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Checked	Scales
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Approved Projects Manager	<b>1:25000</b>
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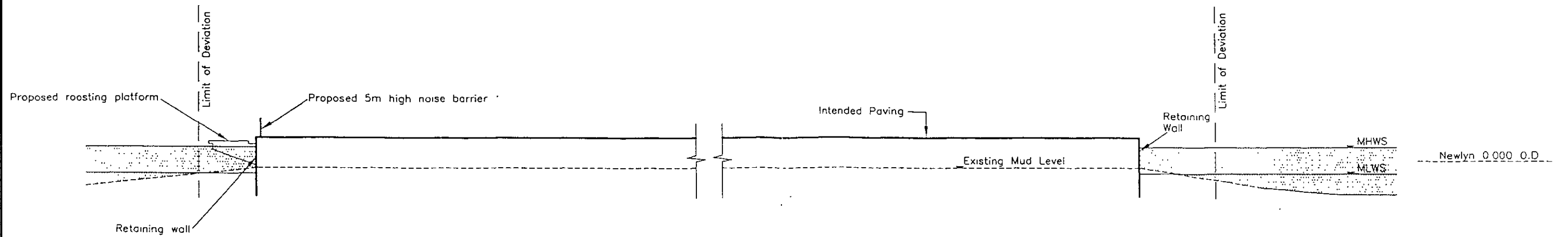
Correspondence Ref. <b>DE/PJT/16/42</b>	
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Contract Drawing No	Drawing No. <b>02/DEC/17</b>	Revision <b>A</b>
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Section a:b

1:1000




Harbour Revision Order  
Sheet 3 : Sections

Note  
Chart Datum is 3.9m  
below Ordnance Datum

00/DEC/119 B

Section c:d

1:1000

 <p>amep able marine energy park</p>	<p><b>ABLE MARINE ENERGY PARK RESPONSE TO DEPARTMENT FOR TRANSPORT'S '<i>MINDED TO APPROVE</i>' LETTER IN RESPECT OF COMPENSATORY MEASURES</b></p>	<p><b>OCT 2013</b></p>
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Annex 4.2

Draft Legal Agreement in respect of Bathside Bay between:

Harwich International Port Limited  
Harwich Haven Authority  
The Environment Agency  
English Nature

Bathside Bay Container Terminal: Tidal Works and Approach Channel Deepening  
Draft European Sites Compensation, Mitigation and Monitoring Agreement



**DATED**

**2004**

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- (1) **HARWICH INTERNATIONAL PORT LIMITED**
- (2) **HARWICH HAVEN AUTHORITY**
- (3) **THE ENVIRONMENT AGENCY**
- (4) **ENGLISH NATURE**

**DRAFT**

---

**DEED**

relating to Bathside Bay Container Terminal,  
Little Oakley Managed Realignment and the  
Conservation (Natural Habitats & c) Regulations 1994

---

**Herbert Smith**  
Exchange House  
Primrose Street  
London EC2A 2HS  
Tel: 020 7374-8000  
Fax: 020 7374-0888  
Ref: 2129/5254/30829215

## TABLE OF CONTENTS

<b>Clause</b>	<b>Headings</b>	<b>Page</b>
1.	DEFINITIONS .....	2
2.	INTERPRETATION .....	4
3.	CONDITIONAL ENTRY INTO FORCE .....	4
4.	COVENANTS BY HIPL.....	5
5.	COVENANTS BY THE REGULATORS .....	5
6.	THIRD PARTIES .....	5
7.	DISPUTE RESOLUTION .....	5
7A	ADJUDICATION PROCEDURE .....	6
8.	APPROVALS .....	7
9.	INTERFACE WITH PROTECTIVE PROVISIONS .....	8
10.	CONFIDENTIALITY .....	8
11.	GOVERNING LAW ETC .....	8
12.	ENTIRE AGREEMENT .....	8
13.	NOTICES .....	9
SCHEDULE 1	.....	10
	Part 1    Mitigation.....	10
	Part 2    Compensation .....	12
SCHEDULE 2	The Compensation Scheme.....	16
SCHEDULE 3	Monitoring .....	17
SCHEDULE 4	The Advisory Group .....	21
SCHEDULE 5	The Consents.....	22

ANNEX 1 Compensation, Mitigation and Monitoring Agreement

**THIS DEED** is made the \_\_\_\_\_ day of \_\_\_\_\_ 2004

**BETWEEN:**

- (1) **HARWICH INTERNATIONAL PORT LIMITED** (Company Registration Number 2486146) of Tomline House, the Dock, Felixstowe, Suffolk IP11 3SY ("**HIPL**");
- (2) **HARWICH HAVEN AUTHORITY** of Harbour House, The Quay, Harwich, Essex, CO12 3HH ("**HHA**");
- (3) **THE ENVIRONMENT AGENCY** whose offices for the purposes of this Deed are at Kingfisher House, Goldhay Way, Orton, Goldhay, Peterborough EE2 5ZR (the "**EA**"); and
- (4) **ENGLISH NATURE** whose Head Office is at Northminster House, Peterborough PE1 1UA ("**EN**").

**WHEREAS:**

- (A) HIPL has made applications under the Town and Country Planning Act 1990, the Harbours Act 1964, the Coast Protection Act 1949 and the Harwich Parkeston Quay Act 1988 (applying the Parkeston Quay Act 1983) for the construction of a new container terminal at Bathside Bay, near Harwich, Essex and an associated Small Boat Harbour. The works to construct the new container terminal and the Small Boat Harbour will include the Marine Works.
- (B) The Marine Works include but are not limited to works for the reclamation of 65 hectares and dredging of 4 hectares of intertidal habitat comprising part of a proposed Special Protection Area as defined in the Habitats Regulations. It is the view of HIPL and HHA, the EA and EN (the "Regulators") that this would constitute an adverse effect on the integrity of a European Site for the purposes of the Habitats Regulations.
- (C) When deciding whether to grant consent or permission for works which may (notwithstanding any proposed mitigation) have an adverse effect upon the integrity of an European Site the Secretary of State may not grant the consent except having satisfied the provisions of Regulation 49 of the Habitats Regulations.
- (D) If having satisfied the provisions of Regulation 49 of the Habitats Regulations consent is granted for a plan or project having an adverse effect upon the integrity of an European Site the Secretary of State is required to secure that any necessary compensatory measures are taken to ensure the overall coherence of Natura 2000 is protected.
- (E) The Regulators are each concerned with the regulation and implementation of policies relating to the matters referred to in recitals (A) to (D) above and more particularly the effects of the Marine Works upon the Estuary System.
- (F) HIPL and the Regulators have agreed certain measures including mitigation and compensation (and the monitoring and management thereof) for (inter alia) the purposes set out in Recitals (C) and (D) above the objectives, principles and nature of which are set out in the CMMA.
- (G) HIPL and the Regulators are entering into this Deed to secure that should the Secretary of State grant the Consents HIPL as a statutory undertaker in relation to the Marine

Works will be under a legal obligation to secure the achievement of the objectives and implementation of the measures identified in the CMMA

**NOW THIS DEED WITNESSETH** as follows:

## **1. DEFINITIONS**

In this Deed where the context so admits the following expressions shall have the following meanings:

**"Adjudication Notice"** means a notice such as is referred to in clause 7.5;

**"Adjudication Procedure"** means the provisions set out in clause 7A;

**"Adjudicator"** means the adjudicator appointed in respect of any dispute or difference in accordance with the adjudication procedure;

**"Advisory Group"** means the group comprising the persons, bodies and associations listed in Schedule 4 hereto;

**"Appointing Body"** means the Technology and Construction Court Solicitors Association;

**"Bathside Bay"** means that area shown for the purpose of identification only edged red on Figure 1 to the CMMA annexed hereto;

**"Breach"** means the breach of the existing sea wall adjacent to the Managed Realignment Site in accordance with the Compensation Scheme and the Realignment Consents;

**"CMMA"** means the document entitled the Compensation Mitigation and Monitoring Agreement setting out the aims and objectives of this Deed attached hereto as Annex 1;

**"Compensation Scheme"** means the scheme, described in outline in Schedule 2, for the provision of compensatory habitat at the Managed Realignment Site to secure the overall coherence of Natura 2000;

**"Compensation Monitoring"** means the monitoring and management of the Managed Realignment Site, the Compensation Scheme and the effects thereof in accordance with Part 2 of Schedule 3 to this Deed;

**"Consents"** means the grant of consents for the construction of the Container Terminal Works, the Small Boat Harbour and other works in accordance with the applications set out in Part 1 of Schedule 5 and shall include any subsequent consent revising or renewing those consents.

**"Container Terminal Works"** means works below mean high water springs for the construction of a new container terminal at Bathside Bay;

**"Dispute Resolution Procedure"** means the procedure set out at Clause 7 of this Deed;

**"Estuary System"** means the estuaries of the Rivers Stour and Orwell shown on Figure 2 to the CMMA annexed hereto;

**"European Site"** means a site as defined under Regulation 10 (as amended) of the Habitats Regulations;

**"Force Majeure"** means fire, flood or other exceptionally adverse or inclement weather conditions, malicious damage, terrorist action, decree of Government, unforeseen exceptional site or ground conditions or other exceptional event, cause of circumstance outside the reasonable control of the party claiming entitlement to rely on this definition, its contractors or agents, and which adversely affects its ability to perform any obligation relating to any works provided for in this Deed **PROVIDED THAT** the same could not reasonably have been avoided or provided against by the party claiming entitlement to rely on this definition its contractors or agents, is not due to the negligence or default of the relevant party and is mitigated against in accordance with the principles of common law to reduce any delay so far as reasonably practicable **PROVIDED** also that for the purpose of HIPL discharging any of its obligations under this Deed flood or weather conditions shall only be treated as being Force Majeure if and to the extent that they prevent or inhibit such compliance;

**"GPS"** means global positioning system;

**"Habitats Regulations"** means the Conservation (Natural Habitats &c.) Regulations 1994;

**"Hamford Water"** means that area shown on Figure 2 to the CMMA annexed hereto;

**"LODWA"** means Little Oakley and District Wildfowlers Association whose address for service is set out in Schedule 4 hereto;

**"Managed Realignment Site"** means the site at or near to Little Oakley, Essex shown for the purposes of identification only edged red on Plan 3 annexed hereto;

**"Marine Works"** means the works for the construction of the Small Boat Harbour and the Container Terminal Works to the extent that any of them lie below mean high water springs;

**"Mitigation Monitoring"** means the monitoring and management of the Sediment Replacement Strategy and the effects thereof in accordance with Part 1 of Schedule 3 to this Deed;

**"Natura 2000"** has the meaning ascribed thereto in the Habitats Regulations;

**"Realignment Consents"** means the consents for the implementation of the Compensation Scheme at the Managed Realignment Site pursuant to the applications listed in Part 2 of Schedule 5 to this Deed and shall include any subsequent consents revising or renewing those consents;

**"Regulators"** means, together, HHA, the EA and EN and references to them shall be construed as meaning the "Regulators or any of them";

**"roosting"** means in relation to waterbirds resting or sleeping;

**"Sediment"** means fine particulate material naturally found or occurring on parts of the bed (mud) and in suspension in the Estuary System;

**"Sediment Replacement Strategy"** means the strategy for returning Sediment to the Estuary System in accordance with the Consents and Schedule 1 to this Deed;

**"Severe Weather"** means weather which would trigger a voluntary cessation of wildfowling or would do so in a wildfowling season in accordance with the published criteria of the Joint Nature Conservation Committee and based on relevant measurements taken at the Shoeburyness Meteorological Station near Southend-on-Sea, Essex; and

**"Small Boat Harbour"** means a small boat harbour constructed on the area shown edged blue on Plan 1 annexed hereto in accordance with the Consents.

## **2. INTERPRETATION**

- 2.1 The headings appearing in this deed are for ease of reference only and shall not affect the construction of this Deed.
- 2.2 References in this Deed to clauses, sub-clauses, paragraphs, sub-paragraphs and schedules are references to those contained in this deed.
- 2.3 References in this Deed to statutes, bye-laws, regulations, orders and delegated legislation shall include any statute, bye-law, regulation, order or delegated legislation amending, re-enacting or made pursuant to the same.
- 2.4 In this Deed (where the context so admits) words importing the singular shall include the plural and vice versa and words importing one gender shall include all other genders.
- 2.5 In this Deed the expressions "HIPL", "HHA", "EA" and "EN" shall include their respective statutory successors.
- 2.6 Any covenant by HIPL not to do an act or thing shall be deemed to include an obligation to use reasonable endeavours not to permit or suffer such act or thing to be done by another person where knowledge of the actions of the other person is reasonably to be inferred and any covenant by HIPL to do an act or thing may be deemed to include an obligation to procure that the act or thing is done.
- 2.7 If any provision in this Deed shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions will not in any way be deemed thereby to be affected, impaired or called into question.
- 2.8 In the event of any conflict between the provisions of this Deed and any document annexed hereto including the CMMA as referred to herein, the terms, conditions and provisions of this Deed will prevail.
- 2.9 The Interpretation Act 1978 shall apply to this Deed.

## **3. CONDITIONAL ENTRY INTO FORCE**

The obligations contained in Clause 4 of this Deed shall have no effect unless and until the Consents and Realignment Consents have been duly granted.

#### **4. COVENANTS BY HIPL**

HIPL hereby covenants with the Regulators that subject to Force Majeure HIPL shall carry out and comply with the obligations on its part contained in Schedules 1 and 3 to this Deed.

#### **5. COVENANTS BY THE REGULATORS**

5.1 The Regulators hereby severally covenant with HIPL that they shall each comply with the obligations on their part contained in Clauses 8 and 9 below.

5.2 Nothing herein contained shall either fetter the statutory rights, powers and duties of the Regulators or any of them or require the Regulators or any of them to act in any way inconsistently with their statutory duties.

#### **6. THIRD PARTIES**

A person who is not a party to this Deed has no rights under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Deed but this does not affect any right or remedy of a third party which exists or is available apart from that Act.

#### **7. DISPUTE RESOLUTION**

7.1 The provisions of this Clause 7 shall be the Dispute Resolution Procedure.

7.2 Without prejudice to any other provision of this Deed, the parties shall attempt to resolve any lack of agreement, dispute or difference between them by discussion and agreement.

7.3 Save where the statutory duties of any of the Regulators provide otherwise the parties agree to use reasonable efforts to avoid any publicity regarding any dispute or difference between them in the national or local press or by means of television, radio or internet newscasting or broadcasting.

7.4 In exercising the powers and rights and in observing the obligations and duties set out in this Dispute Resolution Procedure, the parties shall at all times have regard to the need to resolve any dispute or difference with reasonable expedition and without incurring or causing others to incur unreasonable costs.

7.5 If any dispute or difference shall arise between the parties under or in connection with this Deed then either party shall have the right to refer the matter to adjudication in accordance with the Adjudication Procedure at any time by serving a written notice to that effect on the other party ("**Adjudication Notice**").

7.6 The Parties hereby agree that where any dispute or difference between them is required to be referred for arbitration as provided for by any protective provisions attached to an order made under the Harbours Act 1964 or under any similar provision in any order subsequently to be made as a result of the Consents by HIPL or others referred to in this Deed, then the Dispute Resolution Procedure in this Clause 7 shall not apply.

7.7 The parties hereby agree that where any dispute or difference between them arises wholly or partly out of the subject matter of this Deed then the entirety of that dispute or difference shall be determined in accordance with the Dispute Resolution Procedure set out in this Deed notwithstanding that any protective provisions under any order made

under the Harbours Act 1964 or under any similar provision in any order subsequently to be made as a result of the Consents would otherwise apply or require the same to be referred to arbitration.

7.8 The parties agree in relation to any person who has acted as adjudicator or arbitrator (including any technical or legal expert or other assistant to such adjudicator or arbitrator) in relation to any dispute or difference between the parties that:

7.8.1 that person shall not thereafter be employed by any party to this Deed as a technical, professional or expert advisor in relation to the matters referred to in this Deed whether in relation to any further dispute or difference between the parties or otherwise; and

7.8.2 that person shall after he has carried out his functions as adjudicator or arbitrator or otherwise return to each party any documents and materials in his possession provided to him by that party (whether directly or indirectly).

7.9 Notwithstanding Clause 7.5 if a difference or dispute between the parties relates to any one or more of the following matters and not in whole or in part to construction operations (as defined in section 105 of the Housing Grants, Construction and Regeneration Act 1996) the Adjudication Procedure shall not apply to that dispute or difference and no party to this Deed shall have the right to refer such a dispute to adjudication. The matters to which this Clause 7.9 applies are:-

7.9.1 claims based on tort or delict;

7.9.2 judicial review and other public or administrative law proceedings;

7.9.3 claims for injunctive relief, specific performance and related matters;

7.9.4 claims for or in respect of any remedy or relief that can only be granted by the Court.

## **7A ADJUDICATION PROCEDURE**

### **7A.1 Consultation**

7A.1.1 The Parties will observe the provisions of this Clause 7A and the Adjudication Procedure with a view to procuring the appointment (or as the case may be further appointment) of an adjudicator and the referral of the dispute or difference identified in the Adjudication Notice to him within the time period specified in accordance with sections 108 and 116 of the Housing Grants, Construction and Regeneration Act 1996.

7A.1.2 The parties shall consult together and attempt to agree upon the name of an individual who is independent with respect to the parties with suitable qualifications and experience to be appointed as an adjudicator in respect of the dispute or difference identified in the Adjudication Notice. If the dispute or difference identified in the Adjudication Notice is a Construction Dispute then the parties will complete this consultation within 3 days of the service of the Adjudication Notice.



## **7A.2 TecSA Rules to Apply As Modified**

7A2.1 The appointment of an adjudicator (including any further appointment or appointments) and the referral of the dispute or difference identified in the Adjudication Notice to him (including any further referral or referrals) and the conduct of the adjudication shall be in accordance with the TecSA Adjudication Rules made and published by the Technology and Construction Court Solicitors Association **PROVIDED THAT:-**

- (A) if and to the extent that the TecSA Adjudication Rules conflict with the provisions of the Dispute Resolution Procedure and/or the Adjudication Procedure the provisions of this Deed shall prevail; and
- (B) the following provisions of the TecSA Adjudication Rules shall be of no effect in relation to this Deed and in relation to any dispute or difference sought to be adjudicated under this Adjudication Procedure:-
  - (1) clause 13(ii);
  - (2) clause 17;
  - (3) clause 21(ix);
  - (4) clause 21 (xiii) after the words: "hearing";
  - (5) the last sentence of clause 33; and
  - (6) clause 38.

## **7A.3 Adjudicator's Decision & Costs**

7A3.1 Unless and until revised, cancelled or varied by the Court, by any arbitrator or by agreement between the parties, the Adjudicator's decision shall be binding on all parties who shall immediately give effect to the decision.

7A3.2 The Adjudicator's costs and expenses (including the costs and expenses of any technical or legal advisors he may have employed) of any reference shall be borne as the Adjudicator shall specify in his decision or, if the Adjudicator does not so specify in portions calculated by dividing the number 1 by the number of sides to the reference.

7A3.3 Each party shall bear its own costs arising out of any reference, including legal costs and the costs and expenses of any witnesses.

## **8. APPROVALS**

8.1 Where in accordance with this Deed HIPL or any other person is required to seek an approval or other decision from the Regulators (not being a statutory consent) the provisions of this Clause 8 shall apply.

8.2 The Regulators shall not except in case of urgency or where prevented from doing so by Force Majeure give any such approval unless and until they have consulted with each member of the Advisory Group.

- 8.3 HIPL (or such other person as may be seeking any approval from the Regulators hereunder) shall send to the Advisory Group copies of relevant papers relating to a request for approval or other decision from the Regulators at the same time as submitting such papers to the Regulators. The Regulators shall have regard to such comments from members of the Advisory Group received within twenty-one days of the Regulators themselves receiving any such submission in carrying out their duties under clauses 8.4 and 8.5 below.
- 8.4 The Regulators shall not unreasonably withhold or delay any such approval in relation to any matter provided for in this Deed.
- 8.5 If any such approval or decisions of the Regulators or any of them hereunder is not given within forty-two days of a request for any approval or decision and such decision is not given following a further fourteen days of negotiation between the Regulators and/or HIPL, any Regulator and/or HIPL may following the expiration of the said 14 days refer the matter for determination in accordance with Clause 7 hereof.

## **9. INTERFACE WITH PROTECTIVE PROVISIONS**

In exercising their rights in relation to any protective provisions under any Harbour Revision Order made in relation to the Marine Works or the Consents the Regulators shall each have regard to the CMMA and this Deed.

## **10. CONFIDENTIALITY**

Nothing in this Deed shall require HIPL to disclose to the Regulators or any of them anything which in HIPL's reasonable opinion needs to remain confidential for commercial or corporate reasons such opinion and the reasons for it in relation to any document or information to be given in writing by HIPL to the Regulators at the time when the obligation to disclose the document or information would otherwise have arisen.

## **11. GOVERNING LAW ETC**

- 11.1 This Deed shall be governed by, and construed in accordance with, English Law.
- 11.2 Subject to the provisions of Clause 7 above each party irrevocably agrees that the Courts of England shall have non-exclusive jurisdiction in relation to any claim, dispute or difference concerning this Deed and any matter arising therefrom.

## **12. ENTIRE AGREEMENT**

- 12.1 This Deed constitutes the entire agreement between the parties in relation to its subject matter and supersedes any prior agreements and understandings whether oral or written with respect to its subject matter.
- 12.2 No variation or waiver of the terms of this Deed shall be effective unless it is reduced to writing and is signed by or on behalf of a duly authorised representative of each of the parties.
- 12.3 This Deed is executed in four parts each of which is an original and which together constitute one and the same agreement.

### **13. NOTICES**

- 13.1 A notice or other document required or authorised to be served for the purposes of this Deed or the Consents may be served by post or facsimile.
- 13.2 Where the person on whom a notice or other document is to be served for the purposes of this Deed or the Consents is a body corporate the notice or other document is duly served if it is served on the secretary or clerk of that body.
- 13.3 For the purposes of Section 7 of the Interpretation Act 1978 as it applies for the purposes of this clause, the proper address for the relevant party in relation to the service on it of a notice or document under clause 14.1 above is:
- 13.3.1 if to HIPL to;
- 13.3.2 if to the HHA to the address above, marked for the attention of the Harbour Engineer;
- 13.3.3 if to the EA to the Environment Agency, to the address above, marked for the attention of Regional Solicitor;
- 13.3.4 if to EN to English Nature, Harbour House, Hythe Quay, Colchester, Essex CO2 8JF (fax 01206 794466)
- or in each case to such other address or fax number for the attention of such other persons as each party may from time to time notify to the other parties hereto.
- 13.4 This clause shall not be taken to exclude the employment of any method of service not expressly provided for by it.
- 13.5 Any notice shall be deemed to have been received as follows:
- 13.5.1 if sent by post (otherwise than at a time when the sender is or ought reasonably to be aware of a disruption of the relevant postal service), two business days after posting, exclusive of the day of posting;
- 13.5.2 if delivered by hand, on the day of delivery if delivered at least two hours before the close of business on a business day and in any other case on the next business day;
- 13.5.3 if sent by facsimile (unless the sender knows or ought reasonably to know that the transmission has failed or is incomplete) at the time of transmission if received at least two hours before the close of business on a business day and in any other case on the next business day.
- 13.6 For the purposes of this clause a “business day” means any day except Saturday, Sunday or a Bank or public holiday and “business hours” means between the hours of 9.30am and 5.30pm on a business day.

**IN WITNESS** whereof this deed has been executed by the parties hereto and is intended to be and is hereby delivered on the date first above written.

## SCHEDULE 1

### Part 1

#### Mitigation

#### 1. SEDIMENT PLACEMENT

- 1.1 Following commencement of the Marine Works the Sediment Replacement Strategy shall be implemented by HIPL in accordance with this Schedule.
- 1.2 Unless varied in accordance with the terms of an approval by the Regulators the Sediment Replacement Strategy shall require the direct return of not less than 500,000 dry tonnes of sediment each year (inclusive of sediment replacement strategies already in place at the date hereof) which shall at the outset of the Sediment Replacement Strategy be placed in the general locations and by the methods specified in column (1) of Table 1 below in the amounts specified in column (2):

Table 1

<b>(1) Location/Method</b>	<b>(2) Amount (dry tonnes/year)</b>
Water column recharge – Orwell	40,000
Water column recharge – Stour	160,000
Sub-tidal placement	300,000
<b>TOTAL</b>	<b>500,000</b>

and shall be increased should the results of the Mitigation Monitoring demonstrate a requirement to do so or should the Regulators acting reasonably so require following consideration of the results of the Mitigation Monitoring up to a maximum of 1,000,000 dry tonnes per year.

- 1.3 The Sediment Replacement Strategy shall not be implemented except in accordance with and following the grant of a licence or licences therefor under the Food and Environment Protection Act 1985, Part I.

#### 2. LOCAL SEDIMENT PLACEMENT

In addition to the measures set out in paragraph 1.1 above HIPL shall replace not more than 25,000 dry tonnes of sediment each year (or such other amount as HIPL and the Regulators may agree) in Erwarnton Bay by means of water column recharge subject always to the grant of all necessary statutory consents.

#### 3. PRECAUTIONARY MEASURES RELATING TO SEDIMENT

- 3.1 In carrying out its obligations under paragraphs 1 and 2 above HIPL shall use reasonable endeavours to ensure that the tidally averaged spring tide sediment flux does not increase by more than 100% from the levels of tidally averaged spring tide sediment flux experienced in the Estuary System at the date of this Deed.

- 3.2 HIPL shall ensure the placement of sediment in accordance with the Sediment Replacement Strategy shall be carried out in accordance with and having regard to programmes for the placement of sediment already undertaken within the Estuary System as at the date hereof.
- 3.3 Should siltation in subtidal areas of the River Orwell increase accretion at a rate in excess of that occurring at the date hereof as a result of the Sediment Replacement Strategy HIPL shall use reasonable endeavours to ensure that the Sediment Placement Strategy is varied to avoid any such increase in the rate of accretion.

#### **4. REVIEW OF SEDIMENT PLACEMENT**

- 4.1 When the Sediment Replacement Strategy is subject to the Mitigation Monitoring or the reporting thereof or any approval hereunder the Regulators shall have regard to matters including but not limited to:
- 4.1.1 The desirability of an artificial sediment placement system replicating nature and/or targeting specific areas of eroding inter-tidal;
  - 4.1.2 The relationship of placement locations to the requirements for dredging in the Estuary System so as to minimise the requirement for either sediment placement and/or dredging;
  - 4.1.3 The effect of sediment placement upon benthic communities, any fishery including shellfish and navigation within the Estuary System;
  - 4.1.4 In determining the amount of sediment to be returned to the Estuary System the amount of material dredged from the approaches and berths within the Estuary System in the immediately preceding period; and
  - 4.1.5 The CMMA.
- 4.2 Where making any recommendations in accordance with paragraph 3 of Schedule 3 to this Deed HIPL shall have regard to the matters set out in paragraph 4.1 above.

## Part 2

### Compensation

#### 1. IMPLEMENTATION

- 1.1 HIPL shall implement the Compensation Scheme in accordance with this Deed **PROVIDED THAT** there shall be no requirement to implement the Compensation Scheme unless and until:
  - 1.1.1 the grant of the Consents; and
  - 1.1.2 the commencement of the Marine Works.
- 1.2 HIPL shall use reasonable endeavours to ensure that the Compensation Scheme is implemented so that subject to Force Majeure if the Marine Works are commenced:
  - 1.2.1 in the period from July to September in any calendar year the Breach shall occur not more than 27 months later;
  - 1.2.2 in the Period from October to December in any calendar year the Breach shall occur not more than 24 months later;
  - 1.2.3 in the period from January to March in any calendar year the Breach shall occur not more than 21 months later; or
  - 1.2.4 in the period from April to June in any calendar year the Breach shall occur not more than 18 months later.
- 1.3 HIPL shall use reasonable endeavours to ensure the Breach is carried out not later than 27 months after the commencement of the Marine Works **PROVIDED THAT** should this not occur HIPL shall carry out the Breach as soon as is reasonably practicable thereafter having regard to the Compensation Scheme and the aims and objectives set out in this Schedule, and
- 1.4 In case of Severe Weather HIPL shall carry out such additional measures as HIPL shall propose as soon as is reasonably practicable to the Regulators on occurrence of such weather and the Regulators approval, which may be given subject to reasonable conditions.
- 1.5 Where HIPL is required in accordance with paragraph 1.4 above to propose any measures to the Regulators such measures shall be designed to minimise the effect of the temporary reduction in total habitat at Bathside Bay upon wintering and passage water birds until the Breach in accordance with the Compensation Scheme and shall include but not limited to:
  - 1.5.1 cessation or postponement of maintenance dredging within 100m of inter-tidal habitats situated within the Stour and Orwell Estuaries SPA and pSPA for a period or periods during Severe Weather; and
  - 1.5.2 using reasonable endeavours to negotiate the cessation of the use of gas gun bird scarers or other bird disturbance measures by third parties within 100m of the Estuary System during Severe Weather and such measures shall be maintained

in case of Severe Weather until the Regulators agree that the objectives of the Compensation Scheme shall have been substantially achieved.

- 1.6 Except with the prior approval of the Regulators, following the Breach HIPL shall maintain the concrete sea wall at the Managed Realignment Site as altered by the Breach, the foreshore adjacent to the said sea wall and the habitats created by the Compensation Scheme for a period of not less than fifty years from the date of the Breach **PROVIDED THAT** the requirement to maintain the said sea wall shall be to maintain the same to no less a standard of repair than subsists at the date of the Breach.

## **2. CONTROL OF BATHSIDE BAY WORKS**

- 2.1 HIPL shall not commence the Container Terminal Works until the Small Boat Harbour is complete and open for use for its intended purposes.
- 2.2 HIPL shall ensure that piling works for construction of the quay wall comprised within the Container Terminal Works shall be commenced at or about the eastern limit of Parkeston Quay and proceed in an easterly direction.

## **3. AIMS OF COMPENSATION SCHEME**

- 3.1 The Compensation Scheme shall have the following aims:
  - 3.1.1 maintaining the overall coherence of Natura 2000;
  - 3.1.2 compensation for the predicted adverse effect on the integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of 69ha intertidal mudflats both at Bathside Bay and throughout the estuarine system by the creation of at least 69ha of intertidal mudflat within the Managed Realignment Site;
  - 3.1.3 compensation for the predicted adverse effect on the integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of 2.8ha of saltmarsh at Bathside Bay by the creation of between 10ha and 20ha of intertidal saltmarsh within the site at the Managed Realignment Site; and
  - 3.1.4 compensation for the predicted adverse effect on the integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of approximately 5ha of sand/shingle areas within Bathside Bay by the creation of approximately 5ha of sand and shingle habitat within the site at the Managed Realignment Site.
- 3.2 The targets against which the success of the Compensation Scheme will be assessed in any review following a report in accordance with Schedule 3 hereof are that the Managed Realignment Site should be capable of supporting the following assemblage of water birds:
  - 3.2.1 An assemblage of roosting water birds comprising, on a 5-year mean peak basis at least 2,240 wildfowl and waders including in particular oystercatcher, ringed plover, knot, dunlin, dark bellied Brent goose, turnstone and shelduck in similar proportions to those supported by Bathside Bay during the winters of 1995/96 to 1999/00; and
  - 3.2.2 An assemblage of feeding water birds, comprising on a 5-year mean peak basis at least 1560 wildfowl and waders including in particular ringed plover,

dark-bellied Brent goose, shelduck, knot and mallard in similar proportions to those supported by Bathside Bay during the winters of 2000/1 to 2003/04.

3.3 HIPL shall carry out the Compensation Scheme at the Managed Realignment Site so far as is reasonably practicable to enable the following objectives to be met:

3.3.1 within 15 years of the Breach the Managed Realignment Site should be of sufficient quality to qualify for designation as an extension of the Hamford Water SPA and Ramsar site;

3.3.2 the impact of implementing and managing the Compensation Scheme on the adjacent areas of SPA, including those owned by little Oakley and District Wildfowlers Association, should be minimised; and

3.3.3 the Compensation Scheme should be in the course of being carried out at the time damage occurs to the Stour and Orwell Estuaries SPA and pSPA as a result of construction of Container Terminal Works.

3.4 HIPL shall carry out the Compensation Scheme so as to ensure that so far as is reasonably practicable the initial distribution of areas of different habitat types proposed to be created within the Managed Realignment Site as a result of the Compensation Scheme be as set out in Table 2 below:

**Table 2**

Habitat	Level (m OD)	Approximate area (ha)	Objective for compensation (ha)
Intertidal mudflat (including intertidal creek)	Below +1.5	76	Minimum of 69
Intertidal mudflat/saltmarsh transition	From +1.5 to +2.0	19	
Saltmarsh	From +2.0 to +2.4	10	10 to 20
Sand and shingle	Above +2.4	5	approx 5
Wave breaks	Above +2.4	2	N/A
Topsoil storage area	N/A	7	N/A
New borrow dyke system	N/A	7	approx 5
Other (i.e. footpath, seawall and terrestrial areas)	N/A	12	N/A
<b>TOTAL</b>	-	<b>138</b>	-

3.5 HIPL shall ensure that where reasonably practicable the Compensation Scheme should deliver the habitat characteristics that are capable of accommodating the full assemblages of waterbirds present within Bathside Bay as at the date hereof to feed and roost within the Managed Realignment Site providing where and to the extent technically feasible:

3.5.1 Mudflats similar to Bathside Bay in terms of gradient, substrate, type and elevation;



- 3.5.2 Shallow water characteristics during tidal incursion and excursion;
- 3.5.3 Shelter by means of the remnant seawalls at the Managed Realignment Site following completion of the Compensation Scheme; and
- 3.5.4 the relocation of existing public rights of way to the rear of the new seawalls and the prevention of wildfowling on or over the intertidal areas created so as to limit disturbance of waterbirds.

**PROVIDED THAT** it is hereby acknowledged by the parties hereto that it is outwith the ability of HIPL to ensure the presence of birds referred to in this paragraph within the Managed Realignment Site, notwithstanding having acted at all times in accordance with paragraph 3.2 of Schedule 3 to this Deed.

- 3.6 The Compensation Scheme shall include the placement of sand and gravel not exceeding 75,000 m<sup>3</sup> in volume on the foreshore either side of the Breach and such additional placements as may be revealed to be necessary in the reasonable opinion of the Regulators to achieve pre-nourishment levels adjacent to the sea wall to prevent exposing the toe of the sea wall or to avert any threat to the integrity of saltmarsh as a result of the Breach or to avert any threat to the integrity of the beaches as high tide wader roosts or breeding grounds for little terns.

## **SCHEDULE 2**

### **The Compensation Scheme**

The creation of new habitat at the Managed Realignment Site in accordance with the Realignment Consents by measures including but not limited to:

- Stripping of vegetation;
- Removal of topsoil from part of the Managed Realignment Site;
- Construction of seawall;
- Excavation of borrow dyke and connection to land drainage system;
- Localised deepening and widening of former creek within the Managed Realignment Site;
- Construction of wave breaks adjacent to proposed seawall breaches;
- Diversion of public rights of way;
- Breach of existing seawall;
- Pumping and placement of dredged mud into the Managed Realignment Site;
- Placement of dredged sand and shingle within the Managed Realignment Site.

## **SCHEDULE 3**

### **Monitoring**

#### **1. MITIGATION MONITORING**

- 1.1 The Marine Works the Sediment Replacement Strategy, their effects and the Estuary System shall be monitored by HIPL in accordance with this paragraph 1 of this Schedule which comprises the Mitigation Monitoring.
- 1.2 Save where the Regulators may approve the contrary the Mitigation Monitoring shall include:
  - 1.2.1 A programme or programmes approved by the Regulators prior to commencement of the Marine Works for reporting the following to the Regulators at intervals of five years:
    - (A) bathymetric surveys of the Estuary System and Hamford Water;
    - (B) topographic surveys of saltmarsh and intertidal vegetation within the Estuary System; and
    - (C) mapping of benthic communities within the Estuary System;
  - 1.2.2 Mapping of habitats within the Estuary System based upon the results of the exercise referred to at paragraph 1.2.1 above at intervals of five years;
  - 1.2.3 Monitoring of suspended sediment within the Estuary System by the use of two to six turbidity buoys which shall be moved within the Estuary System from time to time for the purpose of monitoring events and activities occurring within the Estuary System reported not less than annually;
  - 1.2.4 Annual low water counts (comprising not less than four co-ordinated counts in a winter period) of overwintering waterbirds in the Estuary System and analysis of high water WeBS data against historical data and in comparison with trends in the region of Great Britain including the Estuary System and trends in Great Britain reported at such intervals as the Regulators may approve but not less frequently than once every year in such detail as may be appropriate having regard to the level of detail of the most recent report to the Regulators.
  - 1.2.5 Definition of the fishery within the Estuary System including seasonal quantitative and spatial variations in plankton, shellfish, pelagic fish and demersal fish reported at such intervals as the Regulators may approve in such detail as may be appropriate having regard to the level of detail of the most recent report to the Regulators
  - 1.2.6 Targeted monitoring of dissolved oxygen concentrations throughout the water column in areas likely to be affected by the recharge of sediment under the Sediment Replacement Strategy reported not less than annually.
  - 1.2.7 Continued monitoring of dredging, offshore placement of arisings and recycling by analysing dredging records, including volumes and estimates of mass, estimates of mass, estimates of volumes disturbed and volumes and estimates of mass placed at Inner Gabbard or used in the Sediment Replacement Strategy.

- 1.3 Mitigation Monitoring shall also include monitoring of the items set out in this sub-paragraph 1.3 in accordance with such programmes as HIPL shall propose and the Regulators shall approve prior to the commencement of the Marine Works, being:
- 1.3.1 topographic and saltmarsh vegetation surveys of Erwarton Bay and the Shotley foreshore between such locations as HIPL shall agree with the Regulators;
  - 1.3.2 bed elevation monitoring for [a total period of 1-2 months] of intertidal areas in Erwarton Bay and at Shotley foreshore between such locations as HIPL shall agree with the Regulators for the purpose of evaluating the benefit of water column re-charge and establishing in greater detail the nature of intertidal processes reported after the relevant sediment placement campaign in accordance with the Sediment Replacement Strategy;
  - 1.3.3 A targeted study of the potential for the Sediment Replacement Strategy to cause smothering of the benthos including suspended sediment monitoring and biological sampling before and after the replacement of sediment at three sites and in accordance with a programme to be approved by the Regulators;
  - 1.3.4 Monitoring of initial clay distribution on the sea bed at Inner Gabbard (East) and subsequent movement reported in accordance with the terms of any relevant licence under Part I Food and Environment Protection Act 1985; and
  - 1.3.5 Monitoring benthic communities at Inner Gabbard (East) reported in accordance with the terms of any relevant licence under Part I Food and Environment Protection Act 1985.
- 1.4 So far as may be reasonably practicable HIPL shall ensure that the data produced by monitoring shall be compatible with monitoring undertaken by the Regulators and members of the Advisory Group and so far as may be reasonably practicable shall take account of and record the effect of the Marine Works upon navigation within the Estuary System.

## **2. COMPENSATION MONITORING**

- 2.1 The Compensation Scheme and the Managed Realignment Site shall be monitored by HIPL in accordance with paragraph 2 of this Schedule which shall comprise the Compensation Monitoring.
- 2.2 Save where the Regulators may approve the contrary the Compensation Monitoring shall include:
- 2.2.1 photographs taken on at least one day each year from such locations on the existing seawall overlooking the Managed Realignment Site as the Regulators may approve such photographs being taken at fixed intervals from low tide to high tide as the Managed Realignment Site is flooded the time and corresponding tidal height at Harwich being recorded in respect of each such photograph for the purpose of recording changes in elevation within the Managed Realignment Site over time following the implementation of the Compensation Scheme;
  - 2.2.2 for a period of fifteen years following the Breach monitoring of benthic communities within the Managed Realignment Site three times each calendar

year including one sample each in the late summer and late winter of each year by taking of 11cm diameter cores taken to a depth of 15cm at 20 locations within the Managed Realignment Site which shall be marked by labelled stakes and recorded using GPS, three replicate cores being taken from each location of which two shall be subject to analysis and the third stored. Samples so collected shall be taken to a laboratory within twenty-four hours of collection, sieved with a 0.5mm mesh and fixed. Infauna shall be identified to species level where reasonably practicable and counted. Wet weight total biomass and biomass available to feeding waterbirds shall be estimated by dividing each core by thirds of which the biomass present in the uppermost third shall be assumed to be available for feeding waterbirds;

- 2.2.3 At each of the locations and occasions referred to at paragraph 2.2.2 above a further sample shall be taken for
  - (A) particle size analysis by dry sieving and pipette analysis; and
  - (B) calculation of organic carbon content.
- 2.2.4 Quadrat sampling of vegetation by establishing fixed quadrats at intervals around the perimeter of the Managed Realignment Site at such locations as colonisation by vegetation may be reasonably expected to occur such sampling to be carried out in accordance with paragraph 4.4.4(1) and 4.4.4(2) of the CMMA;
- 2.2.5 Counts of overwintering and passage birds at low water undertaken at monthly intervals from 1 September to 31 May each winter with supplementary through the tide counts where required for not less than five years following the Breach;
- 2.2.6 Following the grant of the Consents monitoring of beaches and beach structures by mapping boundaries adjacent to the Managed Realignment Site in accordance with paragraphs 4.5.1 and 4.5.2 of the CMMA such survey being undertaken twice each year for five years following the Breach and thereafter for a further ten years in accordance with such requirements as HIPL shall propose and the Regulators shall approve; and
- 2.2.7 Bathymetric surveys in addition to those referred to in paragraph 1.2.1 of this Schedule of the navigable channels in Hamford Water commencing with a survey prior to commencement of the Compensation Scheme and one such survey each year for each of the three calendar years following the Breach.
- 2.2.8 Regular surveys of foreshore levels, protection of the toe of the seawall and beach in front of saltmarsh to the west of the Managed Realignment Site and the requirement for the nourishment of the foreshore to achieve the protection of the toe of the sea wall and the protection of saltmarsh from the effects of the Breach and the maintenance of the beaches as habitats for roosting waders at high tide and breeding little terns.

### **3. REPORTING AND ACTIONS**

- 3.1 Save where the provisions of paragraphs 1 and 2 above provide otherwise the details and findings of the Mitigation Monitoring and the Compensation Monitoring shall be reported in writing and (subject to the attendance of the Regulators thereat) in meetings

to the Regulators and to the members of the Advisory Group not less frequently than once every twelve months for the monitoring period set out at paragraph 4 below and shall be available to the public the Regulators and the Advisory Group upon request.

3.2 In such reporting as is referred to above HIPL shall set out such recommendations as it may consider should be carried out in light of the results so reported including: changes to, cessation or extension of

3.2.1 the Sediment Replacement Strategy;

3.2.2 the Compensation Scheme; and

3.2.3 the Monitoring;

AND where the Regulators so approve the Sediment Replacement Strategy, the Compensation Scheme and the Monitoring shall be changed in accordance with HIPL's recommendations with such modifications as the Regulators may approve and the terms of this Deed shall apply to such items as so-varied.

### **Siltation**

3.3 If such surveys as are referred to in Paragraph 2.2.7 demonstrate the occurrence of siltation in the Hamford Water Channel between Heather J No. 5 Buoy and the Island Point Buoy shown on the Admiralty Chart valid as at the date of this Deed that is attributable to the compensation scheme then HIPL shall, subject to the agreement of the Regulators, carry out such works as are required to remedy the effect of such additional siltation.

## **4. DURATION**

Except where the provisions of this Schedule provide otherwise in relation to any compensation thereof HIPL shall carry out the Monitoring for a period to be agreed by the Regulators but in any event of not less than ten years from the commencement of the Marine Works.

## SCHEDULE 4

### The Advisory Group

<b>Member</b>	<b>Address For Service</b>
The Felixstowe Dock and Railway Company	Tomline House, the Dock, Felixstowe, Suffolk IP11 3SY
ABP Ipswich	Old Custom House, Quay Street, Ipswich, IP4 1BY
Little Oakley District Wildfowlers Association (in relation to the Compensation Scheme only)	C/o Garland Environmental Services, Rose Cottage, Bradfield Road, Wix, Manningtree, Essex CO11 2SH
Kent and Essex Sea Fisheries Committee	The Ice House, Military Road, Ramsgate, Kent, CT11 9LG
Eastern Sea Fisheries Committee	6 North Lynn Business Village, Bergen Village, Kings Lynn, Norfolk, PE30 2JG
Tendring District Council	The Assistant Chief Executive, Westleigh House, Carnarvon Road, Clacton-on-Sea, Essex CO15 6QF
Essex County Council	The Head of Law and Administration, County Hall, Chelmsford, Essex CM1 1LX
CEFAS	Remembrance Avenue, Burnham on Crouch, Essex CM0 8HA
The Royal Society for the Protection of Birds	The Regional Director, Eastern England Regional Office, Stalham House, 65 Thorpe Road, Norwich, Norfolk, NR1 1UD.
The Suffolk Wildlife Trust	Suffolk Wildlife Trust, Brooke House, Ashbocking, Ipswich IP6 9JY
Essex Wildlife Trust	Abbotts Hall Farm, Colchester, CO5 7RZ
Hamford Water Management Committee (in relation to the Compensation Scheme only)	

## **SCHEDULE 5**

### **Part 1**

#### **The Consents**

1. Planning Permission under the Town and Country Planning Act 1990 for construction of a container terminal being statutory references 03/00600/FUL and APP/P1560/14/03/1129/387;
2. Planning Permission under the Town and Country Planning Act 1990 for construction of a small boat harbour bearing statutory references 03/00601/FUL and APP/P1560/A/03/1129388;
3. Listed Building Consent under the Planning (Listed Buildings and Conservations Areas) Act 1990 for partial demolition of a pier attached to Grade II Listed Train Ferry Gantry at Gas House Creek, Harwich, bearing statutory references 03/00602/FUL and APP/1560/A/03/1129386;
4. Tidal works consent in accordance with the Parkeston Quay Act 1985 and the Harwich Parkeston Quay Act 1988 bearing statutory reference MNA 151/1358/13; and
5. Coast Protection Act 1949 Consent for channel dredging and disposal of dredged arisings bearing statutory reference P89/3/433.

### **Part 2**

#### **The Realignment Consents**

1. Planning Permission under the Town and Country Planning Act 1990 for the creation of compensatory habitats at Little Oakley, Hampford Water bearing statutory references 03/01200/FUL and APP/P1560/A/03/1134582; and
2. Coast Protection Act 1949 consent for proposed managed realignment at Little Oakley, Hamford Water bearing statutory reference MNA 152/1358/11.



**EXECUTED** as a **DEED** by **HARWICH** )  
**INTERNATIONAL PORT LIMITED** by )  
means of these signatories and delivered but )  
not until the date hereof )

Director

Director/Secretary

[**THE COMMON SEAL** of **THE HARWICH** )  
**HAVEN AUTHORITY** hereunto affixed is )  
authenticated by ) [Form of execution to be confirmed.]

Board Member

Board Member]

Signed and delivered as a Deed on behalf of the  
**ENVIRONMENT AGENCY** by

Solicitor [ ] Region as Attorney  
acting pursuant to a Power of Attorney  
dated [ ] 2004 in the presence of

Witness Signature:

Witness Name:

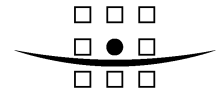
Witness Address:

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[**THE COMMON SEAL** of )  
**ENGLISH NATURE** hereunto )  
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**ROYAL HASKONING**

**POSFORD HASKONING  
ENVIRONMENT**

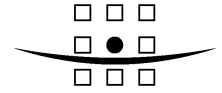
**Bathside Bay Container Terminal: Tidal  
Works and Approach Channel Deepening**

September 2004

**European Sites Compensation, Mitigation  
and Monitoring Agreement**

**FINAL REPORT**

**WITHOUT PREJUDICE AND SUBJECT TO CONTRACT**



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## CONTENTS

	Page
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 BRIEF DESCRIPTION OF THE PROPOSED DEVELOPMENT	1
1.2 PURPOSE OF THIS DOCUMENT	4
1.3 OVERVIEW OF THE RELEVANT PREDICTED ENVIRONMENTAL IMPACTS	6
<b>2 PROPOSALS FOR MITIGATION MEASURES</b>	<b>9</b>
2.1 CURRENT MITIGATION AND PRACTICE	9
2.2 MITIGATION FOR YEAR-ON-YEAR ONGOING LOSS	11
2.3 THE PROPOSED MITIGATION STRATEGY	13
<b>3 PROPOSALS FOR COMPENSATORY MEASURES</b>	<b>19</b>
3.1 INTRODUCTION	19
3.2 OBJECTIVES OF COMPENSATION	19
3.3 MANAGED REALIGNMENT AT LITTLE OAKLEY, HAMFORD WATER	23
<b>4 MONITORING</b>	<b>31</b>
4.1 OBJECTIVES FOR MONITORING THE SUCCESS OF MITIGATION	31
4.2 PROPOSALS FOR MONITORING MITIGATION MEASURES	32
4.3 OBJECTIVES FOR MONITORING THE SUCCESS OF COMPENSATION	34
4.4 HABITAT DEVELOPMENT MONITORING AT THE REALIGNMENT SITE	35
4.5 MONITORING OF POTENTIAL EFFECTS OF THE MANAGED REALIGNMENT	37
<b>5 FUTURE MANAGEMENT STRATEGY</b>	<b>39</b>
5.1 MANAGING THE SEDIMENT REPLACEMENT PROGRAMME	39
5.2 MANAGEMENT OF THE REALIGNMENT SITE	39
5.3 MANAGEMENT OF THE ADJACENT FORESHORE	39
5.4 COMMITMENT TO THE MONITORING STRATEGY	41
5.5 REPORTING	45

## 1 INTRODUCTION

### 1.1 BRIEF DESCRIPTION OF THE PROPOSED DEVELOPMENT

1. In October 2001, Hutchison Ports (UK) Ltd (HPUK) (acting on behalf of Harwich International Port Ltd (HIPL)) submitted an application to the Department of Transport, Local Government and the Regions (DTLR) (Ports Division)<sup>1</sup> to undertake tidal works within Bathside Bay in the Stour Estuary, Essex ('**Bathside Bay Tidal Works**' comprising the proposed reclamation and the provision of a small boat harbour); see Figure 1 for a plan of the proposed tidal works and Figure 2 for a plan showing locations in the Stour Estuary referred to in the text. In conjunction with this application, the Harwich Haven Authority (HHA) submitted a Coast Protection Act application to the DTLR to deepen and widen the approach channel to Bathside Bay and to dispose of the dredged arisings. Posford Haskoning was commissioned by HPUK and the HHA to undertake an Environmental Impact Assessment (EIA) and to produce an Environmental Statement (ES) to accompany the Bathside Bay Tidal Works and Coast Protection Act applications (referred to as the 'Tidal Works ES'; Posford Haskoning, 2001).

2. In summary, the Bathside Bay Tidal Works and capital dredging comprise:

- i) Reclamation of approximately 65ha of intertidal area (above Chart Datum (CD));
- ii) Dredging of approximately 4ha of intertidal in Gas House Creek to create a small boat harbour ('Bathside Bay Small Boat Harbour'); and,
- iii) Dredging of the approach channel to Bathside Bay to a depth of -14.5m CD, from an existing depth of -9.0m CD, with a depth of -15.0m CD in the berthing area adjacent to the quay face.

3. It is proposed to dispose of the capital silt arising from the channel deepening at the existing Inner Gabbard disposal site (licensed to receive dispersive maintenance dredgings). The clay would be deposited at a new offshore disposal site termed 'Inner Gabbard (East)'. The sand and gravel would be utilised within the reclamation. Further details of the proposed works and a full assessment of the associated potential environmental impacts are provided in the Tidal Works ES.

4. Following the submission of the Tidal Works ES, two Supplementary Reports were prepared; a 'Clarification' supplement (Posford Haskoning and HR Wallingford, 2002a) and a 'Further Definition' supplement (Posford Haskoning and HR Wallingford, 2002b) which aimed to provide further explanation of issues covered within the Tidal Works ES and to address additional issues raised by consultees during the post-submission consultation period.

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<sup>1</sup> Now the Department for Transport (DfT) (Ports Division)

**Figure 1**

5. In April 2003, HPUK submitted three detailed planning applications (including an application for Listed Building Consent for the Gas House Creek area) for the '**Bathside Bay Container Terminal**', comprising reclamation works; construction of a concrete block-paved container and stacking facility with 11 quayside cranes and 44 Rubber Tyre Gantry cranes; construction of associated workshops, customs control building, lighting, substations, fuelling station, rail terminal, heavy duty container transfer area, office buildings and logistics facility; car and HGV parking, additional hardstanding, structural landscape and mounting, and a wetland buffer; access and internal estate roads and perimeter fencing. These applications were accompanied by an ES (the 'Planning ES') (Posford Haskoning, 2003a) which incorporates those matters covered by the Tidal Works ES.

6. This was followed by an application for a Harbour Revision Order (the proposed Harwich Parkeston Quay Harbour Revision Order 2004) in December 2003.



**Figure 2** Locations referred to in the text

## 1.2 PURPOSE OF THIS DOCUMENT

### 1.2.1 Introduction

1. This document is concerned with the implications of the proposed Bathside Bay Tidal Works for sites and species protected under the Wild Birds Directive<sup>1</sup>, as amended by the Habitats Directive<sup>2</sup>, and applies to the development authorised by the applications set out below. It addresses the effects of these works on protected species at Bathside Bay and at the Little Oakley managed realignment site<sup>3</sup>. It also provides for the effect of the proposals upon navigation to be recorded and considered and deals with the measures proposed to mitigate and/or compensate any predicted effects on site integrity in either location.

2. The predicted implications of the Tidal Works and dredging the approach channel to Bathside Bay both on the morphology of the Stour and Orwell estuaries and for the conservation status of relevant protected sites and species are summarised below (Section 1.3). This document concentrates on setting out the proposed mitigation (Section 2) and compensation measures (Section 3), as well as the monitoring and management proposals intended to ensure their success (Sections 4 and 5).

3. This document has been prepared in connection with the following applications in relation to the Bathside Bay Container Terminal and the proposed Small Boat Harbour:

- APP/P1560/A/03/1129387
- APP/P1560/A/03/1129388
- APP/P1560/E/03/1129386
- Application Ref. MNA151/1358/13
- Application Ref. P89/3/433
- Application Ref. MNA152/1358/11

In relation to the proposed works for the Little Oakley Managed Realignment, Hamford Water, it is also concerned with:

- APP/P1560/A/03/1134582
- Application Ref. MNA151/1358/15.

It forms the basis of Statements of Common Ground between HPUK, English Nature and the Royal Society for the Protection of Birds (RSPB) and HPUK and Tendring District Council (SCG 2 and SCG 17 respectively).

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<sup>1</sup> Council Directive on the conservation of wild birds (79/409/EEC)

<sup>2</sup> Council Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC)

<sup>3</sup> The Little Oakley site is proposed as compensation under the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) for the adverse effects of the Bathside Bay Tidal Works and associated channel deepening on the integrity of the protected sites, as set out in Sections 1.3.5 and 1.3.6



## 1.2.2 Implementation

1. In order to ensure that the measures contained in this document are legally binding upon HPUK and HHA, the First Secretary of State and the Secretary of State for Transport should ensure that the measures set out herein are implemented. The Secretaries of State may do this by being shown a binding agreement (in the form of a deed) between relevant Regulators, HPUK/HIPL and the HHA and/or by imposing conditions upon the consents that they grant, where appropriate. In order to give effect to such an agreement or conditions, the current Regulators Group (see Section 5.5) would be more formally constituted by means of the deed.

2. This document sets out the obligations that HPUK/HIPL and the HHA (the “undertakers”) will fulfil in relation to the Bathside Bay Container Terminal. These obligations can be imposed by the Secretaries of State should they consider it appropriate in granting consent in relation to the Tidal Works Application dated 21 July 2001, the Coast Protection Act 1949 applications and the planning applications referred to above (which are the subject of a public inquiry). In the case of each obligation, HPUK, HIPL and/or the HHA will either perform the obligation or procure that they are performed in relation to the Bathside Bay Container Terminal works or the Little Oakley Managed Realignment, as the case may be.

3. With respect to the obligations, monitoring and management initiatives set out herein, it is proposed that the HHA will act as an agent for HPUK and HIPL in implementing the actions of both parties.

## 1.2.3 Regulatory and Advisory Group

1. A group will be established to advise upon and give approvals in relation to the matters envisaged by this document. It will consist of:

### 1.1 Regulators -

- Department for Transport (DfT) (Ports Division) (see 2. below)
- Department for Environment, Food and Rural Affairs (Defra) (see 2.)
- The Environment Agency
- English Nature
- HHA

### 1.2 Consultees -

- HPUK, HIPL and FDRC<sup>1</sup>
- The RSPB
- Suffolk Wildlife Trust
- Essex Wildlife Trust
- Kent and Essex Sea Fisheries Committee
- Eastern Sea Fisheries Joint Committee
- CEFAS
- ABP Ipswich

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<sup>1</sup> the Felixstowe Dock and Railway Company

- Tendring District Council, and

*Where discussions relate to the Little Oakley managed realignment site -*

- Little Oakley and District Wildfowlers Association, and
- The Hamford Water Management Committee.

2. All mitigation and compensation works will require approvals/licences issued by the DfT and Defra or the variation of such approvals/licenses. The detailed arrangements for monitoring will be determined by the Regulatory and Advisory Group. During this review process the requirements for modifying the monitoring programme will be considered.

3. Decisions upon any request or application will be taken by the Regulators following consultation with the Consultees and having regard to the representations of Consultees. If the Regulators cannot agree upon the appropriate course of action, or in the event that the HHA or HIPL disagrees with the conclusion of the Regulators, then the matters shall be submitted to mediation (in accordance with the Housing Grants Construction and Regeneration Act 1998). DfT and Defra may choose to give their approvals through statutory consent processes rather than in conjunction with other Regulators. Such consent processes are subject to rights of appeal.

4. The reports required by this agreement (see Section 5.5) will be submitted to the Regulators and the Consultees and shall be made publicly available. The HHA and HIPL will give effect to the reasonable and proper recommendations of the Regulators, following consultation with the Consultees, arising from the subject matter of any annual report and in accordance with the terms of this document. That is, where it is capable itself of doing so, always subject to obtaining all necessary statutory consents.

5. In year 1 of the construction process it is proposed that one (early) meeting of the Regulatory and Advisory Group will be held, to fine tune the monitoring proposals as necessary. In year 2 of the works and for a period of two years after the breach of the seawall at Little Oakley, it is proposed that meetings will be held bi-annually. Following this, meetings will resume their annual programme. The frequency of meetings may be reduced from that proposed with the agreement of the Regulators. Outside of the formal reporting programme, the Regulators will be empowered to raise concerns and address issues as necessary; where this will include the facility to call meetings at short notice (i.e. an urgent response mechanism). In making decisions the Regulators must act reasonably and in a timely fashion.

### **1.3 OVERVIEW OF THE RELEVANT PREDICTED ENVIRONMENTAL IMPACTS**

1. The Tidal Works ES identified a variety of potential impacts on the designated status of the Stour and Orwell estuarine system as a result of the development of the Bathside Bay Container Terminal. Designated sites within the system include the Stour Estuary Site of Special Scientific Interest (SSSI), the Orwell Estuary SSSI and the Stour and Orwell Estuaries Special Protection Area (SPA) and Ramsar site (hereafter referred to as the Stour and Orwell Estuaries SPA).

2. No impacts were predicted on any other estuarine or coastal habitats, including the Hamford Water SPA and Ramsar site located around 4.5km to the south.

3. At the time of preparing the ES, Bathside Bay was not covered by any nature conservation designations, although it was located adjacent to the boundaries of the Stour and Orwell Estuaries SPA and the Stour Estuary SSSI. Since the submission of the ES, and as a result of the environmental studies undertaken during the EIA process, the boundary of the Stour Estuary SSSI has been extended to include Bathside Bay (and an additional section of Copperas Bay). Bathside Bay has now also been submitted by English Nature to Defra for inclusion within the Stour and Orwell Estuaries SPA and Ramsar site (hereafter referred to as the proposed SPA (pSPA)).

4. Despite the fact that Bathside Bay was not designated when preparing the ES, the value of Bathside Bay as a feeding and roosting habitat for waterbirds was recognised. The Tidal Works ES concluded that Bathside Bay is of comparable value to other intertidal bays within the Stour and Orwell estuary system (on the basis of its invertebrate resource and waterbird populations) and that the waterbird populations that use it form part of the overall population of the Stour and Orwell Estuaries SPA. Consequently, the assessment of the loss of intertidal area within Bathside Bay due to the proposed tidal works was undertaken based on the assumption that Bathside Bay has 'SPA value' and supports an important assemblage of overwintering waterbirds.

5. The Tidal Works ES and supplementary work undertaken predicted that the proposed Bathside Bay Tidal Works and approach channel deepening would have a number of direct and indirect impacts on intertidal habitats that were either within the boundaries of the Stour and Orwell Estuaries SPA and/or the pSPA. In summary, these impacts are as follows:

#### *Year-on-year effects*

- i. An estuary wide increase in the background rate of erosion of designated intertidal areas, equating to an annual loss of approximately 2.8ha/year;
- ii. A small additional localised increase in erosion throughout Erwarnton Bay (equivalent to an average of 1 to 2mm/year across Erwarnton Bay) as a result of changes to hydrodynamic regime; and,
- iii. A redistribution of the pattern of erosion over the Shotley foreshore, resulting in a net reduction in erosion of 5 to 10mm/year and some localised areas of increased erosion.

#### *One-off construction effects*

- iv. The decreased exposure of approximately 3ha of designated intertidal habitat within the Stour and Orwell Estuaries SPA due to the effect of the proposed development on tidal propagation;
- v. The direct loss of 62.2ha of intertidal mudflat and 2.8ha of saltmarsh due to the reclamation; and,
- vi. The direct loss of 4ha of intertidal mudflat due to the dredging to create the small boat harbour within Bathside Bay.

6. The year-on-year impacts (items i, ii and iii) can be mitigated; this is discussed and addressed in Section 2 of this document. However, the one-off impacts (items iv to vi) cannot be mitigated. Consequently, it was concluded that the direct loss of 69ha of intertidal habitat within Bathside Bay (that is, the loss of 66.2ha of intertidal mudflat and 2.8ha of saltmarsh) and the effect on tidal propagation would be likely to result in an adverse effect on the integrity of the Stour and Orwell Estuaries SPA and pSPA due to:

- The loss of intertidal area (and hence feeding habitat for 1,560<sup>1</sup> waterbirds) from the pSPA;
- The loss of roosting area (saltmarsh and raised sand and gravel areas) that support 2,240<sup>2</sup> waterbirds from the SPA during the high water period; and,
- Through the above two points, the potential for the Bathside Bay Container Terminal to increase pressure for resources (food, space, etc.) within the remainder of the SPA.

7. Hence it was proposed that compensatory measures would be required in the event that the Secretaries of State agrees with this finding and concludes that the proposed development of the Bathside Bay Container Terminal should proceed; this is discussed in Section 3.

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<sup>1</sup> Table A1 in Appendix 1 sets out the low tide count data for Bathside Bay over the period 2000/01 to 2003/2004 and the 4-year mean peak.

<sup>2</sup> Table A2 in Appendix 1 sets out the high tide count data for Bathside Bay over the period 1995/1996 to 1999/2000 and the 5-year mean peak.

## 2 PROPOSALS FOR MITIGATION MEASURES

### 2.1 CURRENT MITIGATION AND PRACTICE<sup>1</sup>

1. A sediment replacement programme is currently running in the Harwich Haven as a requirement of the HHA's consent for the 1998/2000 Approach Channel Deepening and the extension to the Trinity III Terminal at the Port of Felixstowe (currently under construction). An existing Regulators Group oversees the programme; further details of which are provided in Section 5.5. This programme entails returning a proportion of the material accumulating in the Harbour to the estuary and nearshore system through water column recharge and subtidal placement. The consent for the channel deepening required that the programme should commence and be developed over a period of five years in consultation with a Regulators Group. FEPA (Food and Environment Protection Act 1985) licences must be obtained for the placement activities and these are presently renewed on a three-year basis. The Trimley Marshes Managed Realignment site in part allowed for a (precautionary) shortfall in mitigation during this start-up period.

2. The sediment replacement programme provides for sediment return into the estuaries and the Harbour area (defined as being the area between Landguard Point and the upriver extent of the quays and facilities).

3. The original strategy for sediment replacement in the estuaries was the subtidal placement of 25,000 dry tonnes per year in the Stour estuary only. This approach was modified to include both the Stour and Orwell estuaries, a change in emphasis from subtidal placement to water column recharge (which is believed to be more efficient in terms of feeding material onto the intertidal areas) and a significant scaling up of the mass reintroduced. This change was instigated in light of monitoring results and to assist in the identification of the effectiveness of the programme. These changes were agreed with the Regulators Group. A renewed FEPA licence was granted in November 2001 with a significant increase in amount, to the equivalent of 140,000 dry tonnes per year, of water column recharge, targeted to introduce sediment on the flood tide to intertidal bays.

4. In addition to this up-estuary placement, subtidal placement of up to 110,000 dry tonnes per year is licensed for an area within the dredged approach channel in the Harbour that naturally scours on the western side of the channel between Guard Buoy and South Shelf Buoy. This area has generally been referred to as the 'North Shelf'.

5. The present licences for subtidal placement and water column recharge in the estuaries thus allow for up to 250,000 dry tonnes of maintenance material to be returned to the estuary system.

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<sup>1</sup> Details within this section are as reported in Posford Haskoning and HR Wallingford (2003)

6. Details of the placement activities are provided in the Annual Report to the Regulators Group (Posford Haskoning and HR Wallingford, 2003). The reporting period is June to May and the Annual report is presented in August/September. A breakdown of the present placement sites in the estuaries and the licensed amounts for placement is presented in Table 1 below.

**Table 1 Locations and quantities for annual water column recharge**

Location	Licensed amount (dry tonnes)
Orwell West	15,000
Orwell East	15,000
Erwarton East	40,000
Copperas East	40,000
Copperas West	15,000
Holbrook Bay	15,000
<b>TOTAL</b>	<b>140,000</b>

7. At North Shelf, up to 110,000 dry tonnes are licensed for placement each year and typically this occurs through four campaigns over the year.

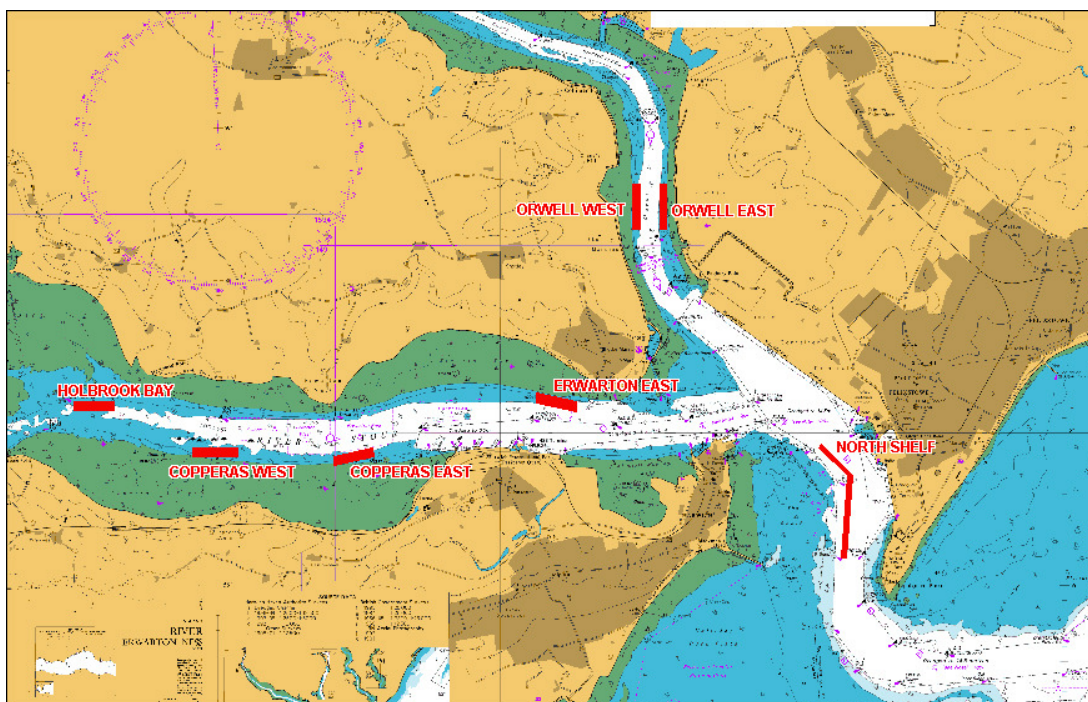
8. The licensed areas are shown in Figure 3.

9. Between June 2000 and May 2003 (the first three years following completion of the channel deepening) the HHA has, on average, recycled about 170,000 dry tonnes/year) through the sediment replacement programme.

10. The influence of the construction of the Trinity III Terminal (Phase 2) Extension and associated habitat enhancement schemes has not yet been observed through the measurement programme as the main dredging works were being completed in May 2003.

11. In addition to the material returned to the estuary system by the sediment replacement programme material is also disturbed and released into the Harbour by the disturbance and agitation effects of the maintenance dredging activity itself. It is estimated that on average between June 2000 and May 2003 about 125,000 dry tonnes/year (approximately 7% of the siltation) was released back into the Harbour by the dredging activity.

12. There also appears to be a disturbance effect associated with the operation of the largest vessels in the Harbour. Assuming a baseline siltation rate of 9,000m<sup>3</sup>/day (an upper limit) would imply vessel disturbance over the last three years to May 2003 equating to resuspension of an average of about 355,000 dry tonnes/year. Over the year to May 2003 the resuspension might have been as much as 500,000 dry tonnes/year.



**Figure 3** Location of sites currently licensed for the placement of maintenance dredged material as part of the sediment replacement programme

13. At present the bulk of the material that deposits in the Harbour area is removed and placed offshore at the Inner Gabbard Site (approximately 62%). A significant proportion is released into the Harbour by the combined disturbance effects of dredging and shipping (approximately 28% over the last three years) and the remainder is returned to the estuary and nearshore system via the sediment replacement programme (approximately 10%).

## 2.2 MITIGATION FOR YEAR-ON-YEAR ONGOING LOSS

1. The proposed tidal works and channel deepening are predicted to cause an increase in the background rate of erosion of intertidal areas of about 24,500 dry tonnes/year. This equates to an estuary-wide annual loss of intertidal area above 0m CD of approximately 2.8ha/year and some minor increases in localised erosion in Erwarton Bay and at Shotley (items i, ii and iii of Section 1.3).

2. The proposed method for mitigating the predicted increase in intertidal erosion rate in the Stour and Orwell estuaries is to increase the amount of sediment used within the sediment replacement programme. This is to be achieved through a number of different means, that is:

- Water column recharge – where material dredged from the berths and approach channel during maintenance campaigns is taken upstream and dispersed into the water column;

- Subtidal placement – where maintenance dredged material is placed at locations on the Harbour and estuary bed from where it is re-entrained by the action of the tidal currents; and
- Disturbance/agitation during the dredging process and through the action of large vessel operations.

3. The prediction of impact with respect to the Stour and Orwell Estuaries SPA is based on the principle that more sediment depositing in the operational areas of the ports (encompassing the approaches) and subsequently being placed offshore through maintenance dredging, would further deplete the eroding estuary system by reducing the supply of sediment to the estuaries. The basic principle, therefore, is to return the extra sediment depositing in the Harbour approaches to the wider estuarine system such that natural processes are then able to redistribute the material leading to retention of some of the returned sediment.

4. In the Tidal Works ES it was demonstrated that, following development of the Bathside Bay Container Terminal, siltation rates at the Haven ports (Felixstowe, Parkeston and Bathside) would increase from 2.8-3.3Mm<sup>3</sup>/year to 4.1-5.4Mm<sup>3</sup>/year (equivalent to between 2.2 and 2.9 million dry tonnes/year). However, the accumulation of silt to be managed through maintenance dredging is expected to be less as a result of the effect of large vessel operations agitating a proportion of the depositing material.

5. To mitigate for the effects of the Bathside Bay Container Terminal and the 1998/2000 Approach Channel Deepening it was predicted in the EIA studies that it will be necessary to replace between 500,000 and 1,000,000 dry tonnes of dredged sediment within the estuary system each year. The upper limit of 1,000,000 dry tonnes is associated with predictions based on a siltation rate considerably higher than presently observed rates of accumulation. Given the present operational experience in the Harbour area (lowering accumulation rates and increasing numbers of large vessels), it is considered unlikely that there will be the need to return in excess of 500,000 dry tonnes of sediment a year to the estuary system. It is therefore proposed that, at this time, the mitigation proposals should plan for managing the return of a quantity of material of the order of 500,000 dry tonnes/year.

6. The predicted annual increase in erosion due to the development (up to 24,500 dry tonnes/year) is small in comparison with the total amount of sediment replacement proposed to mitigate the effect associated with the 1998/2000 Approach Channel Deepening and the proposed Bathside Bay Container Terminal development. However, this differential exists because the natural estuary system is inefficient at retaining material on intertidal areas; only a small percentage of the material entering the estuary system on the flood tide will deposit on the intertidal areas, the majority moving back and forth in the subtidal channels before being exported from the system. Moreover, although it is not necessary to return all of the material predicted to be trapped in the berths/approaches to Bathside Bay to the estuary system in order to mitigate the implications of the works in the Bay, it is assumed that maximising the amount returned is likely to lead to the greatest reduction in intertidal erosion; although this should be within the limits of economic practicality and acceptable impact on fishery resources and other interests (including navigation).



7. The mitigation strategy continues the use of subtidal placement and water column recharge in order to limit the quantity of maintenance dredged material deposited offshore to the amount placed offshore in 1994, with the excess material to be released within the estuary system. The proposed strategy was expressed in the Tidal Works ES in terms of setting an upper limit for offshore placement of material corresponding to the situation prior to the 1993/94 channel deepening (approximately 1.1M dry tonnes/year). Thus if no greater amount of material is taken out of the estuary system, and the sediment replacement programme is effective (see Section 2.3.4), then the estuary-wide morphological impacts associated with a reduction in sediment supply due to the proposed works should be avoided. Alternatives to the proposed strategy, should they be required, could include greater placement of sediment up-estuary where the replacement is expected to be more efficient, in terms of retention of sediment within the estuary system; changes to dredging operation such that a greater proportion of the material was returned to the Harbour at the time of dredging and the use of direct placement at carefully selected sites.

## 2.3 THE PROPOSED MITIGATION STRATEGY

### 2.3.1 Mitigation for estuary-wide impact

1. Details of the proposed sediment replacement programme were initially provided in the Tidal Works ES. The proposals were based upon experience of the programme implemented by the HHA between 1998 and 2001. Since that time further experience has been gained and shared with the existing Regulators Group. It is now considered (by the HHA and HR Wallingford) that the tables included within the ES were overly prescriptive and that it is more helpful to identify the principle rather than the detail of the future scenarios for sediment replacement. This is illustrated in Table 2 for the replacement target of 500,000 dry tonnes/year. Should Bathside Bay Container Terminal receive consent, this programme would be implemented (in the first instance) subject to the strategy for the avoidance of adverse effect (see Section 2.3.3) and any concerns being highlighted through the monitoring process (Section 4). If necessary, the strategy would be adapted using the guidelines outlined in Section 2.3.5.

**Table 2 Details of the proposed sediment replacement scheme**

<b>Location</b>	<b>Existing licensed quantities (as of Nov 2001, dry tonnes/year)</b>	<b>Proposed licensed quantities as mitigation for the Bathside Bay Container Terminal development and previous consented projects (dry tonnes/year)</b>
Water column recharge Orwell	30,000	40,000
Water column recharge Stour	110,000	160,000
Subtidal placement	110,000	300,000
<b>TOTAL</b>	<b>250,000</b>	<b>500,000</b>

2. Further experience will be gained from the ongoing sediment replacement programme before this strategy is implemented (i.e. in the time prior to consent and construction) and it is proposed that this experience will also be used, where appropriate, to refine the detail of the proposals. For example, modelling the effects of the programme to date has predicted that subtidal placements at the North Shelf may lead to an increase in deposition of fine material and, therefore, placements have already been moved slightly upstream towards The Guard buoy.

3. It should be noted that the proposed mitigation strategy outlined herein is subject to the granting of an appropriate licence by Defra, under the Food and Environment Protection Act (FEPA). This licence is renewed every year. The licence sought for the first year will be for 500,000 dry tonnes/year. Should a requirement subsequently be demonstrated (based on siltation rates within the berths and approaches) for the replacement of more material (i.e. up to 1,000,000 dry tonnes/year) future licence applications will be modified to reflect this. In the event that Defra does not grant a licence, no work could take place until an agreement has been reached.

4. It is proposed that the annual reviews of the Regulatory and Advisory Group will provide the forum for making any necessary adjustments to individual placements or the placement regime. As is presently the case, these placements would be achieved via a series of campaigns with large and small trailing suction hopper dredgers each year; currently, four campaigns a year occur. The proposed programme of placement can be varied so that certain activities are limited or restricted at particular times of year.

5. Subtidal placement in the Harbour area and lower Stour estuary is advocated because it can practically accommodate large volumes and here natural flows can re-entrain the sediment, take it back into the estuaries on the flood tide and maintain the supply to the offshore area on the ebb tide. Water column recharge adjacent to the intertidal areas is advocated because this provides a direct response adjacent to the point of impact. However, an alternative would be water column recharge into the subtidal channel of the estuary, which would avoid the potential for temporary accumulation (and the chance of a degree of smothering) on intertidal areas. There is scope for adjusting the proposed balance of placements between subtidal placement and water column recharge and the precise details of placement will be reviewed and refined as a result of ongoing experience from the present sediment replacement programme. A possibility exists that subtidal placement will be targeted at more than one location and that such placements might be phased with regards to the tidal currents. Furthermore, subtidal placement could be undertaken on a "*little and often*" basis throughout the dredge campaign, rather than in one short, intense period as is presently the general case.

6. The quantity and location of material that needs to be returned to the system under this regime (i.e. assumed to be 0.5M dry tonnes/annum) would be tuned according to the amount of material accumulating within the approaches and berths (quantifiable as part of the dredging process). That is, if the maintenance dredging requirement is high in a particular year then more material would be included within the sediment replacement programme in the following year or years, and *vice versa* (within established minimum and maximum boundaries and based on a sediment balance over time). From time to time the longer-term natural trends of input of material to the estuary system would be reviewed (through the HHA's existing annual compliance monitoring

regime; see Section 5) and this information, if necessary, would be used to revise the mitigation strategy. This process would ensure that the mitigation remains a function of the potential effect of the port activity on the estuary system and does not become a function of natural background change.

### 2.3.2 Mitigation for local impact

1. The study into the potential impact of the Bathside Bay Container Terminal on waves predicted that the proposed dredging and reclamation were likely to increase the potential for locally enhanced wave action in the lower Stour, which has the potential to affect the intertidal areas on the Shotley foreshore and in Erwarnton Bay. Furthermore, the hydrodynamic studies indicated that there would be a small increase in peak flood current speeds in the eastern part of Erwarnton Bay matched by a decrease in peak ebb speeds in the same location and general decreases over the Shotley foreshore.

2. As a consequence of these changes, the predicted mean increase in the erosion rate of Erwarnton Bay associated with local changes to the hydrodynamics is 1 to 2mm/year. This is in addition to the predicted increase in estuary-wide erosion, which is of the same order. These predicted increases in the erosion rate need to be considered in the light of the observed natural variation in the background erosion rate of the Bay, which has been found to vary over the range of 13 to 28mm/year.

3. It is, therefore, proposed that this local impact is also addressed through the sediment replacement programme by targeting Erwarnton Bay for local recharge (in addition to that proposed as part of the estuary-wide mitigation). If it is assumed that water column recharge that is specifically aimed at offsetting any local impact is between 10% and 20% efficient at feeding Erwarnton Bay then, in order to offset this predicted localised effect, up to 25,000 dry tonnes/year would need to be recharged at this location. This is in addition to the water column recharge proposed as part of the estuary-wide mitigation. The magnitude of additional water column recharge at this location would be informed by monitoring of the effect.

4. On the Shotley foreshore, the mean erosion rate is predicted to reduce on average by 5 to 10mm/year, mainly as a result of the predicted reduction in current speed. However, there would still be some localised increases in the erosion rate in the vicinity of the entrance to the marina, between Ganges Pier and the marina entrance and near Bloody Point. The observed background erosion rate in this location is estimated to be of the order of 50 to 60mm/year.

5. Since the impact of the Bathside Bay Container Terminal on the Shotley foreshore is predicted to reduce the overall erosion rate, it is considered that no further mitigation for nature conservation purposes need be undertaken at Shotley associated with the development of Bathside Bay. The predicted changes in the erosion rate represent a redistribution of the existing erosion in the context of an eroding foreshore where there is already considerable spatial variation in erosion rates. However, HPUK in conjunction with the HHA, aim to provide further coastal protection to the Shotley seawall should the Bathside Bay Container Terminal proceed, as part of a beneficial use initiative. This would take the form of the placement of clay derived from the dredging programme on the upper intertidal in front of the seawall. As part of the Bathside Bay Container Terminal, beneficial use schemes for coastal defences are also being

examined for the eastern part of Erwarnton Bay and, subject to the agreement of the Regulators, will be implemented.

### **2.3.3 Strategy for avoiding adverse impact**

1. To minimise the risk of an adverse ecological effect arising from sediment replacement (that is through the influence of increased suspended sediment on the benthic or fishery resource) it is initially proposed that the sediment replacement be achieved through a means whereby, generally, the tidally averaged spring tide sediment flux is not increased by more than that which occurs during relatively frequent wave conditions. Therefore sediment fluxes should be well within the envelope that occurs naturally. As a starting point, a suggested potential limit of increase in the tidally averaged sediment flux would be 100%. This factor is proposed because it represents an increase in flux comparable to that associated with wave activity which can occur 20% of the time in the estuaries. However, doubling the sediment flux represents a common wave condition and hence it may be possible to increase the flux to that observed, say, 10% of the time without impact. The use of a limit to the increase in flux from recharge means that up-estuary water column recharge would need to be at a smaller scale than that proposed for downstream.

2. To further minimise the risk of adverse effect, the placement activity builds on the existing programme, which currently returns some 170,000 dry tonnes/year of material to the estuary system without apparent impact, based on monitored results. Note that this is in addition to the effects from dredging and shipping disturbance, which are estimated to release about 500,000 dry tonnes/year in the Harbour area.

3. If it is determined that siltation is occurring in the subtidal areas of the Orwell (which is currently accreting in its lower reaches) at a higher rate than the rate at present, and this is attributable to the sediment replacement programme, the programme would be adjusted to avoid this effect.

### **2.3.4 Dealing with uncertainty**

1. When defining a mitigation strategy it is important to recognise the inherent uncertainty associated with a natural system. This recognition leads to the necessary consideration of risk. The most relevant contributions to risk either relate to the effectiveness of the mitigation strategy or to its potential adverse effects, that is:

- a) The ability of an artificial sediment bypassing system to replicate nature and feed the intertidals, i.e. the efficiency of the sediment replacement programme compared with nature. As noted in Section 2.2, nature itself is not efficient at feeding fine material onto the intertidal areas. Therefore, this risk can be minimised by implementing a strategy which replicates natural processes as far as possible and/or targets individual intertidal areas.

- b) The relevance of the placement locations and their implications for future maintenance. An adverse effect on future maintenance dredging campaign quantities could lead to the requirement to refine placement locations. However, this is not a risk to the overall success of the strategy.
- c) The potential effect of the placements on the estuarine systems benthic ecology and fishery (i.e. increased turbidity, suspended sediment levels and potentially settlement). However, to date, no adverse effects have been reported. In addition, the quantity of sediment replacement proposed is within the natural variability of the system. Moreover, a strategy for the avoidance of adverse impact has been developed (see Section 2.3.3), accompanied by an appropriate monitoring programme (see Section 4).

2. Regarding the uncertainties associated with model prediction, it is accepted that model predictions have been used in conjunction with observed changes in the estuary system and detailed information on dredging, disposal and sediment replacement operations to identify the nature of the future requirement for sediment replacement in the system. In this regard it has already been demonstrated (Posford Haskoning and HR Wallingford, 2003) that the observed rates of accumulation of sediment in the Harbour are less than those used for the modelling presented in the Tidal Works ES and, therefore, the requirement for future annual sediment replacement is unlikely to be greater than 500,000 dry tonnes per year. However, if the actual amount accumulating proves to be greater than this, then the mitigation strategy will be adjusted accordingly.

### **2.3.5 Management of the mitigation strategy**

1. The key to managing the risk is the adoption of a flexible approach to managing the sediment return; through monitoring, reporting, dialogue with the Regulatory and Advisory Group and response. Such an approach recognises the inherent variability of the estuarine system and the obvious uncertainty associated with the exact prediction of the functioning of a natural system. In light of such inherent variability and uncertainty, the HHA commit to adapting the mitigation strategy as appropriate in order that the implications of the proposed Bathside Bay Container Terminal development are effectively mitigated.

2. The strategy for achieving this is described in Section 2.3.1. In summary, the quantity of material to be returned to the system would be determined according to the amount of material deposited within the approaches and berths over the preceding period. The longer-term trends of input of material to the estuary system will be reviewed annually and, if necessary, this information would be used to revise the mitigation strategy. Effects on the benthic resource, the fishery and feeding birds will be monitored through the HHA's on-going monitoring programme, the results of which will be presented to the Regulatory and Advisory Group.

3. If the monitoring programme highlights concerns, then it is proposed that - with the agreement of the Regulatory and Advisory Group - the mitigation strategy would be altered. This might simply involve the relocation of a particular activity to avoid an adverse impact. Indeed that is the current situation with water column recharge at Holbrook Bay, which has recently ceased because of concerns over the nearby native Oyster beds. Alternatively, greater emphasis on more targeted placements at a lower overall level of return might be advocated. That would be the replacement of a lower quantity of material but in the areas where erosion is known to be most rapid and further upstream, where the efficiency of placement is known to be more effective; provided that the rates of input can be proportioned relative to the natural fluxes.

4. If targeted placements are not sufficient to deliver the required mitigation, then direct placement of maintenance dredged sediment onto eroded intertidals of the Stour and Orwell Estuaries SPA would be considered. Any requirement for direct placement would only utilise a small proportion of the material accumulating in the Harbour area. It should be noted that such measures would require additional consents.

### **3 PROPOSALS FOR COMPENSATORY MEASURES**

#### **3.1 INTRODUCTION**

1. As described in Section 1.3 above, the direct impact associated with the development of the Bathside Bay Container Terminal on 69ha of intertidal habitat cannot be mitigated. Furthermore, the predicted impact is likely to have an adverse effect on the integrity of the Stour and Orwell Estuaries SPA and pSPA. Assuming that the competent authority (in this case the DfT (Ports Division)) agrees with this conclusion, Regulation 49(1) of the Habitats Regulations would apply. Regulation 49(1) states that:

*"If..., there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest..., the competent authority may agree to the plan or project notwithstanding a negative assessment of the implications for the site"*

2. Following consideration of the overriding public interest (OPI) case, the project may be consented despite the negative findings of the appropriate assessment. Should this be the case, Regulation 53 would apply, which states that:

*"...the Secretary of State shall secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected".*

#### **3.2 OBJECTIVES OF COMPENSATION**

##### **3.2.1 Proposals for compensation**

1. The objectives for the compensatory measures are described in Sections 3.2.2 and 3.2.3 below. Due to the nature of the habitat that would be lost at Bathside Bay, and the extent of this loss, the most appropriate approach to creating compensatory habitat is another area of intertidal habitat. The best method to create this is considered to be the managed realignment of coastal flood defences.

2. HPUK has identified a suitable site (having an area of 138ha) for undertaking managed realignment on the northern shore of the Walton Backwaters near a village called Little Oakley. An EIA was carried out resulting in an ES (Posford Haskoning, 2003b, hereafter referred to as the 'Little Oakley ES') prepared to accompany the planning application for the realignment. The application and the Little Oakley ES detail the proposal, its objectives, potential environmental impacts and mitigation measures.

3. The proposed site was considered to be the best alternative for creating compensatory measures due to its size, its relative proximity to the impacted site, its relatively low disturbance levels (and the potential to be protected from disturbance) and its outer estuarine location.

### 3.2.2 Primary objective

1. The high level objective for the proposed managed realignment scheme is to ensure the overall coherence of *Natura 2000* (the European-wide network of sites designated as SPAs and/or SACs) through the provision of compensatory measures of SPA quality in light of the predicted adverse effect of the Bathside Bay Container Terminal on the integrity of the Stour and Orwell Estuaries SPA and pSPA.
2. It will be an objective of the scheme that within 15 years of the breach of the existing seawalls, the site is of sufficient quality to qualify for designation as an extension to the Hamford Water SPA and Ramsar site. This should be achieved by creating the range and extent of the various habitats necessary to be capable of supporting equivalent waterbird populations to those that characterise Bathside Bay in terms of total population levels and equivalent numbers of those species for which the Bay is of particular importance.
3. A further objective of the scheme implementation and management is to minimise impacts on adjacent areas of SPA, including those owned by Little Oakley and District Wildfowlers Association.
4. HPUK will use reasonable endeavours to ensure the compensatory measures have been implemented at the time damage occurs to the Stour and Orwell Estuaries SPA and pSPA as a result of construction of the Bathside Bay Container Terminal.

### 3.2.3 Detailed objectives

1. Based on the nature of the predicted effects of the Bathside Bay Container Terminal and through consultation with various nature conservation bodies (e.g. English Nature, the Environment Agency, the RSPB and the Essex Wildlife Trust) habitat objectives for the proposed realignment scheme were developed (Table 3). Most of these habitat objectives are intended to compensate for the predicted effects of the Bathside Bay Container Terminal, while others are intended to off-set the effects of realignment on the nature conservation interest of Little Oakley.
2. The objective of the habitat compensation scheme is to support, indefinitely, an appropriate assemblage of roosting and feeding waterbirds. The targets against which the success of the compensation scheme will be assessed are based on the available data for Bathside Bay and suggest that the site should be capable of (at least) supporting the following:
  - An assemblage of roosting waterbirds, comprising, on a 5-year mean peak basis, at least 2,240 wildfowl and waders including, in particular (*see below*), oystercatcher, ringed plover, knot, dunlin, dark bellied Brent goose, shelduck and turnstone in similar proportions to those supported by Bathside Bay during the winters of 1995/96 to 1999/00<sup>1</sup>; and



- An assemblage of feeding waterbirds, comprising on a 5-year mean peak basis at least 1,560 wildfowl and waders including, in particular (*see below*), ringed plover, dark-bellied Brent goose, shelduck, mallard and knot in similar proportions to those supported by Bathside Bay during the winters of 2000/01 to 2003/04.

*Key species have been identified on the basis that (see Tables A1 and A5 (feeding) and A2 and A7 (roosting) of Appendix 1):*

1. *they are listed as SPA qualifying interests either in their own right or as part of an overall assemblage;*
2. *Bathside Bay supports 5% or more of the Stour and Orwell estuaries' population; and*
3. *the mean peak for that species on Bathside Bay is 50 or more birds.*

3. Should the scheme progress, the targets derived from the Bathside Bay counts (see Section 1.3(6) and Appendix 1) may be modified, on the advice of the Regulatory and Advisory Group, as more recent data becomes available. 'Results' for Little Oakley will be based on count data as it arises, until such a time as 5 years of data is held; after which time a 5-year rolling mean will be used to judge the success of the site.

4. In addition, the proposed realignment site should, where practicable, deliver the necessary habitat characteristics that provide the opportunity for the full assemblage of waterbirds present within Bathside Bay to feed and roost within the site, that is:

- a) Mudflats – should be similar, where technically achievable, to those at Bathside Bay in terms of i) gradient, ii) substrate type and iii) elevation;
- b) Shallow water – the site has been located and will be designed to promote shallow water characteristics during tidal incursion and excursion;
- c) Shelter – the remnant seawalls will be retained for protection (and access restricted); and
- d) Limited disturbance – through the relocation of existing public rights of way to the rear of the new seawalls and the prevention of wildfowling on or over the intertidal areas created.

5. As shown in Table 3, the aim is to create a mixture of habitat types within the managed realignment site. Furthermore, the habitat types that would develop within the site are the same as those present within Bathside Bay. However, the proportion of the various habitat types present would be different (i.e. the realignment site would have a greater proportion of saltmarsh to mudflat than exists at Bathside Bay). This is a deliberate design feature of the scheme, based on discussions with English Nature and the RSPB, as it is considered that mudflat backed by saltmarsh is preferable (from an ecological viewpoint) to mudflat that is backed by seawalls. This is because such a configuration replicates a healthy, natural estuarine system and reduces the risk of disturbance.

6. As described above, it is concluded that the realignment site would, on the basis of the various habitats that would be created, be able to support a similar assemblage of waterbirds, in terms of assemblage size and relative proportions of different key species, as currently utilises Bathside Bay.

**Table 3 Objectives for habitat creation**

OBJECTIVE	HABITAT CREATION TARGET
<b>EFFECT ON THE STOUR AND ORWELL ESTUARIES SPA AND RAMSAR SITE</b>	
To compensate for the predicted adverse effect on integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of 66.2ha of intertidal mudflat at Bathside Bay and 2.7ha throughout the estuarine system (due to the effect on tidal range) by providing alternative feeding habitat for the waterbirds displaced as a consequences of the Bathside Bay Container Terminal	Creation of at least 69ha of intertidal mudflat
To compensate for the predicted adverse effect on integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of 2.8ha of saltmarsh at Bathside Bay and to create a sustainable mudflat/saltmarsh system by providing alternative roosting and feeding habitat for the waterbirds displaced as a consequence of the Bathside Bay Container Terminal	Creation of between 10ha and 20ha of intertidal saltmarsh
To compensate for the predicted adverse effect on integrity of the Stour and Orwell Estuaries SPA and pSPA arising from the loss of approximately 5ha of sand/shingle areas within Bathside Bay by providing alternative roosting habitat for the waterbirds displaced as a consequence of the Bathside Bay Container Terminal	Creation of up to 5ha of sand and shingle habitat within the site
<b>EFFECT ON THE HAMFORD WATER SPA AND RAMSAR SITE</b>	
To offset any loss (due to inundation) of brackish/freshwater drains and associated communities <sup>1</sup>	Creation of 5ha of brackish/freshwater habitat outside the site
To offset any loss (due to inundation) of existing habitat for certain terrestrial and brackish water species	Creation of seawall, borrow dyke and terrestrial habitat to provide suitable conditions for those species affected by the realignment

<sup>1</sup> Method statements (through an Ecological Mitigation Strategy) designed to protect water voles, badgers and reptiles during the construction phase are being developed separately from this agreement and, it is proposed, should be imposed by condition attached to the planning permission for the Little Oakley Managed Realignment.

### 3.3 MANAGED REALIGNMENT AT LITTLE OAKLEY, HAMFORD WATER

1. This section describes the proposals to create compensatory habitat through managed realignment at Little Oakley, Hamford Water (see Figure 4). Full details of the proposals are provided in Chapter 2 of the Little Oakley ES (Posford Haskoning, 2003b).

#### 3.3.1 Site description

1. The proposed realignment site is located close to the village of Little Oakley on the northern shore of the Walton Backwaters inlet. The site comprises a low-lying area of land which is crossed by a relict creek delineated by counter walls. To the north-west, the land rises towards Little Oakley Hall. To the south, the realignment site is delineated by a seawall beyond which are the mudflats and saltmarshes of the Walton Backwaters. Hamford Water is the navigation channel at the mouth of the Walton Backwaters and is adjacent to the proposed realignment site.

2. HPUK has submitted an application for planning permission for the creation of compensatory intertidal habitat and the site described in paragraph 1 above. In addition, an application has been made under section 34 of the Coast Protection Act 1949 for breaching of the seawall.

#### 3.3.2 Detail of the managed realignment proposals

1. The scheme includes the following works (full details are provided in the Little Oakley ES):

- Stripping of vegetation;
- Removal of topsoil from selected areas of the site;
- Construction of a seawall and consequently a borrow dyke that would form part of the land drainage system;
- Some localised deepening and widening of the former creek bed within the site;
- Construction of wave breaks (inside the site) immediately adjacent to the breach;
- Diversion of the footpath around the perimeter of the realignment site;
- Pumping of dredged mud into the realignment site;
- Placement of dredged sand and shingle; and
- Breaching of the seawall.

2. The aim of the works associated with the managed realignment is to create a mosaic of different habitat types within the realignment site comprising intertidal mudflat, a transitional area between mudflat and saltmarsh, saltmarsh, sand and shingle and freshwater and brackish water habitat.

3. The initial distribution of areas of different habitat types proposed to be created within the site as a result of undertaking managed realignment is set out in Table 4. The objectives for the compensation site are also reproduced in the right-hand column.

**FIGURE 4**

4. Over time, the realignment site would act, to some extent, as a sink for fine sediment until an equilibrium state is achieved. This would increase the area of saltmarsh habitat. Furthermore, other areas are likely to scour, such as parts of the creek and other drainage features, and internal wave energy may erode some elevated areas. An estimate of the future distribution of areas and levels within the site (approximately 20 years into the future) is provided in Table 5. This evolution is described further in Chapter 4 of the Little Oakley ES.

5. It should be noted that the figures in Table 5 are approximate. This is because it is not possible to precisely define the future boundary between the intertidal mudflat and saltmarsh habitats within the site. However, it is predicted that the site would provide between 75 and 95ha of mudflat below +2mOD and between 15 and 25ha of saltmarsh.

**Table 4 Areas of habitat within the Little Oakley realignment site post-construction**

Habitat	Level (m OD)	Approximate area (ha)	Objective for compensation (ha)
Intertidal mudflat (including intertidal creek)	Below +1.5	76	Minimum of 69
Intertidal mudflat/saltmarsh transition	From +1.5 to +2.0	19	
Saltmarsh	From +2.0 to +2.4	10	10 to 20
Sand and shingle	Above +2.4	5	up to 5
Wave breaks	Above +2.4	2	N/A
Topsoil storage area	N/A	7	N/A
New borrow dyke system	N/A	7	Up to 5
Other (i.e. footpath, seawall and terrestrial areas)	N/A	12	N/A
<b>TOTAL</b>	-	<b>138</b>	-

6. In the short term, based on evidence gathered from monitoring undertaken in connection with other managed realignment schemes (in particular the ongoing monitoring of the Trimley Marshes managed realignment site in the Orwell Estuary), invertebrate colonisation of the intertidal mudflats is expected to occur rapidly. Within the first year of monitoring, a rapid increase in the total number of taxa, total abundance and biomass has been observed at the Trimley Marshes site. Furthermore, pioneer saltmarsh was observed to have colonised where the elevation of the intertidal was appropriate for marsh development. In terms of invertebrate colonisation and saltmarsh development, the Trimley Marshes site is expected to be comparable to the proposed Little Oakley realignment site; because maintenance dredgings will be pumped into the site following breaching of the seawall and because its elevation is suitable for saltmarsh development over time. It is, however, recognised that it may take a longer period of time (possibly to between 5 and 10 years) for the invertebrate community structure to

fully develop to one comparable of a typical healthy mudflat which would be expected to support larger-bodied, longer-lived species. Further, it is acknowledged that monitoring of the development of the invertebrate community over time is a critical factor in gauging the success of the realignment site and the physical factors that influence the development of the invertebrate community within the site.

**Table 5 Predicted areas of habitat within the realignment site during the operational phase (i.e. an 'at equilibrium' state)**

Habitat	Level (m OD)	Approximate area (ha)	Objective for compensation (ha)
Intertidal mudflat (including intertidal creek)	From 0.0 to +1.5	70 to 80	Minimum of 69
Intertidal mudflat/saltmarsh transition	From +1.5 to +2.0	5 to 15	
Saltmarsh	From +2.0 to +2.4	15 to 25	10 to 20
Sand and shingle	Above +2.4	5	up to 5
Wave breaks	Above +2.4	2	N/A
Topsoil storage area	N/A	7	N/A
New borrow dyke system	N/A	7	N/A
Other (i.e. footpath, seawall and terrestrial areas)	N/A	12	N/A

7. The proposed realignment site will only be implemented if the following conditions are met:

- Consent is obtained for the Bathside Bay Container Terminal and construction works commence<sup>1</sup> at Bathside Bay;
- The proposals for the managed realignment scheme are considered to be suitable by the Secretaries of State in terms of providing the required compensation for the Bathside Bay Container Terminal; and
- Consents are obtained for the managed realignment scheme.

8. Assuming that these conditions are met, it is not possible to state definitively when the seawall at Little Oakley would be breached (and, therefore, when intertidal habitat would begin to be created) in relation to the commencement of construction at Bathside Bay (it should be noted that commencement of construction means at award of the construction contract). This is because it will be dependant on the time of year that consent for the Bathside Bay Container Terminal is achieved and the fact that work on

<sup>1</sup> The commencement of construction work in this instance is defined as being at the time when marine construction work commences on the small boat harbour, this being the first item of work associated with the Bathside Bay Container Terminal

the realignment site can only take place at certain times of the year (i.e. between, depending on ground conditions, about March and November). Further, it is assumed that construction at Bathside Bay would commence immediately following receipt of the necessary consents (see Section 3.3.3 below). However, should this not be the case, the same programming assumptions would apply.

9. Therefore, in order to estimate the maximum and minimum period of time between the commencement of construction work at Bathside Bay and the breach of the seawall at Little Oakley it is necessary to consider two scenarios, namely:

- A – construction at Bathside Bay commences at the beginning of July of year 1 and, therefore, there is insufficient time in year 1 for work to be undertaken at Little Oakley prior to the winter (i.e. November); and
- B – construction at Bathside Bay commences at the beginning of a summer season where work at Little Oakley can commence at the same time (i.e. April).

10. As concluded in Section 3.3.4, the maximum period of time is estimated to be 27 months (under Scenario A) and the minimum period of time is estimated to be 18 months (under Scenario B). This is illustrated in the programme shown on Figure 5.

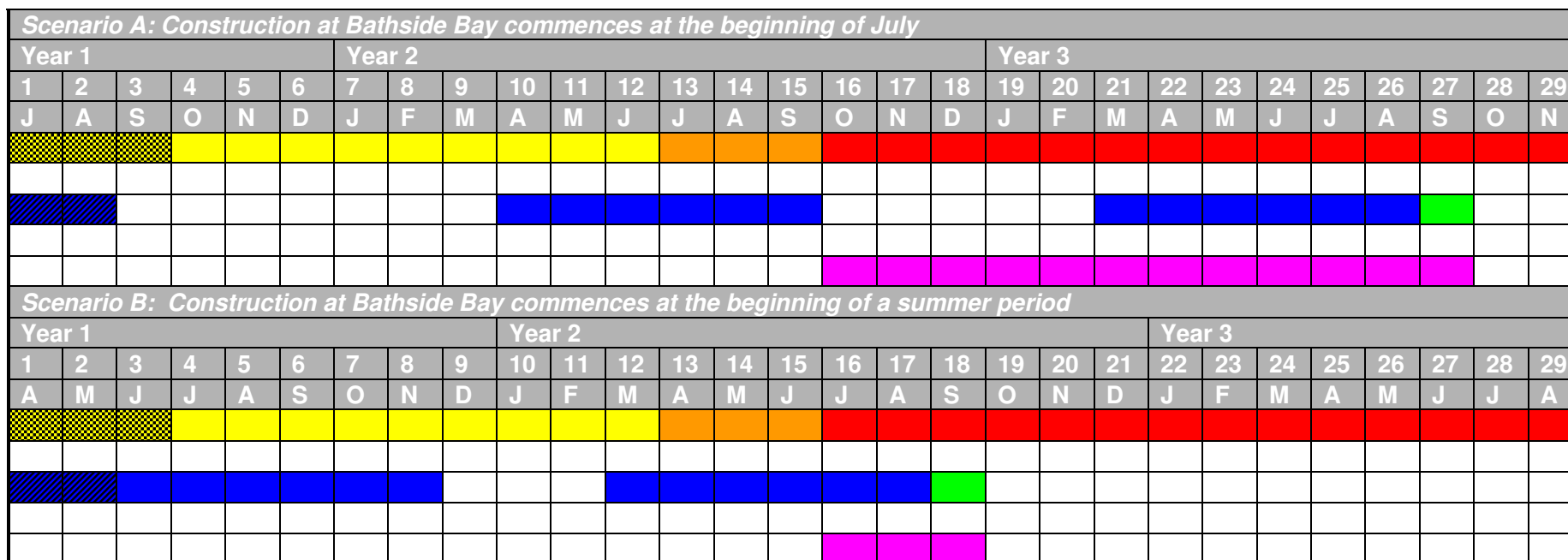
### **3.3.3 Implications for the Stour and Orwell Estuaries SPA and pSPA**

1. The relative timing of the commencement of construction work at Bathside Bay and the breaching of the seawall at Little Oakley to create intertidal habitat has important implications for nature conservation. In order to explore these implications it is necessary to consider the timing of the various construction activities at Bathside Bay and the consequences of these activities for the Stour and Orwell Estuaries SPA and pSPA in relation to the timing of the breaching of the seawall.

2. The first aspect of the construction work to be undertaken in Bathside Bay would be the creation of the small boat harbour in the Gas House Creek area. This work is scheduled to take between 9 and 12 months to complete (see Figure 5). With respect to direct impact on estuarine habitats, the creation of the small boat harbour comprises the dredging of approximately 4ha of intertidal area in the north-eastern region of Bathside Bay (see Figure 1). Throughout this 9 to 12 month period, no other construction work would take place within Bathside Bay, as the small boat harbour needs to be completed prior to construction of the Bathside Bay Container Terminal.

3. Given the above, it is concluded that although feeding habitat for waterbirds would be lost within the Gas House Creek area, the remainder of Bathside Bay would be available for feeding and roosting waterbirds for a period of up to 12 months following the commencement of construction work.

**Figure 5 Illustration of the relative timing of commencement of works at Bathside Bay and breaching of the seawall at Little Oakley**



[Cross-hatched]	Lead in time prior to construction of small boat harbour (design)
[Yellow]	Construction of small boats harbour at Bathside Bay
[Orange]	Stripping of silts and commencement of piling at Bathside Bay
[Red]	Reclamation work at Bathside Bay
[Blue diagonal]	Lead-in time prior to construction of Little Oakley Managed Realignment (design)
[Blue]	Construction of Little Oakley Managed Realignment
[Green]	Breaching of the seawall at the Little Oakley Managed Realignment site
[Magenta]	Period between commencement of reclamation and breaching of the seawall



4. Following completion of the small boat harbour, the construction of the Bathside Bay Container Terminal would commence. This would comprise the stripping of surface muds along the proposed quay line for a distance of up to 35m behind this line followed by the commencement of piling works; this is expected to last for a period of about 3 months (see Figure 5). Subsequently, piling would commence in the western part of Bathside Bay, adjacent to Parkeston Quay, and progress from west to east. The duration of piling is expected to be approximately 12 months. Therefore, the gradual progression of the piling along the proposed quay line would have the effect of partially 'isolating' Bathside Bay and acting as a barrier to usage of Bathside Bay by feeding birds. However, the effect will be minimised by commencing piling from one end of Bathside Bay and progressing to the other end, rather than commencing from both ends.

5. Both the construction of the small boat harbour and the stripping of surface muds along the proposed quay line represent further disturbance to feeding and roosting waterfowl through either noise and movement of plant or direct loss of feeding area. However, reclamation work would not commence until the completion of the stripping of the surface muds. During this period the remainder of Bathside Bay would not be directly impacted.

6. Therefore, there will be a period of up to 12 months following the commencement of construction works on the small boat harbour when the intertidal habitat within Bathside Bay would be largely unaffected by construction and a further period of up to 3 months when construction work would be limited to the northern (riverwards) strip of Bathside Bay (see Figure 5).

7. Throughout this 15 month period (and particularly during the initial 12 months), it is expected that Bathside Bay will continue to provide a significant feeding and roosting habitat for waterbirds. However, it is acknowledged that there would be some displacement of waterbirds to other feeding and roosting habitats within the Stour and Orwell estuaries. It is not expected that a significant effect on waterbird populations of the Stour and Orwell Estuaries SPA and pSPA would arise and the remainder of the estuarine system would be expected to be able to support any displaced birds, albeit the pressure on the remainder of the system would be increased for this period.

8. Subsequent to the 15 month period described above, reclamation work within Bathside Bay would commence (see Figure 5). It is at this point that, although reclamation of Bathside Bay would be a gradual process, the intertidal habitats would be effectively lost and unavailable for feeding or roosting waterbirds.

### 3.3.4 Conclusions

1. In light of the above, it is possible to assess the implications of the relative timing of the commencement of construction works at Bathside Bay and the breaching of the seawall at Little Oakley on the Stour and Orwell Estuaries SPA and pSPA. Scenario A is based on the prediction that the Little Oakley Managed Realignment would require two summer working periods (March/April to September) for the site to be prepared and the seawall breached and assumes that construction work commences at Bathside Bay in July. Under this scenario, the period between the commencement of reclamation of

intertidal habitat at Bathside Bay and the breach of the seawall at Little Oakley would be a maximum of 12 months and could span one winter period (see Figure 5). If, however, construction at Bathside Bay commenced in April, work at the realignment site could commence at the same time (Scenario B). In this scenario, the time between the loss of Bathside Bay and the breaching of the seawall at Little Oakley would be reduced to 3 months (also outlined in Figure 5).

2. In either case it is apparent that during the time of year when there is greatest pressure on waterbird survival and on the food resources of the system (i.e. during periods of severe weather), the Stour and Orwell Estuaries SPA and pSPA would be under stress. At other times, the estuary system would have more capacity to accommodate the displaced birds. However, this effect would persist for the period between the loss of the intertidal resource at Bathside Bay and the establishment of a functional intertidal habitat of an equivalent value to feeding and roosting birds at Little Oakley.

3. HPUK will therefore use reasonable endeavours to breach the seawall at Little Oakley no later than 27 months after commencement of the Bathside Bay Tidal Works.

4. In the event that there is a legitimate and unavoidable delay in meeting the commitment to breach the seawall at Little Oakley by the time set out in the preceding paragraph, then HPUK agree to use all reasonable endeavours to implement the breach as soon as reasonably practicable thereafter.

5. Mitigation measures will be taken by HPUK and the HHA during periods of severe weather<sup>1</sup> from the initiation of the construction phase at Bathside Bay until the Regulatory and Advisory Group agrees that substantive achievement of the objectives of the compensation site has occurred. These measures include:

- cessation of maintenance dredging activity within 100m of intertidal habitat within the Stour and Orwell Estuaries SPA and pSPA; and
- using reasonable endeavours to negotiate the cessation of the use of gas guns within 100m of the Stour and Orwell estuary.

6. It will be incumbent on the members of the Group to decide, as part of the annual review process, whether or not the measures should continue (taking account of the latest information on the quality of the compensation habitat).

7. Based on the timing proposed for the construction works at Bathside Bay and the breach at Little Oakley, as well as the agreed mitigation measures, it is concluded that any stress placed on the Stour and Orwell Estuary SPA/proposed SPA would be limited as far as possible.

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<sup>1</sup> As defined by the published Joint Nature Conservation Committee (JNCC) criteria which trigger a voluntary cessation of wildfowling or would do so if it were still the wildfowling season

## 4 MONITORING

### 4.1 OBJECTIVES FOR MONITORING THE SUCCESS OF MITIGATION

1. The implementation of proposals for sediment replacement set out in Section 2 of this document will be monitored as part of the ongoing monitoring commitment of the HHA in the Stour and Orwell estuaries (PDE, 1998). Details of the objectives of this monitoring, updated in light of ongoing research and data collection since 1998, are provided below. The monitoring was originally developed in order to ascertain whether an adverse effect on site integrity would arise from deepening the approach channel to the Haven Ports in 1998/2000 and extended to take account of the Trinity III Terminal (Phase 2) Extension. In line with this approach, it is proposed to further extend the ongoing monitoring programme to take account of the proposed Bathside Bay Container Terminal and channel deepening.

2. The objectives of the existing monitoring programme are outlined below:

- 1) To continue the work begun in 1993 to increase understanding of the processes operating within the Stour and Orwell estuaries;
- 2) To define those aspects of system change that relate to port development;
- 3) To provide sediment budgets that will enable the refinement of mitigating actions, if required;
- 4) To determine which mitigation methods are the most efficient;
- 5) To better define the assemblage of intertidal habitats that provide for the effective geomorphological functioning of the estuaries;
- 6) To better understand the relationship between morphology, habitat and the populations and distribution of bird species for which the Stour and Orwell Estuaries SPA has been designated;
- 7) To measure the effect of the works on the estuarine system (including the fishery);
- 8) To fully monitor the effect and thereby success of mitigation, that is, the extent to which its objectives are being met;
- 9) To ensure that the mitigation measures do not cause adverse environmental impact;
- 10) To measure change in habitat distribution;
- 11) To monitor the position (status) of the SPA and pSPA relative to regional and national trends for the designated species.

3. The extent of success is determined through regular review of the results of monitoring (see Section 5).

## 4.2 PROPOSALS FOR MONITORING MITIGATION MEASURES

1. The monitoring considered to be necessary with respect to the Bathside Bay Container Terminal and its mitigation proposals is encompassed within the ongoing monitoring programme undertaken by the HHA in relation to the 1998/2000 Approach Channel Deepening (PDE, 1998). Details of the results of this monitoring are provided in Chapter 12 of the *Bathside Bay Container Port Planning Applications ES* (Posford Haskoning, 2003a) and through the HHA's annual reports (most recently Posford Haskoning and HR Wallingford, 2003) but, in essence, the programme includes:

- Bathymetric surveys (on a 5 year rolling programme) throughout the Stour and Orwell estuarine system and within Hamford Water (see also Section 4.5.3);
- Estuary-wide topographic surveys of the saltmarsh and monitoring intertidal vegetation (on a 5 year rolling programme);
- Mapping the benthic communities (on a 5 year rolling programme);
- Based on the items above (and, therefore, at intervals of approximately 5 years), habitat mapping;
- Suspended sediment monitoring (up to six monitors are in use at 10 fixed locations - monitors are moved to record various events and operations)<sup>1</sup>;
- Low water overwintering bird counts and the analysis of high water WeBS data for the system<sup>2</sup> (against a historical baseline and in comparison with regional/national trends); and,
- Definition of the fishery (including the seasonal importance and spatial variability of plankton, shellfish, and pelagic and demersal fish).

2. In addition to the above measures, the following monitoring initiatives will be implemented:

- The continued analysis of dredging performance, offshore placement and recycling through analysis and reporting of dredging records. As the dredging regime has been established as a key effect on the estuary regime, the presentation and incorporation of this information into the compliance monitoring regime will be important;

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<sup>1</sup> For this initiative it is proposed that the equipment is deployed to monitor firstly the effects of dredging and reclamation at Bathside Bay and then the effects of breaching and placing maintenance dredged muds into the Little Oakley site. Some of the 10 existing locations will be selected as baseline monitoring points whilst additional locations will be used to quantify any local effects.

<sup>2</sup> Where the methodology for and frequency of counts should be kept under review, in order to ensure that they are fit for purpose.

- Recording of dredging activities will continue with annual reporting of volumes of sedimentation (as measured by bathymetric survey), volumes dredged, estimates of mass (dredged and *in situ*) and volumes disturbed. The volumes (and estimates of mass) placed at Inner Gabbard or used in the sediment replacement programme will also be reported; and
- Targeted monitoring of dissolved oxygen concentrations throughout the water column during a water column recharge campaign.

3. As well as the estuary-wide monitoring recommended above, further targeted monitoring (at a frequency to be determined via the Regulatory and Advisory Group in prior to the commencement of the reclamation works at Bathside Bay) will measure the local effects of the proposed Bathside Bay Container Terminal and approach channel deepening, namely:

- Topographic and vegetation (saltmarsh) surveys of Erwarton Bay and the Shotley foreshore;
- Targeted bed elevation monitoring on the intertidal at Erwarton Bay (e.g. a short term intensive monitoring survey for a period of 1 to 2 months) to evaluate the benefit of water column recharge and to monitor the detail of intertidal processes. The short term monitoring will be supplemented by the installation, at agreed sites, of permanent ('low tech') bench marks that will enable long term measurements of bed level change (e.g. monthly over a period of 3 years) to be obtained;
- A targeted study to assess the potential for smothering to occur and the implications of such smothering during sediment replacement. This will include suspended sediment monitoring together with sediment and biological sampling, pre- and post-replacement. It will cover three separate replacement sites (and appropriate reference sites), at locations to be agreed, to assess the different behaviour at these locations and will be carried out over different time periods at each site during November to April;
- Monitoring of the clay placement at the Inner Gabbard (East) to identify the initial distribution of clay on the bed after placement and any subsequent movement; and,
- Monitoring of the biological communities at the Inner Gabbard (East).

4. It is relevant to note that the monitoring undertaken by the HHA is an ongoing, extensive programme of research within the estuaries and, therefore, there is a requirement to ensure the compatibility of new monitoring with existing data gathered via the monitoring programme. This will be achieved through the continued management of the programme by the HHA. In this way, a long-term dataset will be developed over time that should incorporate monitoring undertaken by the HHA and other members of the Regulatory and Advisory Group.

5. The monitoring specifically associated with the Bathside Bay Container Terminal and approach channel deepening is to continue for at least 10 years (i.e. following completion of construction) or for as long as is necessary to demonstrate that relevant

initiatives are not having a net adverse effect on the integrity of the Stour and Orwell Estuaries SPA, the pSPA or the Hamford Water SPA. In this case relevant initiatives include the 1998/2000 Approach Channel Deepening, the extension of the Trinity III Terminal and, should it receive consent, the Bathside Bay Container Terminal and approach channel deepening, as well as the subsequent maintenance requirement. The monitoring will also record the effect of these initiatives on fisheries and navigation within the Haven estuary system.

6. Subject to HPUK achieving consents for the development of the Bathside Bay Container Terminal (i.e. in year 1 of the construction phase), a detailed programme of monitoring, including proposed timings and locations, will be prepared and circulated to the Regulatory and Advisory Group for comment and agreement.

### 4.3 OBJECTIVES FOR MONITORING THE SUCCESS OF COMPENSATION

1. If the Secretaries of State require HPUK to carry out the proposed compensation measures (managed realignment at Little Oakley), a dedicated monitoring programme will be implemented as set out below.

2. With respect to ecological status of the realignment site, the objectives of monitoring are to:

- 1) Determine the nature of the changes in the benthic invertebrate populations of the realignment site, primarily to determine its value as a feeding resource for waterbirds;
- 2) Monitor the particle size distribution of the sediments;
- 3) Monitor the development of saltmarsh vegetation;
- 4) Determine the value to and usage by feeding and roosting waterbirds of the realignment site;
- 5) Determine the change in and extent of different habitat types over time; and,
- 6) Monitor the effects of the site on the coastal processes adjacent to the site on the northern shore of Hamford Water, primarily to determine whether or not the realignment has a gross impact on the extent, level or position of the beach structures over time due to predicted interference with littoral drift of sediment.

3. Details of the monitoring proposed in relation to each of the above are provided below.

4. It is proposed that a sub-group of the Regulatory and Advisory Group should be established to review and report to the main group on the monitoring associated with the realignment site. This sub-group can be attended by all members of the Group but specifically will be formatted so that interested non-statutory parties, such as the Little Oakley District and Wildfowlers Association (LODWA), with a local interest can participate practically.

## 4.4 HABITAT DEVELOPMENT MONITORING AT THE REALIGNMENT SITE

1. The following sub-sections outline the monitoring that is proposed with respect to the managed realignment site.

### 4.4.1 Elevation

1. Photographs will be taken at least once a year from a fixed location on the seawall over the realignment site. Photographs will be taken at fixed intervals as the tide floods the site. The level of the tide line can be determined by recording the time that each photograph is taken and recording the tidal height at Harwich. Differences in elevation over time can then be compared between photographs taken at the same point in the tidal cycle between years.

2. In addition to the use of photographic records to demonstrate elevation levels and inundation of the site, it is proposed that the Environment Agency measure elevations along three cross-sections within the site. Initially, these lines will be surveyed twice a year. One of the lines will tie-in with an existing Environment Agency beach profile cross-section (adjacent to the breach). The other two will tie-in with new beach profile lines; the positions of which are to be agreed with the Agency and the Little Oakley Advisory sub-Group.

### 4.4.2 Benthic invertebrate communities

1. The structure of the benthic community will be monitored using cores (11cm diameter) taken to a depth of 15cm. A total of 20 sampling stations would be established. The location of each station would be marked with a labelled stake and the position recorded with GPS. Three replicate cores would be taken from each sampling station (within an area of approximately 2m<sup>2</sup>) giving a total of 60 samples over the whole site, although 2 replicates would be analysed and the third stored to be analysed in the event that there was significant intra-stations variability requiring further investigation.

2. The samples would be taken to the laboratory for analysis within 24 hours of collection, sieved using a 0.5mm mesh and fixed. The infauna would be identified to species level, where possible, and counted. Wet weight biomass (both total biomass and biomass available to feeding waterbirds) will also be estimated by dividing each core sample into the top five centimetres and then the remainder.

3. The benthic communities would be monitored 3 times per year. Sampling will include a late summer sample so that the harvestable crop for birds is assessed and a late winter sample to enable assessment of depletion after the wintering waterbirds have left. Based on the findings of the initial monitoring, it may be necessary to amend the design of the monitoring programme to investigate certain aspects in further detail. The monitoring will continue for a minimum of five years after the breach of the seawall. Monitoring requirements after that date will be reviewed by the Advisory sub-Group.

#### 4.4.3 Particle size distribution

1. Sediment composition plays an important role in benthic community composition. Therefore at each of the 20 stations sampled for community composition, a sample will be taken for particle size analysis. It is proposed that a combination of dry sieving of the samples and pipette analysis (where a significant proportion of the sediment is comprised of very fine material) will be undertaken.
2. At each of the 20 stations, a sample will also be taken for calculation of organic carbon content of the sediment which is a further important parameter that can influence the composition of the invertebrate community.
3. Particle size will be monitored at the same frequency as the benthic invertebrate communities described above.

#### 4.4.4 Vegetation

1. Vegetation (saltmarsh and other coastal vegetation) monitoring will be undertaken using quadrat sampling. Fixed quadrats will be established at regular intervals around the perimeter of the site where, on the basis of topography, vegetation may be expected to colonise, and marked at two diagonal corners using stakes. It is proposed that 30 stations will be established and the position of each one recorded using a GPS. For the first 3 years of monitoring, each quadrat will be 'paired' in order to assess the degree of spatial variability in vegetation distribution (i.e. patchiness). On the basis of the monitoring results, and through discussion within the Advisory sub-Group, it may be deemed appropriate to move to single quadrats following this period. Each quadrat would cover an area of 2m by 2m. Within each quadrat the percentage cover of each species will be recorded and any target notes made. A photograph of each quadrat will be taken. This should be undertaken once a year in late summer, for a minimum of 5 years after the breach of the seawall, monitoring requirements after that date to be reviewed by the Advisory sub-Group.
2. In order to gain an overview of the colonisation of the site by saltmarsh, on each visit notes will be made on the general vegetation cover of species. An estimate will be made of the area covered by vegetation, species lists produced and photographs taken.

#### 4.4.5 Waterbirds

1. The waterbird usage of the site will be monitored by means of low water counts undertaken at monthly intervals throughout the overwintering and passage period (September to May), supplemented where appropriate with through the tide counts. During the counts, all species present would be identified.
2. Low water counts will be undertaken for at least 5 years after the breach of the seawall, monitoring requirements after that date to be determined by the Advisory sub-Group, bearing in mind the need to meet a primary objective that the site should achieve SPA quality within 15 years of the breach taking place.



## 4.5 MONITORING OF POTENTIAL EFFECTS OF THE MANAGED REALIGNMENT

1. As described in the Little Oakley ES, the proposed realignment scheme is predicted to have the potential to interfere with the littoral drift of sandy sediment to the north and south of the proposed breach location. This in turn has the potential to lead to a reduction in the supply of sandy sediment to the beaches (Irlam's Beach to the south-west and Middle Beach/West End Beach to the north-east) that are present to either side of the breach. These beaches serve an important function in protecting the saltmarsh behind them, owned by the Little Oakley District and Wildfowlers Association, from erosion due to tidal currents and waves. In addition, the beaches have an intrinsic nature conservation value in their own right and provide important roosting areas for waders from the Hamford Water SPA and a breeding ground for the little tern, a Birds Directive Annex 1 species for which the Hamford Water SPA has been designated. Therefore, it will be an objective of the compensation scheme to ensure, so far as practicable, that the habitat available to both roosting waterbirds and breeding little terns is not reduced in extent or quality as a consequence of the realignment scheme.

2. Given the above, it is important to monitor the beaches following the creation of the managed realignment site. It is proposed that the most effective way to monitor for gross change is to measure the beach level, extent and position over time. This is best achieved through field survey and collaboration with those presently involved in the management of the area, as described below.

3. Sedimentation in the channel is not expected to occur. However, this will be monitored through the on-going bathymetric survey programme implemented by the HHA.

### 4.5.1 Beach level and profile

1. It is proposed that beach level and profile monitoring will be undertaken as an extension to the existing Environment Agency surveys in the area. Currently there are three survey lines of relevance; one of these runs through the site and the other two are one kilometre either side of this line. The lines are surveyed twice a year and every fifth year a bathymetric survey is undertaken to extend them offshore. It is proposed that a further six lines are added, the positions of which are to be agreed with the Agency and the Advisory sub-Group. It is suggested that the lines are approximately 100m apart along the concrete seawall and then further apart to fill the gap between the existing one kilometre spaced lines.

2. The profile lines will need to be surveyed before construction starts on site. It is proposed that the first survey is undertaken by the Contractor undertaking the works to Environment Agency national survey specifications, but that thereafter the surveys are carried out as an extension to the Environment Agency's Strategic Coastal Monitoring Programme, with HPUK contributing the additional survey costs.

#### 4.5.2 Crest level, position and extent of the beaches

1. The crest level of the beach structures (relative to a datum point consistent with the Agency's profile lines) and their full extent will be determined through levelling surveys. A number of monitoring stations will be established and their levels recorded using real time kinematic (RTK) differential GPS. It is particularly important to monitor levels close to the location of the breach where the greatest change is predicted.
2. The data will be downloaded into a GIS, using an aerial photograph as a backdrop, and data from subsequent surveys will be overlaid to show any temporal changes to the beach structures. Information available from the Little Oakley and District Wildfowlers Association will be incorporated to provide a historical context to the present form of the shoreline.
3. It is recommended that the above surveys are undertaken twice a year for the first 5 years after the breach has occurred, with their frequency and the requirement for future monitoring to be reviewed by the Advisory sub-Group. In addition, it is important that a baseline is established prior to the works beginning.

#### 4.5.3 Bathymetry

1. As described in paragraph 1 of Section 4.2, bathymetric monitoring of the Stour and Orwell estuaries and Hamford Water is undertaken on a 5 year rolling programme in order to monitor the mitigation measures. It is proposed that additional surveys are undertaken of the navigable channels as part of monitoring the effects of the realignment site. Such surveys will comprise a baseline pre-construction survey and one survey per year post-breaching of the seawall for a period of 3 years. Thereafter, the 5 yearly rolling programme of bathymetric survey would take place.
2. In addition, as explained above, every 5 years the Environment Agency's beach profile lines are extended offshore through bathymetric survey. In the future, this will encompass nine survey lines along the coast adjacent to the Little Oakley site.

## **5 FUTURE MANAGEMENT STRATEGY**

### **5.1 MANAGING THE SEDIMENT REPLACEMENT PROGRAMME**

1. It is clear that the sediment replacement programme should be managed acknowledging the variability inherent in the functioning of the natural system, as well as in such a way as to avoid any adverse effects on the habitats and ecology of the Stour and Orwell estuaries. This is particularly relevant in the context of the fisheries resource of the system and the Stour and Orwell Estuaries SPA.

2. Proposals for achieving this are set out in Section 2.3. In essence, however, through annual reporting and the Regulatory and Advisory Group (see Sections 1.2 and 5.5), a mechanism is in place to allow any changes to be made where they are determined to be necessary, appropriate and practicable.

### **5.2 MANAGEMENT OF THE REALIGNMENT SITE**

1. With respect to the management of the future development of the habitats within the realignment site, the overall aim is to minimise intervention as far as possible.

2. However, it will be necessary to maintain the existing concrete seawall and the armoured wave breaks adjacent to the breach. Furthermore, there will be a requirement to inspect the new seawall and the inner face of the existing seawall to ensure that they are not being degraded due to internally generated waves.

3. A range of other management measures will need to be implemented around the site such as grass cutting and maintenance of the depth of the borrow dyke system to ensure that adequate drainage is maintained throughout the operational phase. The responsibility for maintenance measures will be borne by HPUK.

4. There will be no wildfowling on or over the realignment site (to ensure this HPUK own the shooting rights that exist and will not allow them to be acted upon). Human disturbance to the realignment site will be further minimised through the diversion of the public footpath (that currently runs along the top of the existing seawall) to a lower level behind the new seawall around the rear of the realignment site.

### **5.3 MANAGEMENT OF THE ADJACENT FORESHORE**

1. Under the existing situation, in the absence of a breach through the seawall, it is predicted that the beaches outside and adjacent to the realignment site will gradually erode, leading to a reduction in their ecological value and diminishing their ability to protect the saltmarsh behind from erosion. Historically, erosion of the beach structures has occurred and the beaches have indirectly benefited as material derived from the 1999 beneficial use scheme at Foulton Hall Point (75,000m<sup>3</sup> of sand and gravel) migrated to the north-east and south-west.

2. Importantly one of the objectives of the Foulton Hall Point scheme was to protect the toe of the existing concrete seawall. The scheme achieved this, albeit the protection is now diminished. Thus protecting the seawall with suitable material will also lead to feeding material to the beaches either side of the seawall.

3. It is proposed that, as part of the construction process for Little Oakley, a nourishment of the foreshore either side of the breach is undertaken to improve protection to the toe of the seawall and to provide a source of material to feed to the adjacent beaches. Consequently, a consideration of the detailed design of the breach configuration will be whether to initially place sandy material inside the site adjacent to the breach or whether to anticipate a degree of infill from the material present on the foreshore. If material accumulates within the site it may be practical to recycle some of this material.

4. Following placement, regular surveys of the foreshore levels will be undertaken to establish the degree of protection to the toe of the seawall and the beach in front of the saltmarsh. Should it be determined that the protection has been significantly reduced over a length of the wall (where this is proposed as the 'trigger' for intervention), then HPUK will undertake a further nourishment of the foreshore.

5. The volume of the first nourishment will be determined through consultation with the Regulatory and Advisory Group but it is envisaged that a similar scale of placement to the Foulton Hall Point scheme is likely to be appropriate. The 'trigger' level is also to be agreed with the Regulatory and Advisory Group. An option is that it is initially set as a level which would represent returning to the pre-nourishment levels adjacent to the seawall, subject to the toe of the seawall not being exposed or the integrity of the saltmarsh not being threatened prior to construction (in which case a higher level would be required).

6. It is not proposed that any further baseline data is collected to inform this management approach or the trigger levels. The ongoing surveys by the Environment Agency will provide a useful historical context regarding change in this area and it is proposed that these surveys are extended to provide the quantitative basis for management of the area after consent has been given (see Section 4.5.1). HPUK will meet the additional cost of extending the ongoing Environment Agency surveys.

7. Surveillance monitoring of the beaches and marshes either side of the site will be undertaken by the HHA (on behalf of HPUK) and members of the Regulatory and Advisory Group. This information will be used, in conjunction with the experience of the 1999 Foulton Hall Point placement, to refine future nourishment of the site. For example, nourishment could be of sands or of sands and gravels, and different timings and volumes of these materials might be required to produce different benefits to the adjacent areas. Feedback from the surveillance monitoring will provide the basis for refining future placements and optimising protection to the adjacent marshes. In time, it may also provide a basis for refining the trigger levels.

8. The nature of any placement (i.e. volume, timing and location) would be agreed through the Advisory sub-Group concerned with the future management of Little Oakley.

## 5.4 COMMITMENT TO THE MONITORING STRATEGY

### 5.4.1 Introduction

1. The actions relating to compensation, mitigation and monitoring outlined in this Agreement will be managed by the HHA who will act as agents to HPUK.
2. HPUK and the HHA will undertake to minimise the risk associated with compensation and mitigation. If the package fails to achieve its objectives, or part thereof, HPUK and the HHA will take reasonable steps to adjust the mitigation and compensation in order to meet objectives set out in this document.

### 5.4.2 Ensuring success

1. As stated in Section 3.2.2, the high level objective of the managed realignment scheme is to provide compensatory habitat of SPA quality; that is, the realignment site should qualify for designation as an extension to the Hamford Water SPA and Ramsar site within 15 years. A further objective is to minimise impacts on the adjacent areas of SPA. Detailed habitat objectives are defined in Section 3.2.3, although it is acknowledged that the ultimate criteria for the success or failure of the managed realignment scheme, in terms of whether or not it is of sufficient quality to be proposed for designation, has to be based on the waterbird assemblage that it supports.
2. The objectives for monitoring the managed realignment scheme are set out in Section 4.3 and Section 4.4 provides details of the proposed approach to monitoring for each parameter included in the monitoring programme. In order to define whether or not the realignment site is progressing towards achieving the high level objective set out in Section 3.2.2, it is valuable to define a series of targets over certain timescales for each strand of the monitoring programme. These targets can be viewed as 'interim' targets intended to inform decisions as to whether specific actions need to be taken in order to minimise the risk of failing to meet the high level target for the realignment scheme.
3. Two categories of 'interim' targets for the managed realignment site can be usefully defined: those relating to the physical habitats that are expected to develop within the realignment site and those relating to the biological communities. The former heavily influences the latter and, in this respect, the two sets of targets are interlinked. However, in the short term (say between the creation of the site and year 5) it is most appropriate to assess the success or otherwise of the scheme against 'physical habitat targets' which can provide an early indication (from year 1) as to whether or not the site is likely to provide the necessary habitat characteristics for the development of 'desired' biological communities (and use by the waterbird assemblage) at a later date.
4. Although 'biological targets' can be defined for the short term, there is more uncertainty in defining success based on such targets over this timescale. For example, in the first 1 to 2 years following the creation of the realignment scheme, saltmarsh would not be expected to develop. It is for this reason that it is more appropriate to monitor whether the physical conditions are appropriate for the development of saltmarsh in the future. Nevertheless, it is also important to attempt to define interim

targets for biological communities, as these relate to habitat quality rather than simply habitat area.

*Interim targets for physical habitats*

5. Tables 4 and 5 (above) define the predicted areas of habitat within the realignment site for the post-construction period (i.e. the short term) and for the equilibrium state (i.e. the medium/long term, which could be considered as being from year 6 onwards). Physical habitat interim targets can, therefore, be defined on the basis of the predictions made in Tables 4 and 5. For the medium to long term, it is more appropriate to define the interim targets as a range, given that the site will continue to evolve over this period.

6. Table 6 defines interim targets for the habitats within the realignment site to be determined through the monitoring outlined in Section 4.4.

**Table 6 Interim targets for physical habitats**

Conditions suitable for the development of the following habitat	Interim target (ha)	
	Short term (approximate area)	Medium/long term (range)
Intertidal mudflat	76	70 – 80
Intertidal mudflat/saltmarsh transition	19	5 – 15
Saltmarsh	10	15 – 25
Sand and shingle	5	5

*Interim targets for biological communities*

7. As described above, in the short term, it is more appropriate to judge the success or otherwise of the scheme on the basis of the targets defined for physical habitats. It is, however, useful to define interim targets for biological communities over the short and longer term in order to assess the development of habitat quality.

8. The precise quantification of these targets is more problematic than for the physical habitat targets given the inherent variability in biological communities and the fact that no two managed realignment sites are directly comparable. It is, however, possible to define broad targets relating to the nature of biological communities, and the trends in these communities, that would be expected to develop over different time periods. It is proposed, therefore, that the targets outlined in Table 7 are adopted, but that decisions as to whether the site has achieved 'success' and regarding management of the site need to be made through the annual reporting process and the Regulatory and Advisory Group. Substratum type is included in Table 7 because this parameter is closely linked to the biological communities.

**Table 7 Interim targets for biological communities**

Parameter	Interim target	
	Short term	Medium/long term
Benthic invertebrate communities	Community dominated by a low number of species in high abundance. Species generally small bodied and fast growing. Community dominated by Polychaeta and Oligochaeta. Species diversity and biomass would be initially low and expected to increase over time	Community gradually comprises a greater range of species with a more even distribution in abundance between species. Larger and slower growing species make up a greater proportion of the community. Community comprises a greater range of taxa, including Mollusca and Polychaeta. Species diversity and biomass increasing over time but would be expected to reach plateau
Vegetation	Pioneer species dominant (typically <i>Salicornia</i> and <i>Atriplex portulacoides</i> ) forming a band of vegetation at lower elevations. At higher levels, other species would colonise over time (e.g. <i>Suaeda maritima</i> )	The diversity of the community would increase with pioneer species becoming less dominant
Waterbirds	Most waterbirds are opportunistic feeders and would be expected to begin using the site rapidly. As the available biomass increases, the number of waterbirds using the site would also be expected to increase over time	Waterbird usage of the site should increase as the diversity of the benthic community increases. A plateau would be reached when the waterfowl assemblage should be comparable with adjacent intertidal areas in terms of feeding density and species
Nature of substratum (intertidal areas and transitional areas)	Substratum dominated by fine sediments (silt and very fine sand)	The proportion of very fine sand and fine sand would be expected to increase, but the sediments should remain silt dominated

9. It is proposed that if the monitoring demonstrates that the managed realignment site has the characteristics described in Table 7, then it is developing as expected. It is, however, important to assess success through consideration of both the physical and biological attributes of the site.

*Targets for monitoring the adjacent foreshore*

10. A further measure of the success of the scheme could be defined as the avoidance of significant effects on the adjacent foreshore. In this regard, the most important aspect is the level and extent of the beach, given that the beach structures

protect the extensive areas of saltmarsh behind them from erosion. Targets against which to assess the 'success' of the scheme in this context, and the management measures that would be implemented in the event that intervention is required, are described in Section 5.3.

*Risk of failure and possible intervention measures*

11. On the basis of the engineering and environmental studies that have been undertaken, as well as evidence from implemented managed realignment schemes, it should be emphasised that there is a high level of confidence that the primary and detailed objectives for the managed realignment site can be achieved. It is, however, acknowledged that there is a degree of uncertainty (albeit limited) in predicting how managed realignment sites will develop. In view of this, it is necessary to put in place a comprehensive monitoring strategy and to define targets against which the success of the scheme can be assessed (as set out herein). It is also necessary to be informed of possible intervention measures that could be applied in the event that the managed realignment site does not develop as expected.

12. The nature of the management that may be required will be dependant on the problem that has been identified through the monitoring of the site. However, Table 8 lists some of the potential problems that may be encountered and describes the intervention that could be implemented to address the problems and to increase the likelihood of the site fulfilling its objectives.

**Table 8 Possible problems and intervention measures that may be required**

<b>Potential problem</b>	<b>Possible intervention measure</b>
Land levels too high leading to a greater proportion of saltmarsh to mudflat than desired	Localised lowering of land levels within the site
Land levels too low leading to a lower proportion of saltmarsh to mudflat than desired	Localised raising of land levels to encourage further saltmarsh growth
Significant accretion leading to excessive saltmarsh growth at the expense of mudflat	Localised removal of fine sediment to readjust land levels and encourage mudflat development
Localised 'ponding' at low water	Infilling of localised depressions within maintenance dredged material and/or the introduction of land drains
Excessive shallow water areas present at low water	Alterations to the creek structure to facilitate drainage, possibly combined with localised pumping of maintenance dredged material
Gradual coarsening of substratum to detriment of biological communities	'Topping up' with further maintenance dredgings
Poor colonisation by vegetation	Consider seeding and/or planting options



13. It should be noted that Table 8 lists general potential problems with managed realignment sites and not problems that are specific to the Little Oakley Managed Realignment. The aim of Table 8 is to demonstrate that there are a range of management measures that can be adopted. Any management of the site will be subject to the agreement of the Regulatory and Advisory Group.

## 5.5 REPORTING

1. The findings of the monitoring programme described in this agreement will be reported on an annual basis and presented to the Regulators (and others) through the HHA's compliance monitoring initiative. The annual report will present full details of the monitoring undertaken, its findings and recommendations for action. The annual report shall be reviewed at the annual meeting of the Regulatory and Advisory Group and made publicly available.

2. Through the reporting process, the requirement for extension, modification or cessation of the various aspects of the monitoring programme will also be determined.

3. The current Regulators Group (originally established for the 1998/2000 Approach Channel Deepening) oversees the ongoing programme of monitoring associated with development in the Stour and Orwell estuaries. The Group comprises English Nature, the Environment Agency, the Department for Transport and Defra. In addition, the meetings of the Group are attended by the RSPB, the Suffolk and Essex Wildlife Trusts and ABP Ipswich (in line with standing agreements between these organisations and the HHA), as well as CEFAS (at the request of Defra) and the Port of Ipswich (at the invitation of the HHA). The group reviews the findings of the monitoring that is undertaken, draws conclusions on the basis of the monitoring results and makes recommendations (if necessary) as to modifications to the monitoring programme.

4. The formal composition, role and procedures of and relating to the newly constituted Regulatory and Advisory Group will be established through a binding and enforceable legal agreement; a Deed to be known as the Compensation, Mitigation and Monitoring Deed (the CMMD). Details are provided in Section 1.2 above.

## REFERENCES

PDE (1998). *Harwich Haven Authority Channel Deepening: Mitigation and Monitoring Package*. Prepared by Posford Duvivier Environment for the Harwich Haven Authority.

Posford Haskoning (2001). *Bathside Bay Tidal Works and Approach Channel Deepening: Environmental Statement*. Prepared for HPUK, December 2001.

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Posford Haskoning (2003b). *Managed Realignment at Little Oakley, Hamford Water: Environmental Statement*. Prepared for HPUK, May 2003.

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Posford Haskoning and HR Wallingford (2003). *Mitigation and monitoring for the Stour and Orwell Estuaries SPA and the Hamford Water SPA: Annual Report*. Prepared for the HHA, September 2003.

**APPENDIX 1  
FEEDING AND ROOSTING COUNT DATA  
BATHSIDE BAY**

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### **Annex 5.1**

Analysis of mudflat area and exposure at the RTE fields and at the AMEP site


**Analysis of mudflat area and exposure at the RTE fields and at the AMEP site**

1. HR Wallingford has undertaken further analysis and comparison of available mudflat resource lost at Immingham and gained at the Cherry Cobb Sands RTE site.
2. Table 9.1 of EX 28.3 illustrates a scenario of operation over a typical spring-neap cycle with the RTE fields at an average level of +2.1m OD. During the spring-neap cycle individual fields are either intertidal (T), impounded as a reservoir to a depth in excess of 100mm (R), impounded to a shallow depth (~100mm) such that they can provide a feeding resource(S), drained (D) or refilled to a shallow depth (~100mm) (F).
3. Table A1 below represents the information provided in Table 9.1 of EX28.3 but also includes a column that shows the amount of intertidal that has been lost at Immingham as a result of the AMEP development and the disturbed area around the site. The area of mudflat resource provided by each field has been taken to be 15ha.

**Table A1: Illustration of wet mudflat areas gained and lost for RTE fields with level of +2.1m OD.**

Tide Type	Tide No	RTE1	RTE2	RTE3	RTE4	Total area of functional wet habitat gained in RTE (ha)	Total area of intertidal lost at AMEP (ha)
S	1,2	T	T	T	T	60	43.1
S	3,4	T	T	T	T	60	43.1
S	5,6	T	R	T	T	45	43.1
S	7,8	T	R	T	T	45	43.1
S	9,10	T	R	T	T	45	43.1
M	11,12	T	R	T	T	45	36.6
M	13,14	S	R	T	S	45	36.6
N	15,16	D	R	F	S	45	22.4
N	17,18	F	R	D	S	45	22.4
N	19,20	D	R	F	S	45	22.4
N	21,22	F	R	D	S	45	22.4
N	23,24	D	S	F	S	60	22.4
M	25,26	T	T	T	T	60	36.6
M	27,28	T	T	T	T	60	36.6
Average area gained in RTE over S-N cycle						50.4	
Average area lost at AMEP over S-N cycle							33.9

4. In this simple analysis of how much wet mudflat resource is available (or lost) on a tide by tide basis the average area gained (50.4 ha) from the RTE scheme is 1.17 times greater than the total area lost at the AMEP site (43.1ha) (including the area disturbed). Furthermore when the tide varying nature of the intertidal exposure of the area lost at AMEP is considered then the average area lost at AMEP over the spring -neap cycle is 33.9ha. Making the gains at the RTE site 1.49 times greater than the total area lost. On a tide by tide basis there is always more mudflat resource available on each tide at the RTE site than is lost at AMEP (including the area disturbed).

	<b>ABLE MARINE ENERGY PARK</b> <b>RESPONSE TO DEPARTMENT FOR</b> <b>TRANSPORT'S 'MINDED TO APPROVE' LETTER</b> <b>IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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5. In Table A2 the analysis is repeated for the case where the RTE field has accreted to +2.4m OD (taken from table 9.2 of EX28.3).

**Table A2: Illustration of wet mudflat areas gained and lost for RTE fields with level of +2.4m OD.**

Tide Type	Tide No	RTE1	RTE2	RTE3	RTE4	Total area of functional wet habitat gained in RTE (ha)	Total area of intertidal lost at AMEP (ha)
S	1,2	T	T	T	T	60	43.1
S	3,4	T	T	T	T	60	43.1
S	5,6	T	R	T	T	45	43.1
S	7,8	T	R	T	T	45	43.1
S	9,10	T	R	T	T	45	43.1
M	11,12	T	R	S	S	45	36.6
M	13,14	F	R	D	S	45	36.6
N	15,16	D	R	F	S	45	22.4
N	17,18	F	R	S	D	45	22.4
N	19,20	D	R	S	F	45	22.4
N	21,22	F	R	FD	S	45	22.4
N	23,24	D	R	F	S	45	22.4
M	25,26	F	S	D	S	60	36.6
M	27,28	T	T	T	T	60	36.6
Average area gained in RTE over S-N cycle						49.3	
Average area lost at AMEP over S-N cycle							33.9

6. In this scenario of wet mudflat resource on a tide by tide basis the average area gained (49.3 ha) from the RTE scheme is 1.14 times greater than the total area lost at the AMEP site (43.1ha) (including the area disturbed). Furthermore when the tide varying nature of the intertidal exposure of the area lost at AMEP is considered then the average area lost at AMEP over the spring-neap cycle is 33.9ha. Making the gains at the RTE site 1.45 times greater than the total area lost.
7. A further level of detail can be assessed whereby the amount of time in the tide that the mudflat resource is exposed is calculated tide by tide. In terms of the footprint at Immingham this has been calculated based on the HR Wallingford modelling and determining that the mudflat is not available as a resource once it is inundated by more than 100mm. The resultant is that the area of intertidal lost represents a reduction in exposure of intertidal resource over a spring-neap cycle of about 6,600ha hours.
8. At the RTE field some of the exposure that occurs is tidal (on spring and mean tides) and some is non tidal when the sites are either drained, impounded to a shallow extent or being refilled. In Tables A1 and A2 the distinction is made between green cells (tidally exposed) and orange cells (permanently availability). Table A3 summarises the method of calculating the exposure of habitat at the RTE fields.

**Table A3: Illustration of wet mudflat area exposed at RTE fields with level of +2.1m OD.**

Tide Type	Tide No	Time per tide that mudflat exposed when intertidal (hours)	Area of mudflat exposed intertidally (ha)	Area of mudflat available but not tidally influenced (ha)	Intertidal exposure per tide (ha hours)	Additional non-tidal mudflat resource available (ha.hours)
S	1,2	9.7	60		582	
S	3,4	9.3	60		558	
S	5,6	9.2	45		414	
S	7,8	9.7	45		436	
S	9,10	9.7	45		436	
M	11,12	10.4	45		468	
M	13,14	11.3	15	30	169	372
N	15,16	n/a		45		558
N	17,18	n/a		45		558
N	19,20	n/a		45		558
N	21,22	n/a		45		558
N	23,24	n/a		45		558
M	25,26	11.3	60		678	
M	27,28	10.4	60		624	
Intertidal exposure of RTE fields					8,730	
Non tidal availability of RTE field						6,324

9. It can be seen that over a spring-neap cycle the tidally available mudflat exposure of 8,730 ha.hours with the fields at a level of +2.1m OD is greater than the tidally available resource lost at AMEP (6,600 ha.hours). In addition the RTE fields provide a further resource of 6,324 ha.hours of mudflat. The RTE fields thus generally provide a resource of exposed mudflat which is 2.28 times greater than that lost at Immingham.
10. Table A4 presents the results of the analysis for the RTE fields at a level of +2.4m OD.

**Table A4: Illustration of wet mudflat area exposed at RTE fields with level of +2.4m OD.**


Tide Type	Tide No	Time per tide that mudflat exposed when intertidal (hours)	Area of mudflat exposed intertidally (ha)	Area of mudflat available but not tidally influenced (ha)	Intertidal exposure per tide (ha hours)	Additional non-tidal mudflat resource available (ha.hours)
S	1,2	10.6	60		636	
S	3,4	9.9	60		594	
S	5,6	9.8	45		441	
S	7,8	10.6	45		477	
S	9,10	10.6	45		477	
M	11,12	11.8	15	30	177	372
M	13,14	n/a		45		558
N	15,16	n/a		45		558
N	17,18	n/a		45		558
N	19,20	n/a		45		558
N	21,22	n/a		45		558
N	23,24	n/a		45		558
M	25,26	n/a		60		744
M	27,28	11.8	60		708	
Intertidal exposure of RTE fields					7,020	
Non tidal availability of RTE field						8,928

11. It can be seen that over a spring-neap cycle the tidally available mudflat exposure of 7,020 ha.hours with the fields at a level of +2.4m OD is greater than the tidally available resource lost at AMEP (6,600 ha.hours). In addition the RTE fields provide a further resource of 8,928 ha.hours of mudflat. The RTE fields thus generally provide a resource of exposed mudflat which is 2.42 times greater than that lost at Immingham.
12. Comparison of Tables A3 and A4 demonstrates that as the field level rises the amount of tidal exposure of the mudflat resource in the fields reduces but the overall exposure of the RTE fields as a mudflat resource increases because the amount of time that the fields are inundated to a level in excess of 100mm reduces.


**Summary**

13. The losses of mudflat resource at Immingham associated with the AMEP development (direct and indirect) can be compared with the gains from the RTE fields.
14. When comparing availability of mudflat on a tide by tide basis at the RTE fields throughout the spring-neap cycle with the maximum area lost at Immingham the RTE fields provide about 1.15 times more mudflat than the area lost.
15. When comparing both gains at the RTE fields and losses at Immingham on a tide by tide basis through the spring-neap cycle the RTE fields provide about 1.45 times more mudflat than the area lost.



	<b>ABLE MARINE ENERGY PARK          RESPONSE TO DEPARTMENT FOR          TRANSPORT'S '<i>MINDED TO APPROVE</i>' LETTER          IN RESPECT OF COMPENSATORY MEASURES</b>	<b>OCT 2013</b>
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16. If the assessment considers the time varying availability of the mudflat resource through the spring-neap cycle then the RTE fields provide about 2.3 times more exposure of mudflat resource than that lost at Immingham.

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## **Annex 5.2**

Revised Development Programme and Explanatory Note

## **1 THE EXAMINERS CONCLUSIONS**

1.1 The timing of the implementation of the compensatory measures is considered in the Panel's Report at paragraphs 10.178 *et seq*, before it concludes that:

*10.187 On balance, having considered the texts of both the EU Guidance and the DEFRA draft Guidance carefully, the Panel concurs with the applicant. In our view the test is the coherence of the Natura 2000 network, and this must allow for damage to occur at a given site provided the necessary compensation measures have been secured not necessarily delivered. The two sets of guidance both clearly allow for a possible time lag, although obviously they will not encourage it.*

## **2 PROGRAMME CONSTRAINTS IN THE DRAFT DCO**

2.1 In order to limit the time lag that might arise between the loss of existing functional mudflat and the creation of the compensatory habitat, the draft DCO dated 28 August 2013 contains the following requirements:

### Schedule 8

*1.—(1) The following dependencies apply to the licensed activities in paragraphs 4 to 12.*

*(1) If the licence holder carries out any of the activities licensed under paragraph 4 (construction of the quay), then it must:*

*(a) carry out the activity licensed under paragraph 8 (compensation site creation) in the June following the creation of the compensation site, which in turn must be done during the first earthworks season following the commencement of the activity licensed under paragraph 4;*

### Schedule 11

*2.—(1) The undertaker must not commence construction of the quay (Work No. 1) less than 7 months after commencing construction of the compensation site referred to in paragraph 4(a) of Schedule 1 (authorised development)).*

*(1) The undertaker must use all reasonable endeavours to create the Cherry Cobb Sands breach no more than 15 months after commencing construction of the quay (Work No. 1).*

### **3 THE REVISED BASE PROGRAMME**

- 3.1 The Applicant, in their response to the Examiners Rule 17 letter dated 15 November 2012, set out a discussion of alternative programmes and their impact upon the project<sup>1</sup>. A revised base programme ('the programme') which is compliant with the draft DCO and takes cognisance of the Examiner's conclusions with respect to time lag has been prepared by the applicant, dated September 2013, and is attached to this document and explained below.

#### Consenting Process

- 3.2 The Secretary of State (SoS) has confirmed by letter dated 24 September 2013 that he intends to make a decision on the application by 18 December 2013. Following that, the programme allows a 6 month period for Special Parliamentary Procedures (SPPs) to be undertaken and a 6 week period for any aggrieved party to make an application for Judicial Review. The Order only becomes effective on completion of the SPP process.
- 3.3 The programme assumes that once the SoS makes a positive decision, the applicant will begin to seek discharge of any pre-construction requirements with the various regulators and the relevant planning authority. This will enable the speedy discharge of such construction precedent conditions once the DCO is in place. It therefore assumes that the SPP process will not generate significant changes to the final Order.

#### East Halton Marsh Further Overcompensation

- 3.4 The works at East Halton are permitted through an existing planning consent issued by North Lincolnshire Council for Able Logistics Park (ALP) (NLC reference PA/2009/0600). These works may therefore commence before the DCO is made, and the intention would be to undertake the works in Spring 2014. In the event that the DCO is not granted the completed works would act as mitigation for the whole of the ALP development, so would never become abortive works. In the event that the DCO is granted then the further overcompensation site would serve as partial mitigation for ALP (12 ha) and as further overcompensation for AMEP (20 ha) until such time as the RTE site achieves its biomass objectives. At this point the further overcompensation portion of the site would become 'banked' and available to serve as mitigation for other development on the South Humber Bank (including but not limited to the balance of mitigation for ALP, although by agreement with NE, the balance of ALP mitigation may be provided off-site).

#### Cherry Cobb Sands Wet Grassland Overcompensation

- 3.5 The wet grassland works at Cherry Cobb Sands are permitted through an existing planning consent issued by East Riding of Yorkshire Council (ERYC reference DC/12/04154/STPLF/STRAT). These works may therefore commence before the DCO is made, but as they are only required if the DCO is granted then, they are not programmed to commence until the DCO is made. The works will then be complete in time for winter rainfall to be

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<sup>1</sup>[http://infrastructure.planningportal.gov.uk/wp-content/ipc/uploads/projects/TR030001/2.%20Post-Submission/Representations/Further%20Information%20Requested%20by%20the%20Examining%20Authority%20\(Rule%2017\)/121123\\_TR030001\\_Able%20Humber%20Ports%20Limited.pdf](http://infrastructure.planningportal.gov.uk/wp-content/ipc/uploads/projects/TR030001/2.%20Post-Submission/Representations/Further%20Information%20Requested%20by%20the%20Examining%20Authority%20(Rule%2017)/121123_TR030001_Able%20Humber%20Ports%20Limited.pdf)

captured enabling the wet roost to become functional during late 2014 and early 2015.

#### Cherry Cobb Sands RTE/MR Site

- 3.6 The RTE/MR works at Cherry Cobb are permitted through the DCO and cannot therefore commence until the DCO is made. These works must commence at least 7 months before the Quay works commence and are therefore planned to start in October 2014 (see paragraph 3.1 above). Once the works are complete the flood defence works are required to stand over a winter period before the breach is created in the following June. The breach is therefore planned for June 2016.

#### Quay Works

- 3.7 The Quay Works are permitted through the DCO and cannot commence until at least 7 months after the start of the RTE/MR works. Piling restrictions contained in Schedule 8 of the DCO make the optimal time to commence these works, the June of any particular year. A later start is not excluded but is likely to result in a significant financial penalty to the applicant. These works must also commence within at least 15 months of the breach being created in the RTE site, so commencing these works in June 2015 is the optimal time (see paragraph 3.1 above).
- 3.8 The programme further shows the loss of mudflat on the NKM foreshore beginning around 20 weeks after the marine works start, and being totally lost over the following 9 months. This reflects the programme for reclamation of the mudflats which will lag behind the piling programme.

