

ABLE MARINE ENERGY PARK TR030001
SUMMARY OF CASE AT 12-13 NOVEMBER 2012
HEARINGS
ANNEXES A – I

ANNEX A

TABLE OF CORRESPONDENCE WITH MMO, EA & NE

Consultation with EA/MMO/NE on the MR/RTE Design

Date	Time	Email/Letter/ Telecon (E/L/T)	From	To	Reason
9.11.12	17:12	E	MMO (GMcN)	Able (RC)	Attaching MMO's comments on additional environmental information
8.11.12	11:18	E	Natural England (AH)	Able (RC)	Telecon before Hearings requesting to be copied into Able's responses to PINS and RSPB.
7.11.12	11:09	E	Able (RC)	Natural England (AH)	To arrange a telecon before Hearings.
7.11.12	15:32	E	Natural England (EH)	Able (RC), Natural England (AE, AH) & MMO (GMcN)	Providing reference to limiting saltmarsh growth.
7.11.12	12:12	E	Able (RC)	Natural England (EH, AH, AH) & MMO (GMcN)	Requesting reference to a need for 600 inundations per year to limit saltmarsh growth.
6.11.12	17:24	E	Able (RC)	Natural England (AH)	EX8.12A WFD Assessment – clarification of wording
6.11.12	16:54	E	EA (AH)	Able (RC)	EX8.12A WFD Assessment – textual query
6.11.12	10:58	E	MMO (GMcN)	Able (RC)	Currently compiling comments on submissions of 12 th October. Had been out of office pre-booked leave and sickness.
6.11.12	09:45	E	Able (RC)	Environment Agency (SM)	Forwarding JBA's response – EX8.7A update.
6.11.12	08:52	E	JBA Consulting	Able (RC)	AMEP EX8.7A Update
6.11.12	08:39	E	Natural England (AH)	Able (RC), Natural England (EH, AH), MMO (GMcN)	Acknowledging proposed consultation programme for EMMPS but unable to guarantee 'final comments' will be made on 23.11.12 on EMMPs
5.11.12	17:47	E	Natural England (EH)	Able (RC), Natural England (AE, AH) & MMO (GMcN)	Attaching NE's initial comments on draft EMMPs.
5.11.12	17:19	E	Able (RC)	JBA Consulting	EX8.7A Update – response to EA request for clarification.
5.11.12	12:03	E	Able (RC)	Natural England (AE, EH, AH) & MMO (GMcN)	Suggesting a consultation programme following questions from the Examiner regarding the EMMP's.

Date	Time	Email/Letter/ Telecon (E/L/T)	From	To	Reason
31.10.12	14:13	E	Able (RC)	MMO (GMcN)	Requesting feedback on submissions and suggesting a meeting.
31.10.12	14:00	T	Able (RC)	MMO (GMcN)	Requesting feedback on submissions and suggesting a meeting. GMcN unavailable.
30.10.12	13:00	T	Telecon	Able, NE, EA	MMO unavailable
29.10.12	16:21	E	Able (RC)	MMO (GMcN)	Requesting feedback on submissions of 12 th October.
29.10.12	16:20	E	MMO (GMcN)	Able (RC)	Automated out of office reply – out of office till 30th
26.10.12	12:45	E	Natural England (EH)	Able, MMO, NE, EA	Dial in details for Telecon on 30.10.12 @13:30-16:30
25.10.12	17:09	E	MMO (GMcN)	BDB (AW)	Attaching MMO's comments, amendments and additions to draft DCO/DML dated 9 th October. Not able to comment yet on docs dated 12 th
25.10.12	15:22	E	Able (JM)	Natural England, MMO, EA	Suggesting time and date for telecon for EMMP. Doodle poll attached. SM unavailable, MMO no response.
24.10.12	15:17		Able (JM)	Natural England, MMO, EA	Requesting a conference call to discuss the draft EMMPs to be submitted as part of File 24.
19.10.12	16:58	E	Natural England (AH)	Able (RC), EA, MMO	Reviewing Able documents and considering SoCG. Call booked with MMO and EA. Will call with feedback thereafter.
19.10.12	09:47	E	Able (RC)	Natural England (AH, AH), MMO (GMcN)	Request for SoCG to be jointly prepared, and request to agree dates for telecons over next 3 weeks.
11.10.12	13:16	E	MMO (GMcN)	Able (RC)	Thanking for the draft EX 28.3 and for attending a workshop on 2.10.12. Declined to comment until final report and EMMPs received.
9.10.12	11:37	E	Environment Agency (SM)	Able (RC)	Preliminary Response on RTE Proposals
2.10.12		Meeting			Presentation of draft EX28.3 Parts 2, 3 & 5
1.10.12	14:00	E	Able (RC)	NE, EA, MMO	Attaching draft report EX28.3 Parts 2, 3 & 5.

Leslie Hutchings

From: McNiven, Gregor (MMO) <Gregor.McNiven@marinemanagement.org.uk>
Sent: 09 November 2012 17:12
To: Richard Cram
Cc: ablemarineenergypark@infrastructure.gsi.gov.uk
Subject: MMO comments on additional environmental information
Attachments: MMO Response to Able - additional environmental information (091112).pdf

Importance: High

Dear Richard

Please find attached the MMO's comments on the additional environmental information provided by Able dated 12 October 2012. As discussed in our call this afternoon I have also copied the Planning Inspectorate in to this correspondence for their information.

Kind regards

Gregor

Mr Gregor McNiven BSc (Hons), MSc, CSci CMarSci MIMarEST
Senior Marine Licensing Manager
Marine Management Organisation
Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH
Tel: 0191 376 2721

Web: www.marinemanagement.org.uk

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The Marine Management Organisation (MMO)

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Leslie Hutchings

From: Hearle, Andrew (NE) <Andrew.Hearle@naturalengland.org.uk>
Sent: 08 November 2012 11:18
To: Richard Cram
Cc: WALKER Angus; Jonathan Monk
Subject: RE: AMEP Meeting/Telecon before Hearings

Richard

We are currently finalising our response to your further details with an outline of Natural England's position which we aim to send to you tomorrow (Friday) copied to PINS. I will also include a copy of the Royal Haskoning report to which our note will refer.

I suggest that our response will provide you with the necessary detail to give you a clear understanding of what is/is not agreed. Perhaps I could call you tomorrow to discuss once we have sent the note. I am in Hull and travelling for much of Friday but should be able to make contact to discuss.

Is it possible for us to be copied into your response to the Panel's recent questions? I wonder also if you have provided a response to RSPB's letter of 24 October and if so whether we could have sight of this?

Kind regards
Andrew

Andrew Hearle
Principal Adviser, Land Use
Natural England
Parkside Court
Hall Park Way
TELFORD TF3 4LR

Tel: 0300 060 0613 Mob: 07900 405350

<http://www.naturalengland.org.uk/>

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 07 November 2012 11:09
To: Hearle, Andrew (NE)
Cc: WALKER Angus; Jonathan Monk
Subject: AMEP Meeting/Telecon before Hearings

Andrew,

It would be good to avoid surprises on Monday next week. Could we have a meeting/telcon tomorrow/Friday to understand what is agreed and what is not.

Also, is it possible to have a copy of the Royal Haskoning Report?

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
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Leslie Hutchings

From: Hawthorne, Emma (NE) <Emma.Hawthorne@naturalengland.org.uk>
Sent: 07 November 2012 15:32
To: Richard Cram; Hearle, Andrew (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: RE: AMEP: Programme to complete the EMMPs

Hi Richard

This came from one of our specialists on coastal habitats. She said (and I think we provided this info to you previously):

The number of immersions, depth of water and length of time when exposed between tidal immersion are all important. I think that 450 tidal immersions a year might be too few – *Salicornia* can establish between 250-600 tides a year, depending on how long exposure between tides and what time of year this occurs. In addition, the RTE environment may be more sheltered so less wave energy which might be a factor in allowing colonisation, even if there is a short period between tides. In addition, in some locations *Spartina anglica* has been reported to survive periods of 6 hours of flooding. If it did establish, then it could easily cope with 300mm depth, so this may be again too low. The depth needs to be enough to enable wave energy to form when flooded and thus remove any seedlings that do establish.

Going on immersions alone, I would think that 450-600 would be a minimum, basically it needs to be flooded nearly every day, with a high degree of waterlogging in the mud to prevent it from drying out between tides and reduce the ability of saltmarsh species to survive effectively.

To some extent RTE enables closer manipulation with the right sluices, spills etc, but it will need to be carefully managed. You might also get more salinity of the RTE site when there is greater evaporation.

There is some good explanation of the processes in JNCC report 334 (available on-line from JNCC)
Boorman, L.A., 2003 *Saltmarsh Review. An overview of coastal saltmarshes, their dynamic and sensitivity characteristics for conservation and management*

We discussed this further on Fri and agreed that the objective should be the higher figure – ie 600 inundations – particularly as Sue had already advised that 450 is likely to be too low.

Thanks
Emma

Emma Hawthorne
Senior Adviser - Coastal
Land Use Operations Team
Natural England
25 Queen Street
Leeds
LS1 2UN

Direct dial 0300 060 1873
Mobile 0777 3341639

From: Richard Cram [mailto:rcram@ableuk.com]
Sent: 07 November 2012 12:12
To: Hawthorne, Emma (NE); Hearle, Andrew (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: Re: AMEP: Programme to complete the EMMPs

Emma,

Can you provide the reference to a need for 600 inundations per year to limit saltmarsh growth.

Kind regards

RICHARD CRAM

Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

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From: Emma Hawthorne <Emma.Hawthorne@naturalengland.org.uk>

Date: Mon, 5 Nov 2012 17:46:41 -0000

To: Richard Cram <rcram@ableuk.com>, Andrew Hearle <Andrew.Hearle@naturalengland.org.uk>, Annette Hewitson <annette.hewitson@environment-agency.gov.uk>, "McNiven, Gregor (MMO)" <Gregor.McNiven@marinemanagement.org.uk>

Cc: Nick D Cutts <N.D.Cutts@hull.ac.uk>, Steve Barnard <Steve.Barnard@hull.ac.uk>, Jonathan Monk <jmonk@ableuk.com>

Subject: RE: AMEP: Programme to complete the EMMPs

Dear Richard

Please find attached Natural England's initial comments on the draft EMMPs to help guide the next versions.

Andrew will reply separately on your proposed timetable.

Thanks

Emma

Emma Hawthorne
Senior Adviser - Coastal
Land Use Operations Team
Natural England
25 Queen Street
Leeds
LS1 2UN

Direct dial 0300 060 1873

Mobile 0777 3341639

From: Richard Cram [<mailto:rcram@ableuk.com>]

Sent: 05 November 2012 12:03

To: Hearle, Andrew (NE); Hawthorne, Emma (NE); Annette Hewitson; McNiven, Gregor (MMO)

Cc: Nick D Cutts; Steve Barnard; Jonathan Monk

Subject: AMEP: Programme to complete the EMMPs

Andrew et al,

The Examiner has sent me a multitude of questions regarding the EMMPs, amongst which is the question, '*what is the timetable for the production of the final monitoring and management plans*'. I propose to respond by telling him that the final draft documents will be submitted on 23 November.

In order that these are as final as possible, I suggest the following consultation programme with you.

1. Able to submit revised draft to NE/EA/MMO on 12 November.
2. NE/EA/MMO to provide comments on 16 November (telecon or by word track)
3. Able make further revisions and re-issue on 20 November.
4. NE/EA/MMO to make final comments on 23 November (am telecon)
5. Able to issue to PINS 23 November pm

Given the examination closes on 23 November and we have four days of Hearing still to attend, can you agree to this programme?

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
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Leslie Hutchings

From: Richard Cram <rcram@ableuk.com>
Sent: 06 November 2012 17:24
To: Hewitson, Annette
Subject: Re: EX8.12A WFD assessment question

Well, looking at Table 1 the 252 ha includes the dredging of the approach area and the disposal sites none of which are 'lost'. Indeed Table 1 talks about areas 'affected' not lost. Perhaps the words need changing to reflect the true situation.

Kind regards

RICHARD CRAM
Design Manager

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From: Annette Hewitson <annette.hewitson@environment-agency.gov.uk>
Date: Tue, 6 Nov 2012 16:54:40 +0000
To: Richard Cram <rcram@ableuk.com>
Subject: EX8.12A WFD assessment question

Hi Richard,

We have come across something in EX8.12A, WFD Assessment, which we would like to raise with you. It states on Page 21 :

The effects on benthic invertebrates arising from the reclamation, dredging and disposal activities are as follows:

- *Combined sub tidal habitat loss of up to 2.52 km² (see Table 1)*
- *Temporary local deposition of sediment associated with overflow during the trailer suction hopper dredging.*

The combined loss of 2.52 km² of sub tidal habitat relates marginally greater than 1% of the Humber Lower water body area (247 km²). This is not considered to be a significant effect on benthic invertebrates at water body level.

The habitat to be lost forms part of a Natura 2000 site and Section 5.4.14 of the HRA notes that the proposed intertidal compensation site at Cherry Cobb Sands will provide compensatory habitat to negate this impact. It is therefore assumed that the HRA will consider the issues related to the effects on the Natura 2000 site.

This equates to 252ha of sub-tidal habitat loss, and Cherry Cobb Sands is only compensating for approx 100ha of this.

Any thoughts?

Kind regards,
Annette

Annette Hewitson

Principal Planning Advisor

Environment Agency

✉ Waterside House, Waterside North, Lincoln, LN2 5HA

☎ 01522 785896

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Leslie Hutchings

From: McNiven, Gregor (MMO) <Gregor.McNiven@marinemanagement.org.uk>
Sent: 06 November 2012 10:58
To: Richard Cram
Subject: RE: AMEP - draft DCO/DML (25/10/12)

Richard

I was out of the office all of last week due to a combination of sickness and also some pre-booked leave, hence my lack of communication.

I am currently compiling our comments on your submissions of 12th October but am not yet in a position to pass these on. Therefore it is probably not worth holding a meeting at this stage, but I will aim to get these to you as soon as I can.

Kind regards

Gregor

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 31 October 2012 14:13
To: McNiven, Gregor (MMO)
Subject: Re: AMEP - draft DCO/DML (25/10/12)
Importance: High

Gregor,

Just phoned but you were not at your desk.

Obviously, the compensation Hearings are bearing down on us. When do you think you will be able to provide any feedback on any of our submissions earlier this month?

I could attend your offices for a meeting if you think that would help sort out any queries more quickly.

Kind regards

RICHARD CRAM

Design Manager

Able UK Ltd

Able House

Billingham Reach Industrial Estate

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From: "McNiven, Gregor (MMO)" <Gregor.McNiven@marinemanagement.org.uk>
Date: Thu, 25 Oct 2012 17:09:10 +0100
To: WALKER Angus <AngusWALKER@bdb-law.co.uk>
Cc: Richard Cram <rcram@ableuk.com>, Andrew Hearle <Andrew.Hearle@naturalengland.org.uk>, Mike Quigley <Mike.Quigley@naturalengland.org.uk>, Emma Hawthorne <Emma.Hawthorne@naturalengland.org.uk>, Annette Hewitson <annette.hewitson@environment-agency.gov.uk>, Susan Manson <susan.manson@environment-agency.gov.uk>, "Morgan, Victoria (MMO)" <victoria.morgan@marinemanagement.org.uk>, "Kerrigan, Andrew (MMO)" <Andrew.Kerrigan@marinemanagement.org.uk>
Subject: AMEP - draft DCO/DML (25/10/12)

Angus

Please find attached the MMO's comments, amendments and additions to the draft DCO/DML, made as tracked changes on your 9th October version. I wanted to provide these to you prior to the deadline for provision of draft requirements to PINS so you had the opportunity to amend your submission should you wish. This document will form the basis of the MMO's submission tomorrow, however the MMO reserves the right to amend, update, remove or add further conditions given that we have not yet had adequate time to review the further environmental information provided on 12th October 2012.

Kind regards

Gregor

Mr Gregor McNiven BSc (Hons), MSc, CSci CMarSci MIMarEST
Senior Marine Licensing Manager
Marine Management Organisation
Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH
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Leslie Hutchings

From: Richard Cram <rcram@ableuk.com>
Sent: 06 November 2012 09:45
To: Susan Manson
Subject: FW: 2010s4456 - AMEP - EX8.7A update

Sue,

See response from JBA below.
Kind regards

RICHARD CRAM
Design Manager

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From: Crispian Batstone <Crispian.Batstone@jbaconsulting.com>
Date: Tue, 6 Nov 2012 08:52:05 +0000
To: Richard Cram <rcram@ableuk.com>, Graham Siggers <G.Siggers@hrwallingford.com>
Cc: Mark Lawless <Mark.Lawless@jbaconsulting.com>
Subject: RE: 2010s4456 - AMEP - EX8.7A update

Richard,

The figure is correct – 0.5mm; there is a 0 missing from the value quoted in the text.

Kind regards,

Crispian Batstone
Senior Analyst | Coastal Risk Management

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 05 November 2012 17:19
To: Crispian Batstone; Graham Siggers
Cc: Mark Lawless
Subject: Re: 2010s4456 - AMEP - EX8.7A update

Crispian,

EA has commented that section 3.3.4 of the report states that HW levels in Halton Middle will increase by 0.005m which is 5mm but the figure says 5×10^{-4} which is 0.0005m or 0.5mm. Can you confirm which is correct please.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
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From: Crispian Batstone <Crispian.Batstone@jbaconsulting.com>
Date: Thu, 11 Oct 2012 13:44:15 +0100
To: "rcram@ableuk.com" <rcram@ableuk.com>, Graham Siggers <G.Siggers@hrwallingford.com>
Cc: Mark Lawless <Mark.Lawless@jbaconsulting.com>
Subject: 2010s4456 - AMEP - EX8.7A update

Richard, Graham,

Here is the updated EX8.7A. Please let me know if you need the Word version (13MB). Also let me know if there are other things that need changing.

Kind regards,

Crispian Batstone
Senior Analyst | Coastal Risk Management

JBA first internal send 13:44 Thu 11 Oct 2012

Leslie Hutchings

From: Hearle, Andrew (NE) <Andrew.Hearle@naturalengland.org.uk>
Sent: 06 November 2012 08:39
To: Richard Cram; Hawthorne, Emma (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: RE: AMEP: Programme to complete the EMMPs

Richard

Thank you for your email with your proposed consultation programme for the EMMPs.

As discussed when we spoke briefly on this on the phone yesterday, Natural England is keen to input and advise on the EMMPs so that these can be progressed as soon as possible and to this end will do its utmost to contribute to your consultation programme. However, as you will appreciate there are many demands on our time from the examination process over the next three weeks, thus I could not guarantee that our 'final comments' on the EMMPs would be made on 23 November.

Hopefully, the comments on the draft EMMPs provided by Emma yesterday will help in meeting this timescale.

Kind regards
Andrew

Andrew Hearle
Principal Adviser, Land Use
Natural England
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Hall Park Way
TELFORD TF3 4LR

Tel: 0300 060 0613 Mob: 07900 405350

<http://www.naturalengland.org.uk/>

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 05 November 2012 12:03
To: Hearle, Andrew (NE); Hawthorne, Emma (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: AMEP: Programme to complete the EMMPs

Andrew et al,

The Examiner has sent me a multitude of questions regarding the EMMPs, amongst which is the question, '*what is the timetable for the production of the final monitoring*

and management plans'. I propose to respond by telling him that the final draft documents will be submitted on 23 November.

In order that these are as final as possible, I suggest the following consultation programme with you.

1. Able to submit revised draft to NE/EA/MMO on 12 November.
2. NE/EA/MMO to provide comments on 16 November (telecon or by word track)
3. Able make further revisions and re-issue on 20 November.
4. NE/EA/MMO to make final comments on 23 November (am telecon)
5. Able to issue to PINS 23 November pm

Given the examination closes on 23 November and we have four days of Hearing still to attend, can you agree to this programme?

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
Fax: 01642-655655
Email: rcram@ableuk.com
Web: www.ableuk.com & www.ableshiprecycling.com

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Leslie Hutchings

From: Hawthorne, Emma (NE) <Emma.Hawthorne@naturalengland.org.uk>
Sent: 05 November 2012 17:47
To: Richard Cram; Hearle, Andrew (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: RE: AMEP: Programme to complete the EMMPs
Attachments: NE advice on draft EMMPs.doc

Dear Richard

Please find attached Natural England's initial comments on the draft EMMPs to help guide the next versions. Andrew will reply separately on your proposed timetable.

Thanks
Emma

Emma Hawthorne
Senior Adviser - Coastal
Land Use Operations Team
Natural England
25 Queen Street
Leeds
LS1 2UN

Direct dial 0300 060 1873
Mobile 0777 3341639

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 05 November 2012 12:03
To: Hearle, Andrew (NE); Hawthorne, Emma (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Nick D Cutts; Steve Barnard; Jonathan Monk
Subject: AMEP: Programme to complete the EMMPs

Andrew et al,

The Examiner has sent me a multitude of questions regarding the EMMPs, amongst which is the question, '*what is the timetable for the production of the final monitoring and management plans*'. I propose to respond by telling him that the final draft documents will be submitted on 23 November.

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Kind regards

RICHARD CRAM
Design Manager

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Leslie Hutchings

From: Richard Cram <rcram@ableuk.com>
Sent: 29 October 2012 16:21
To: McNiven, Gregor (MMO)
Subject: Re: AMEP - draft DCO/DML (25/10/12)

Importance: High

Gregor,

When do you think you will be able to provide any feedback on any of our submissions earlier this month?

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

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From: "McNiven, Gregor (MMO)" <Gregor.McNiven@marinemanagement.org.uk>
Date: Thu, 25 Oct 2012 17:09:10 +0100
To: WALKER Angus <AngusWALKER@bdb-law.co.uk>
Cc: Richard Cram <rcram@ableuk.com>, Andrew Hearle <Andrew.Hearle@naturalengland.org.uk>, Mike Quigley <Mike.Quigley@naturalengland.org.uk>, Emma Hawthorne <Emma.Hawthorne@naturalengland.org.uk>, Annette Hewitson <annette.hewitson@environment-agency.gov.uk>, Susan Manson <susan.manson@environment-agency.gov.uk>, "Morgan, Victoria (MMO)" <victoria.morgan@marinemanagement.org.uk>, "Kerrigan, Andrew (MMO)" <Andrew.Kerrigan@marinemanagement.org.uk>
Subject: AMEP - draft DCO/DML (25/10/12)

Angus

Please find attached the MMO's comments, amendments and additions to the draft DCO/DML, made as tracked changes on your 9th October version. I wanted to provide these to you prior to the deadline for provision of draft requirements to PINS so you had the opportunity to amend your submission should you wish. This document will form the basis of the MMO's submission tomorrow, however the MMO reserves the right to amend, update, remove or add further conditions given that we have not yet had adequate time to review the further environmental information provided on 12th October 2012.

Kind regards

Gregor

Mr Gregor McNiven BSc (Hons), MSc, CSci CMarSci MIMarEST
Senior Marine Licensing Manager
Marine Management Organisation
Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH
Tel: 0191 376 2721

Web: www.marinemanagement.org.uk

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The Marine Management Organisation (MMO)

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Leslie Hutchings

From: McNiven, Gregor (MMO) <Gregor.McNiven@marinemanagement.org.uk>
Sent: 29 October 2012 16:20
To: Richard Cram
Subject: Out of Office AutoReply: AMEP - draft DCO/DML (25/10/12) OTHER COMMENTS

I am now out of the office until Tuesday 30th October.

Should your query be urgent please contact the Marine Licensing Team at marine.consents@marinemanagement.org.uk or call 0300 123 1032.

Kind regards

Gregor

The Marine Management Organisation (MMO)

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Leslie Hutchings

From: Hawthorne, Emma (NE) <Emma.Hawthorne@naturalengland.org.uk>
Sent: 26 October 2012 12:45
To: jmonk@ableuk.com; Richard Cram; Les Hatton; Andy Coates; Nick D Cutts; Steve Barnard; Susan Manson; Annette Hewitson; McNiven, Gregor (MMO); Quigley, Mike (NE); Hearle, Andrew (NE); Whitehead, Andrew (NE); Saunders, Richard (NE); Browne, Siobhan (NE)
Subject: RE: AMEP EMMP's - Feedback & Next Stage

Hello
Dial in details for Tues are 0800 528 5280 code 5356011
Thanks
Emma

Emma Hawthorne
Senior Adviser - Coastal
Land Use Operations Team
Natural England
25 Queen Street
Leeds
LS1 2UN

Direct dial 0300 060 1873
Mobile 0777 3341639

From: Jonathan Monk [mailto:jmonk@ableuk.com]
Sent: 25 October 2012 15:22
To: 'Jonathan Monk'; 'Richard Cram'; 'Les Hatton'; 'Andy Coates'; 'Nick D Cutts'; 'Steve Barnard'; 'Susan Manson'; 'Annette Hewitson'; McNiven, Gregor (MMO); Hawthorne, Emma (NE); Quigley, Mike (NE); Hearle, Andrew (NE); Whitehead, Andrew (NE); Saunders, Richard (NE)
Subject: RE: AMEP EMMP's - Feedback & Next Stage

Dear all,

Based on the results of the Doodle poll so far, the best slot for this call is looking like the afternoon. Can I ask then that we book the slot 13:30-16:30 on Tuesday 30th October for the EMMP call? Emma, can we please use your dial-in details? I will circulate a more formal agenda on Monday, but I think we need the basic structure of receiving the regulators' comments on the three reports in turn, then IECS's and Able's proposals of how the reports will be further developed, before we agree timescales and targets.

Kind regards

JONATHAN MONK
AHP Marine Energy Park

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX
Tel: 01642-806080
Fax: 01642-655655
Email: jmonk@ableuk.com
Web: www.ableuk.com

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From: Jonathan Monk [mailto:jmonk@ableuk.com]
Sent: 24 October 2012 15:17
To: 'Richard Cram'; 'Les Hatton'; 'Andy Coates'; 'Nick D Cutts'; 'Steve Barnard'; 'Susan Manson'; 'Annette Hewitson'; 'McNiven, Gregor (MMO)'; 'Hawthorne, Emma (NE)'; 'Mike Quigley'; 'Hearle, Andrew (NE)'; 'Andrew Whitehead'; 'richard.saunders@naturalengland.org.uk'
Subject: AMEP EMMP's - Feedback & Next Stage

Dear all,

We are seeking to hold a conference call to discuss the draft EMMP's submitted as part of File 24 of the AMEP application, to receive regulatory feedback, and to discuss the strategy for the further development of those documents. The suggested date is Tuesday 30th October, and three hours is the suggested maximum time slot. I have proposed either a morning or afternoon session, but if we have availability problems, we are of course happy to try other slots that day. Can you please make use of the poll below to advise me of your availability? I will issue an agenda in due course.

I would like to invite you to the Doodle poll "AMEP EMMP's - Feedback & Next Stage".

Please follow the link in order to participate in the poll:
<http://doodle.com/fp26zpnmpx9f7xbu>

Kind regards

JONATHAN MONK

AHP Marine Energy Park

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX
Tel: 01642-806080
Fax: 01642-655655
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Poll "AMEP EMMP's - Feedback & Next Stage"

<http://doodle.com/fp26zpnmpx9f7xbu>

October 2012		
Tue 30		
	AM (09:30 - 12:30?)	PM (13:30 - 16:30?)
Sue Manson		
Jonathan Monk	OK	OK
Annette Hewitson	OK	OK
Les Hatton		
Andy Coates		
Steve Barnard (IECS)		OK
Nick Cutts (IECS)		OK
Richard Cram	OK	OK
Emma Hawthorne	OK	OK
Andy Whitehead		OK
Count	4	7

Leslie Hutchings

From: Hearle, Andrew (NE) <Andrew.Hearle@naturalengland.org.uk>
Sent: 19 October 2012 16:58
To: Richard Cram; Annette Hewitson; McNiven, Gregor (MMO)
Cc: Hawthorne, Emma (NE); Quigley, Mike (NE)
Subject: RE: AMEP

Richard

Sorry to come back to you so late in the day. We're busily reviewing your documents that you provided us on Monday as well as the Report on the Integrity of the European Sites as submitted by PINS which we received on Wednesday this week.

We're also considering your proposal for a Statement of Common Ground as well as identifying whether there are possible dates when we provide feedback to IECS on the draft EMMPs.

We have a call with MMO and EA on Monday midday when we can discuss your proposal – I'll call you soon after to feedback reactions and thoughts on timescales for this.

Kind regards
Andrew

Andrew Hearle
Principal Adviser, Land Use
Natural England
Parkside Court
Hall Park Way
TELFORD TF3 4LR

Tel: 0300 060 0613 Mob: 07900 405350

<http://www.naturalengland.org.uk/>

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 19 October 2012 09:47
To: Hearle, Andrew (NE); Annette Hewitson; McNiven, Gregor (MMO)
Cc: Hawthorne, Emma (NE); Quigley, Mike (NE)
Subject: AMEP
Importance: High

Andrew,

I phoned and left a message on your answerphone.

We propose to draft a Statement of Common Ground to cover the final compensation proposals which we have detailed in EX28.3 of the package of information issued last week to the PI. The aim of this is to ensure there is full clarity on our positions before the compensation hearings on 12 and 13 November. Can you advise if you are happy to adopt this approach? I think we would need a meeting once we have completed a draft but I appreciate that you need to absorb the documents too.

We also need to progress further with the EMMPs which we issued in draft last week (EX28.3:Part, EX10.9 and EX11.32), as NE has advised the PI that they need to be agreed by the end of the examination. Is this best progressed with a meeting of all parties with IECS or telecons?

Given that the compensation Hearings start three weeks on Monday, time is rather pressing so I would like to agree dates for telecons etc over the next three weeks asap. Can you give me a call, perhaps set one up including EA and MMO, to agreed the way forward.

Kind regards

RICHARD CRAM

Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080

Fax: 01642-655655

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Leslie Hutchings

From: McNiven, Gregor (MMO) <Gregor.McNiven@marinemanagement.org.uk>
Sent: 12 October 2012 14:38
To: Richard Cram
Subject: RE: AMEP DRAFT DOCUMENT NOT FOR DISTRIBUTION

Richard

Thanks. I only have comments on points 16.8 and 16.9. I think for both of these points, the text should reflect that discussions are still required with Natural England as to suitable requirements to be included in the DML (if appropriate). I have not managed to speak to Emma/Andrew this week, but would hope to catch up with NE next week to discuss.

Therefore please insert the following text for both points (16.8 and 16.9) if you agree, and I will do the same:

"Further discussions to be held between Natural England, MMO and Applicant regarding possible conditions to be included in the DML".

Regards

Gregor

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 12 October 2012 12:59
To: McNiven, Gregor (MMO)
Subject: AMEP DRAFT DOCUMENT NOT FOR DISTRIBUTION

Gregor,

Attached is my current draft which is awaiting a couple of inputs.

My updated annotated copy of your Annex 2 is within it.

THIS IS A DRAFT SO PLEASE DELETE IT AFTER YOU HAVE COPIED WHAT YOU WANT.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
Fax: 01642-655655
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Leslie Hutchings

From: McNiven, Gregor (MMO) <Gregor.McNiven@marinemanagement.org.uk>
Sent: 11 October 2012 13:16
To: Richard Cram
Subject: RE: AMEP Draft Report on RTE Design

Richard

Thank you for sending this draft report. Thank you also for holding the workshop on Tuesday 2nd October.

Having now reviewed the draft report, I do not have any specific points which I wish to raise at this time, and I believe it would be more appropriate to provide comment on the final report to be issued tomorrow (12th October). As you are aware, the MMO are most interested in those proposed activities which are potentially licensable, both during the construction and operational phases, and how commitments to monitoring and maintenance activities will be secured in the longer term. As discussed at the workshop, it is envisaged that this will be through conditions contained within the DCO/DML and the production of the relevant EMMP's.

We look forward to receiving the final report and EMMP's for comment in due course.

Regards

Gregor

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 01 October 2012 14:00
To: Susan Manson; Annette Hewitson; Hearle, Andrew (NE); Quigley, Mike (NE); Hawthorne, Emma (NE); McNiven, Gregor (MMO)
Cc: Jonathan Monk; WALKER Angus; Andy Coates; Les Hatton; David Keiller; Nicola Meakins; Mike Dearnaley
Subject: AMEP Draft Report on RTE Design

Dear All,

Attached is the draft report which we will present tomorrow.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

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Fax: 01642-655655
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Leslie Hutchings

From: Manson, Susan <susan.manson@environment-agency.gov.uk>
Sent: 09 October 2012 11:37
To: Richard Cram
Cc: Hewitson, Annette
Subject: Preliminary response on RTE proposals

Richard

We appreciate that we no longer have time on our side with the AMEP examination process. As such the advice given below is given in the spirit of the intention to be helpful and to provide advice as and when it is available. Unfortunately, we have not yet finished reviewing the RTE draft proposal at present, but wanted to provide you with our thoughts to date. We may be able to provide further advice ahead of Friday, but we reserve the right to change our position in relation to any further information received/reviewed and the formal submission of this document.

1. Page 3-3 States that the finished quay will be 6.1mAOD? Is this correct?
2. The EA are currently reviewing the work reported in Sections 3.5-3.6.2 and will provide further comment on this in the future.
3. The EA are currently reviewing the work reported in Section 5 and will provide further comment on this in due course.
4. Para. 6.5.3 states that the new flood embankment will have its top level width increased from 4 to 14 metres, later paragraphs (including 10.2.1) state that this will result in a 11.3 metre increase in the base width of the bank. The result of this widening and the creation of additional banks within the site - to create the 4 RTE fields, will mean that incoming tides are guided into a much more restricted area than previously prescribed. A possible effect is that the new flood bank is subject to more erosion and requires more linearly extension erosion protection. The report needs to clearly confirm or reject this.
5. Under previous proposals, it was of little consequence should the old redundant flood bank breach naturally in the future, along any part of its length. However, now an additional natural breach would mean the uncontrolled ingress of water into one or more of the RTE fields, with impacts of the habitat being nurtured here. What are the contingencies for preventing this? The most likely area in which this could happen is at the unprotected ends of the engineered breach area. Figure 6.3 in the RTE report shows an RTE field boundary is not far from the end of the intended breach. Is erosion protection required at the breach ends to prevent this?
6. A great deal of volume is being lost to the inclusion of new or bigger embankments - does this have any implications for delivering the necessary volume/area to compensate for coastal squeeze? We need to see a clear table showing the total site area, the total area taken by internal banks and the total available area that will be available as compensatory habitat.
7. The RTE report could address some concerns (specifically any increase in flows in Cherry Cobb Sands creek which affects flows in Stone Creek at their confluence) raised by Stone Creek Boat Club at the recent hearing. The RTE report makes some reference to creek enlargement in paragraph 14.5.2. Richard, following our discussions at the meeting at Foss House on 2nd October, you indicated that you would make David Keiller aware these matters. As such we expect this to be reflected in the new document.
8. The RTE report needs to consider the implications of the Reservoirs Act on these proposals.

9. The comments that we provided in our WFD response last week (5th October) with regard to the RTE, also apply to changes made to this document as well as the WFD assessment itself.

Please get in touch if we help with clarification to any of the above. Our formal response on the draft RTE will follow in due course.

Kind regards

Sue

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ABLE UK	AGENDA	By: JM
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Present:

Richard Cram (RC)	-	Able UK Ltd
Jonathan Monk (JM)	-	Able UK Ltd
Les Hatton (LH)	-	ERM
Andy Coates (AC)	-	ERM
Aisling Connolly (AiC)	-	ERM
Nick Cutts (NC)	-	IECS
Steve Barnard (SB)	-	IECS
Mike Dearneley (MD)	-	HR Wallingford
David Keiller (DK)	-	B&V
Angus Walker (AW)	-	BDB
Dan Normandale (DN)	-	Environment Agency
Sue Manson (SM)	-	Environment Agency
Adam Waugh (AW)	-	Environment Agency
Gregor McNiven (GM)	-	Marine Management Organisation
Emma Hawthorne (EH)	-	Natural England
Mike Quigley (MQ)	-	Natural England
Andrew Hearle (AH)	-	Natural England
Richard Saunders (RS)	-	Natural England

Date & Time: 02 October 2012 @ 10:00

Location: DEFRA offices, York

Subject: AMEP TRI-AGENCY MEETING No 15

	<u>ACTION</u>
<p>1. <u>PURPOSE OF MEETING</u></p> <p>1.1. To discuss outcomes of items at last meeting.</p> <p>1.2. To hold a workshop on the compensation package.</p> <p>1.3. To hold a workshop of the EMMP's.</p> <p>2. <u>COMPENSATION WORKSHOP (10:00-13:30)</u></p> <p>2.1. <u>BASELINE</u> (10:00-11:00)</p> <p>2.1.1. Existing foreshore (RC) (15 mins)</p> <p>2.1.2. Benthic interest (LH/AC) (15 mins)</p> <p>2.1.3. Avifaunal interest (LH/AC) (15 mins)</p> <p>2.2. <u>INTERTIDAL COMPENSATION</u> (11:00-12:30)</p> <p>2.2.1. Design of compensation site (DK) (1hr)</p> <p>2.2.2. Maintenance of RTE site (MD) (30 mins)</p> <p>2.3. <u>FUNCTIONALITY</u> (LH/AC) (30 mins)</p> <p>2.4. <u>PROGRAMME</u> (RC) (15 mins)</p> <p>BREAK</p> <p>3. <u>ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS (14:00-16:15)</u></p> <p>3.1. <u>MARINE EMMP</u> (SB/NC) (45 mins)</p> <p>3.2. <u>TERRESTRIAL EMMP</u> (SB/NC) (45 mins)</p> <p>3.3. <u>COMPENSATION EMMP</u> (SB/NC) (45 mins)</p>	

ABLE UK	AGENDA	By: JM
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4. **AOB**
5. **FUTURE MEETINGS**
17th August, Leeds – Compensation site, HRA

ANNEX B

EVIDENCE OF IMMINGHAM OUTER HARBOUR BEING OPERATIONAL 10 MONTHS BEFORE BREACH

http://econat-network.org/docs/documents/Session4_Estuaries_PAPER_Immingham.pdf

b) Immingham Outer Harbour, Humber, England

Kate Jennings, RSPB (formerly Natural England)

Immingham Outer Harbour port development, Humber Estuary, UK	
Full Title	Immingham Outer Harbour port development, Humber Estuary, UK: Application of Articles 6(3) and 6(4) of the Habitats Directive to a major infrastructure project
<p style="text-align: center;">THIS IS AN EXAMPLE OF:</p> <ul style="list-style-type: none">• The application of Articles 6(3) and 6(4) of the Habitats Directive to a major infrastructure development, including determination of ‘likely significant effects’ and ‘adverse effects on the integrity of an SPA, candidate SAC and Ramsar site• Proactive engagement of regulators and stakeholders in the Habitats Directive process, including the development of compensatory measures• Evolution of the UK approach by both developers and regulators to the Habitats Directive process, building, in part, on lessons learnt from the Dibden Bay case.	
Location	Country: UK Region: Yorkshire and the Humber Location: Port of Immingham, Humber Estuary Nearest city: Kingston-upon-Hull
European Site(s)	Humber Estuary Special Protection Area (SPA): Site number: UK9006111; Area: 37630.24 hectares Humber Estuary candidate Special Area of Conservation (cSAC) Site number:UK0030170; Area: 36657.15 hectares Humber Estuary Ramsar site Site number: UK11031; Area: 37987.80 hectares Humber Estuary Site of Special Scientific Interest (SSSI) – national designation Area: 37000.59 hectares
	<u>Habitats:</u> <ul style="list-style-type: none">• Estuary• Intertidal mudflats and sandflats• Subtidal sand banks• Saltmarshes• Sand dunes• Coastal lagoons <u>Species:</u> <ul style="list-style-type: none">• Sea and river lamprey• Grey seals• Natterjack toads• Breeding marsh harrier and wintering hen harrier (Annex 1)• Breeding avocet, bittern and little tern (Annex I)• Wintering avocet, bittern, golden plover and bar-tailed godwit (Annex I)• Ruff on passage (Annex I)

- Regularly occurring migratory species in numbers representing 1% or more of the biogeographic populations (knot, dunlin, black-tailed godwit and redshank in winter and on passage, and wintering shelduck)
- Waterfowl assemblage: In the non-breeding season, the area regularly supports 153,934 individual waterbirds

Economic activities:

- 400,000 people live in the flood plain – main centres of population on the banks of the estuary are the city of Kingston-upon-Hull, and the towns of Goole, Barton-upon-Humber, Barrow-upon-Humber, Immingham, Grimsby and Cleethorpes.

- The Humber has five ports (Hull, Goole, Immingham and Grimsby - all operated by Associated British Ports (ABP) and between them handling approx. 16% of all UK seaborne trade, and Humber Sea Terminal at North Killingholme operated by the Simon Group). It also has two large oil refineries, and is a major centre for chemical production, making this the largest ports and petro-chemical complex in the UK
- Much of the Humber's hinterland is highly productive Grade 1 Agricultural land (much of it having been claimed from the estuary in the past)
- Fishing, recreation and tourism also occur.

Authorities responsible for the management of the Natura 2000 site:

The status of the site as an SSSI, SPA, Ramsar and cSAC means that all 'public bodies' have statutory responsibilities with regard to the management of the site. These include:

- Countryside and Rights of Way Act 2000 (national legislation for SSSIs), Section 28G - 'Duty....to take reasonable steps, consistent with the proper exercise of the authority's functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest'
- Habitats Regulations 1994 (which transpose the Habitats Directive into UK law), Regulation 3(3) – ' In relation to marine areas any competent authority having functions relevant to marine conservation shall exercise those functions so as to secure compliance with the requirements of the Habitats Directive'
- Habitats Regulations 1994, Regulation 3(4) – 'Without prejudice to the preceding provisions, every competent authority in the exercise of any of their functions, shall have regard to the requirements of the Habitats Directive so far as they may be affected by the exercise of those functions'
- Habitats Regulations 1994, Regulations 48 – 50 – Require all competent authorities, before deciding to undertake, or give any consent, permission or other authorisation for a plan or project which may have a likely significant effect upon an SPA, Ramsar site* or SAC, to follow the processes set out in Articles 6(3) and 6(4) of the Habitats Directive.

* In the UK, the Habitats Regulations are also applied as a matter of policy to all Ramsar sites listed under the Convention on Wetlands of

	<p>International Importance, especially as Waterfowl Habitat.</p> <p>Natural England, selects, designates and regulates activities on SSSIs. In its role as the Government’s independent advisor on nature conservation, Natural England acts on behalf of Government to identify sites and propose them for designation as SPAs, Ramsar sites and/or SACs, and provides statutory advice to all competent authorities in relation to the Article 6(3) and 6(4) assessment of all plans and projects which may have likely significant effect upon any of these sites, and to all relevant authorities in relation to European Marine Sites. Natural England also leads on the production of conservation objectives for, and the monitoring of SSSIs, SPAs, Ramsar sites and SACs.</p> <p><u>Management Plan:</u></p> <p>For ‘European Marine Sites’ – ie SPA/Ramsar/SAC sites with intertidal and/or subtidal components), the Regulation 34 of the Habitats Regulations states that those public bodies with jurisdiction over the site (the ‘Relevant Authorities’) ‘may establish for a European marine site a management scheme under which their functions (including any power to make byelaws) shall be exercised so as to secure in relation to that site compliance with the requirements of the Habitats Directive’. Regulation 33 requires the appropriate nature conservation body (which for England is Natural England) to ‘advise other relevant authorities as to - (a) the conservation objectives for that site, and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated.</p>
	<p>On the Humber Estuary there are approx 35 Relevant Authorities who between them developed the ‘Humber Management Scheme’ (launched in 2005). Through this mechanism, the Authorities plan and review actions required to manage ongoing operations and activities on the site. However, the scheme does not cover the regulation of plans and projects.</p>
<p>Plan or project for which a Habitats Directive assessment was required</p>	<p>Proposal by Associated British Ports (ABP) - the UK’s largest ports group, for a new 4 berth deep water ‘ro-ro’ (roll on – roll off) terminal at the Port of Immingham</p>
<p>Project Description</p>	<p>This £55 million major infrastructure project was required by ABP to accommodate the next generation of freight handling ro-ro ferries, as the capacity of the existing port was limited by the width of the harbour mouth. The footprint of the development lay entirely within the Humber Estuary SSSI, SPA, Ramsar and cSAC, and the development had a number of significant and permanent predicted impacts:</p> <ul style="list-style-type: none"> • Direct loss of 22 hectares of intertidal mudflat (to lowest astronomical tide) supporting a typical intertidal invertebrate assemblage • Potential for indirect loss of additional intertidal mudflat (maximum 5 hectares) supporting a typical intertidal invertebrate assemblage • Permanent displacement of up to 603 over-wintering waterfowl (mean of peak counts) from the intertidal area including dunlin, redshank, black-tailed godwit, shelduck, curlew, teal, ringed plover and lapwing <p>There were also some predicted effects (including the loss of 0.4 hectares of saltmarsh) associated with creation of the managed realignment sites</p>

	designed to compensate for the losses associated with this development)	
Key Stages and Dates	Scoping document submitted to the then Department for the Environment, Transport and the Regions (DETR)	October 2000
	Draft Environmental Statement completed	June 2001
	Harbour Revision Order Application submitted to the Department for Transport	September 2001
	Application for Food and Environment Protection Act (FEPA) and Coastal Protection Act (CPA) licenses submitted to Marine Environment and Consents Unit	November 2001
	Signing of legal agreement between ABP, Natural England and other stakeholders setting out agreed compensation and mitigation measures which would be required were the development to be allowed to proceed in the absence of any alternatives and for imperative reasons of overriding public interest – June 2003	June 2003
	Approval of Harbour Revision Order (including conclusion of Appropriate Assessment, and ruling on the case for ‘no alternatives’ and ‘imperative reasons of overriding public interest’) by the Secretary of State for Transport	July 2004
	Immingham Outer Harbour becomes operational	
	Official opening of the breached managed realignment sites at Welwick and Chowderness	July 2006
		April 2007
Consents required and competent authorities	<ul style="list-style-type: none"> ▪ Harbour Revision Order – Secretary of State for Transport ▪ Food and Environment Protection Act licence – Maritime Consents and Environment Unit (MCEU) ▪ Coastal Protection Act licence – MCEU ▪ Planning permissions (for compensatory managed realignments) – East Riding of Yorkshire Council and North Lincolnshire Council 	
Assessment procedure	<p>The Habitats Regulations assessment (including the Appropriate Assessment) was undertaken by the Secretary of State for Transport (in their capacity as competent authority for the Harbour Revision Order application). This assessment was informed by a range of environmental baseline studies and modelling of predicted effects, funded and commissioned by the developer, with the advice of the stakeholders listed below. (The Habitats Regulations stipulate that developers seeking a permission that is likely to have a significant effect on a Natura 2000 site and therefore requires Appropriate Assessment must provide the information required to inform that assessment).</p> <p>The developer was proactive in involving a range of stakeholders including statutory bodies (Natural England, the Environment Agency, the Department for the Environment, Food and Rural Affairs (Defra), the Centre for Fisheries, Environment and Aquaculture Science (CEFAS) and the local planning authorities) and non-governmental organisations (The Royal Society for the Protection of Birds (RSPB) and the Yorkshire and Lincolnshire Wildlife Trusts) early in the development process, with extensive consultation commencing at the</p>	

	<p>scoping stage. Therefore, the proposal as submitted for assessment had already benefited from the input of these stakeholders. In addition, the Habitats Regulations require that when undertaking an Appropriate Assessment, the competent authority must consult the appropriate statutory nature conservation body (Natural England) and have regard to their advice, and the other stakeholders listed were also consulted on the Harbour Revision Order application.</p> <p>There was no consultation of the general public as part of the Habitats Regulations assessment.</p>
Assessment results	It was agreed that the impacts of this development (described under ‘project description’ above) were likely to constitute an adverse effect on the integrity of the Humber Estuary SPA, Ramsar site and candidate SAC.
Mitigation measures	<p>The following key mitigation measures were agreed, and where required by means of a legal agreement (covering both mitigation and compensation requirements) drawn up between the developer (ABP) and Natural England, the Environment Agency, The RSPB, the Lincolnshire Wildlife Trust and the Yorkshire Wildlife Trust:</p> <ul style="list-style-type: none"> • A habitat enhancement scheme over 4 hectares of existing intertidal habitat within the SPA, Ramsar site and cSAC, involving the closure of Doig’s creek sluice to permit natural infilling of Doig’s creek through accretion of intertidal sediments; • A Code of Practice to be agreed by the Environmental Steering Committee (as described under ‘Monitoring and/or Survey’ below) for construction workers to ensure awareness of the sensitivities of the estuarine environment; • Construction work required to adhere to the Environment Agency’s Pollution Prevention and other guidelines; • Construction work to be suspended for any period during which there is a severe weather ban on wildfowling in force on the Humber Estuary; • Dredging and construction works at the southern end of the development site to be avoided during the period November to March where feasible; • Contingency plans required for any major spillages that might occur, and all dredging vessels to be equipped with facilities to clean up minor spillages. <p>These measures were not sufficient to mitigate all expected adverse effects.</p>
Adverse effects after mitigation measures	The predicted adverse effects are those impacts listed under ‘Project Description’ above
Alternative solutions	<p>The following alternative solutions were identified:</p> <ul style="list-style-type: none"> • ‘Do nothing’ • Better use of existing facilities at the Port of Immingham • Alternative designs for works at Immingham • Alternative developments at other local ports
Imperative reasons of overriding public interest (IROPI)	<p>The case for imperative reasons of overriding public interest was based on the following:</p> <ul style="list-style-type: none"> • Ro-ro traffic through the UK, and especially on the Humber has increased and will continue to do so, and therefore new capacity was required • The key importance of the Port of Immingham to the regional and

	<p>national economy</p> <ul style="list-style-type: none"> • The presence of good transport links from Immingham – including via rail (20% of all UK rail freight is generated through activities at Immingham) • Location of the port in an area of high unemployment, where the port provides direct employment for 13% of the total employed in the working area, and indirect employment for 21% of the total employed • Without the new development, the existing port would not be able to handle new and larger vessels, with potentially adverse consequences for business and employment in the region and beyond <p>The Secretary of State agreed that there were no alternative solutions and imperative reasons of overriding public interest, and therefore that, subject to adequate compensation being secured, the development should proceed in spite of its predicted adverse effects on the integrity of the Humber Estuary SPA, Ramsar site and cSAC. This decision was made nationally, and the advice of the Commission was not sought in this instance.</p>
<p>Compensation measures (CM)</p>	<p>The compensation measures secured by means of the legal agreement described under ‘Mitigation measures’ above, were as follows:</p> <ul style="list-style-type: none"> • A managed realignment scheme at Welwick Sunk Island in the outer Humber Estuary designed to create around 45 hectares of intertidal habitat; • A managed realignment scheme at Chowderness in the inner Humber estuary designed to create 11 hectares of intertidal habitat, 5 of which are related to the Immingham Outer Harbour development (the remaining 6 hectares being required as compensation for another ABP development on the estuary). <p>ABP have responsibility for the funding, delivery and future management and monitoring of both schemes.</p> <p>The two schemes, combined with the habitat enhancement at Doig’s creek listed above were designed to include in total not less than 31 hectares of intertidal mud, (the total area to be lost as a result of the two developments to which this compensation relates, including 22 hectares direct loss and up to 5 hectares indirect loss due to the construction of Immingham Outer Harbour plus 4 hectares direct loss associated with the other development. This equates to an overall replacement ratio approaching 2:1. This is lower than the 3:1 ratio sometimes used for intertidal habitat in the UK, but was considered acceptable as, through the legal agreement, the developer is committed to taking further measures if the required targets are not achieved.</p> <p>The schemes were also designed to have the ability to provide feeding habitat for in excess of 800 (peak mean over five years) feeding water birds with typical species occurring in specified proportions: 60% dunlin; 20 black-tailed godwit; 10% redshank and 10% other species). This compares to the displacement of up to 603 over-wintering waterfowl (mean of peak counts) from the intertidal area at Immingham Outer Harbour (and 215 from the other ABP development), equating to a replacement:loss ratio of 1:1 in terms of bird numbers.</p> <p>Under the legal agreement, ABP was not able to start development of the Immingham Outer Harbour until:</p>

	<ul style="list-style-type: none"> • It had sufficient proprietary interest in the land needed for the managed realignments to enable it to undertake those managed realignments; and • It had secured any consents needed for the implementation of the Welwick managed realignment. (Consents for Chowderness were to be secured ‘as soon as reasonably practicable’) <p>Construction of the port development and engineering of the managed realignment sites ran broadly in parallel, and the formal opening of the realignments (shortly after they were breached) took place approximately 10 months after Immingham Outer Harbour became operational. As part of the agreed Code of Practice for construction (mentioned under ‘Mitigation measures’ above), the engineering of the managed realignment sites was monitored by an ecologist from the Humber Industry and Nature Conservation Association (of which both ABP and the majority of signatories to the legal agreement are members).</p>
<p>Monitoring and/or survey of the CM</p>	<p>There is an Environmental Management and Monitoring Plan that covers the construction and post-development monitoring of the Immingham Outer Harbour and Quay 2005 developments (the latter being the other ABP development on the Humber Estuary also linked to the Chowderness managed realignment). The plan also covers the construction and development of the associated habitat creation and enhancement projects described above which were required to mitigate and compensate for the impacts of these developments.</p> <p>Delivery of the Plan is the responsibility of ABP, but is overseen by the Environmental Steering Committee (ESC) which includes representatives from Natural England, the Environment Agency, the Department of Food and Rural Affairs (DEFRA), the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), the Local Authorities (East Riding of Yorkshire Council and North Lincolnshire Council), ABP Humber Estuary Services (a public authority arm of ABP responsible for navigation and vessel traffic in the Estuary), The RSPB, the Lincolnshire Wildlife Trust and the Yorkshire Wildlife Trust.</p> <p>The plan sets out the agreed duration for monitoring activities, which varies for the different parameters covered. For example, while construction monitoring was limited to the duration of the construction activity, aspects of post construction monitoring and monitoring of the mitigation and compensation sites will continue for up to 10 years, with full reviews to be conducted by the Environmental Steering Committee after 5 and 10 years.</p> <p>To date, the monitoring work undertaken has been effective in describing the evolution of the sites. As with other realignments elsewhere on the estuary, some features of the sites have developed more quickly than expected, while others have been slower than expected. For example, rates of warping (sediment accretion) have been higher than expected and the sites have rapidly become major roosting sites, while development of an invertebrate fauna characteristic of the surrounding intertidal habitats has been slow, and therefore numbers of feeding birds have been slow to build up. The Environmental Steering Committee have therefore agreed reductions in the frequency of monitoring of some parameters, while the duration of</p>

monitoring of others may need to be extended	
Key Issues (from the ECONAT peer-exchange point of view)	
Key/issues/questions raised	<p><i>The discussion in relation to this case study largely focussed on aspects which were considered to represent good practice:</i></p> <ul style="list-style-type: none"> • Proactive engagement by the developer of both regulators and other stakeholders very early in the development application process • Early agreement between all parties that the development would have a likely significant effect, would need an Appropriate Assessment, and was likely to have adverse effects on the integrity of the Humber Estuary SPA, Ramsar site and cSAC. This meant that was focussed on ascertaining the likely scale of those effects. • Based on a shared understanding that there was likely to be a strong case for ‘no alternatives’ and ‘imperative reasons of overriding public interest’, development of a legal agreement between the developer, environmental regulators and NGOs to agree the mitigation and compensation measures that would be required, where the development to be permitted to proceed. The legal agreement meant that both regulators and other stakeholders did not have to object to the development, thereby avoiding a Public Inquiry that would otherwise have been required.
Useful References	<p>Natural England: www.naturalengland.org.uk</p> <p>Associated British Ports: www.abports.co.uk</p> <p>The RSPB: www.rspb.org.uk</p> <p><i>How the scale of effects on internationally designated nature conservation sites in Britain has been considered in decision-making: A review of authoritative decisions.</i> English Nature Research Report No. 704, Hoskin & Tyldesley, 2006 Can be downloaded as a pdf from www.naturalengland.org.uk/ - follow links for ‘publications’</p> <p>Humber Industry and Nature Conservation Association (HINCA): Organisation linking industry and nature conservation and providing ecological services to members www.humberinca.co.uk</p> <p>Humber Management Scheme Management Scheme for ongoing activities within the ‘marine’ components of the Humber SPA, Ramsar and candidate SAC (ie all areas below Highest Astronomical Tide) www.humberems.co.uk</p> <p>Humber Bibliography: Online bibliographic database for published and grey literature about the physical and biological characteristics of the estuary plus land management and activities such as fishing www.humber-bib.hull.ac.uk</p>

	<p><i>The Humber Estuary: A Comprehensive Review of its Nature Conservation Interest</i></p> <p>English Nature Research Report No 547, Allen et al, 2003</p> <p>Can be downloaded as a pdf from www.naturalengland.org.uk/ - follow links for 'publications'</p>
Contacts for more information	<p>Kate Jennings, (formerly of Natural England). The RSPB, The Lodge, Potton Road, Sandy, Bedfordshire, SG19 2DL, kate.jennings@rspb.org.uk</p>

ANNEX C

COMPARISON OF AFFECTED AREA, COMPENSATION AREAS, RATIOS & TIME LAGS WITH OTHER COMPARABLE PROJECTS

COMPARISON OF HABITAT COMPENSATION SCHEMES

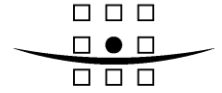
Scheme	Area affected	Compensation	Ratio	Timing
AMEP (proposed)	44 ha mudflat 13.5 ha estuary	101.5ha falling to a minimum of 44 ha of mudflat	2:1 falling to 1:1 for intertidal; 1:1 for estuary	Reasonable endeavours that breach shall be no more than 15 months after start of construction
Bathside Bay	69ha of mudflat 2.8ha of saltmarsh 5ha of sand/shingle	69ha of mudflat 10-20ha of saltmarsh 5ha of sand/shingle	1:1 for mudflat and sand/shingle, 4-8:1 for saltmarsh	Reasonable endeavours that breach is no more than 27 months after start of construction
Bristol	<p>Direct loss at the Avonmouth Site of 2.0ha of intertidal mudflat forming part of the SPA and the cSAC; a further 11.5ha of intertidal mudflat forming part of the cSAC; and a further 20.0ha of intertidal habitat (including 0.5ha saltmarsh) forming part of the SSSI.</p> <p>Localised alteration of the hydrodynamic regime leading to short to medium term functional change, as a result of significant accretion of fine sediments above background rates, in the vicinity of the Avonmouth Site to 60.0ha of intertidal mudflat and 5.0ha of atlantic saltmarsh forming part of the SPA, the cSAC and the Ramsar Site; and a further 15.0ha of intertidal mudflat forming part of the cSAC.</p> <p>Total: 113.5ha</p>	A minimum of 120ha of estuarine intertidal habitat.	Just over 1:1 (less than 1.1:1)	Compensation site had to be fully functional before construction of development.

Immingham Outer Harbour and Quay 2005	<p>Direct loss of 22ha of mudflat inside pSPA and 4ha outside pSPA</p> <p>Indirect estimated loss of 5ha</p> <p>Total: 31ha</p>	<p>59ha initially, never falling below 31ha</p>	<p>Nearly 2:1 falling to 1:1</p>	<p>ABP to have proprietary interest in land and have obtained any consents for two of three sites before construction; the third (a MR scheme) as soon as reasonably practicable. No maximum time lag specified.</p>
London Gateway Port	<p>Loss of 25ha undesignated mudflat, including 9ha used by wintering wildfowl associated with the SPA</p> <p>Conversion of up to 5ha designated mudflat from intertidal to subtidal (predicted to occur through coastal processes)</p> <p>Conversion of up to 10ha of designated mudflat to saltmarsh (predicted to occur through coastal processes)</p> <p>Accumulation of silt on up to a further 50ha of designated mudflat leading to 'net functional change'</p> <p>Total: 74 ha</p>	<p>a minimum of 74ha of intertidal mudflats (split across two MR sites) to provide habitat for displaced wintering waterfowl</p>	<p>1:1 from the outset</p>	<p>Breach to create one site (site A - up to 33ha) before commencement of construction, breach for other site (site X – rest of 74ha) no later than 48 months after start of construction.</p>

ANNEX D

BATHSIDE BAY CEMMP

(provided to Applicant by Natural England on 3rd October 2012)



ROYAL HASKONING

**POSFORD HASKONING
ENVIRONMENT**

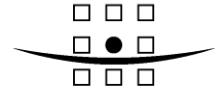
**Bathside Bay Container Terminal: Tidal
Works and Approach Channel Deepening**

September 2004

**European Sites Compensation, Mitigation
and Monitoring Agreement**

FINAL REPORT

WITHOUT PREJUDICE AND SUBJECT TO CONTRACT



ROYAL HASKONING

**POSFORD HASKONING
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Document title Bathside Bay Container Terminal: Tidal
Works and Approach Channel Deepening
European Sites Compensation, Mitigation
and Monitoring Agreement

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Project number 9M1274
Client Hutchison Ports (UK) Ltd
Reference 9M1274/R/MAS/Exet

Prepared by Matt Simpson and Sian John (Posford Haskoning) /
Jeremy Spearman and Mike Dearnaley (HR
Wallingford)

CONTENTS

	Page
1 INTRODUCTION	1
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
2 PROPOSALS FOR MITIGATION MEASURES	9
2.1 CURRENT MITIGATION AND PRACTICE	9
2.2 MITIGATION FOR YEAR-ON-YEAR ONGOING LOSS	11
2.3 THE PROPOSED MITIGATION STRATEGY	13
3 PROPOSALS FOR COMPENSATORY MEASURES	19
3.1 INTRODUCTION	19
3.2 OBJECTIVES OF COMPENSATION	19
3.3 MANAGED REALIGNMENT AT LITTLE OAKLEY, HAMFORD WATER	23
4 MONITORING	31
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
5 FUTURE MANAGEMENT STRATEGY	39
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)¹ 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.

¹ 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 Directive¹, as amended by the Habitats Directive², 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 site³. 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).

¹ Council Directive on the conservation of wild birds (79/409/EEC)

² Council Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC)

³ 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 FDRC¹
- The RSPB
- Suffolk Wildlife Trust
- Essex Wildlife Trust
- Kent and Essex Sea Fisheries Committee
- Eastern Sea Fisheries Joint Committee
- CEFAS
- ABP Ipswich

¹ 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 1,560¹ waterbirds) from the pSPA;
- The loss of roosting area (saltmarsh and raised sand and gravel areas) that support 2,240² 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.

¹ 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.

² 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 PRACTICE¹

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.

¹ 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
TOTAL	140,000

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 9,000m³/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.

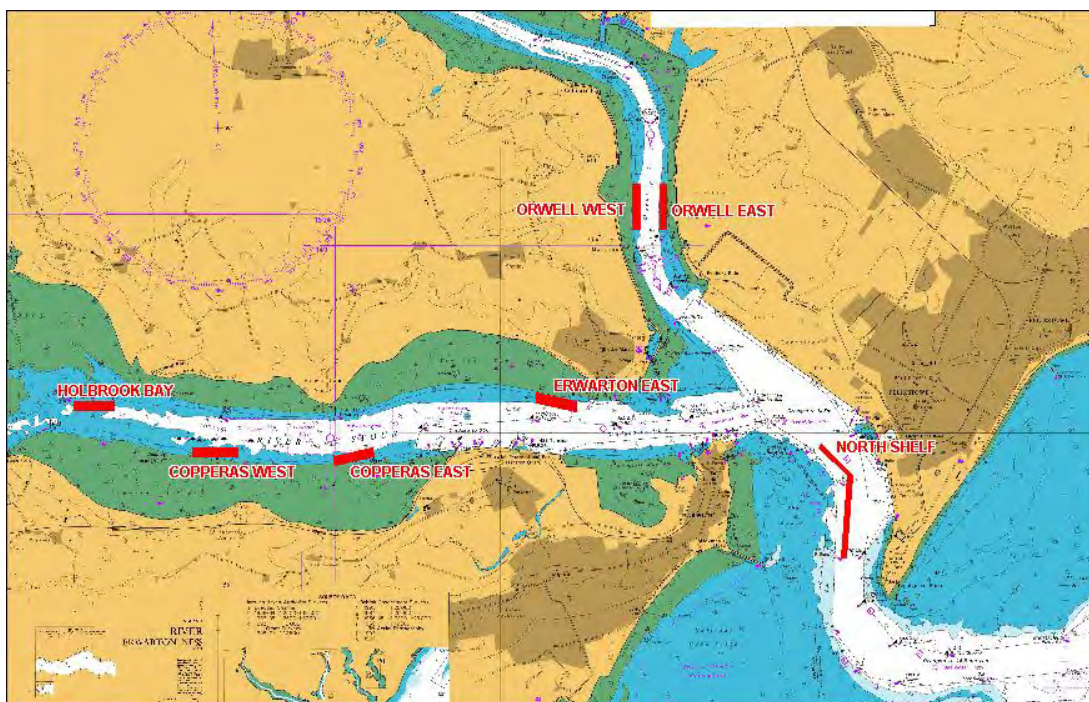


Figure 3 Location of sites currently licensed for the placement of maintenance dredged material as part of the sediment replacement programme

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 2.8-3.3Mm³/year to 4.1-5.4Mm³/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

Location	Existing licensed quantities (as of Nov 2001, dry tonnes/year)	Proposed licensed quantities as mitigation for the Bathside Bay Container Terminal development and previous consented projects (dry tonnes/year)
Water column recharge Orwell	30,000	40,000
Water column recharge Stour	110,000	160,000
Subtidal placement	110,000	300,000
TOTAL	250,000	500,000

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 1999/00¹; 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:

- Mudflats – should be similar, where technically achievable, to those at Bathside Bay in terms of i) gradient, ii) substrate type and iii) elevation;
- Shallow water – the site has been located and will be designed to promote shallow water characteristics during tidal incursion and excursion;
- Shelter – the remnant seawalls will be retained for protection (and access restricted); and
- 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
EFFECT ON THE STOUR AND ORWELL ESTUARIES SPA AND RAMSAR SITE	
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
EFFECT ON THE HAMFORD WATER SPA AND RAMSAR SITE	
To offset any loss (due to inundation) of brackish/freshwater drains and associated communities ¹	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

¹ 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
TOTAL	-	138	-

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 commence¹ 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

¹ 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.

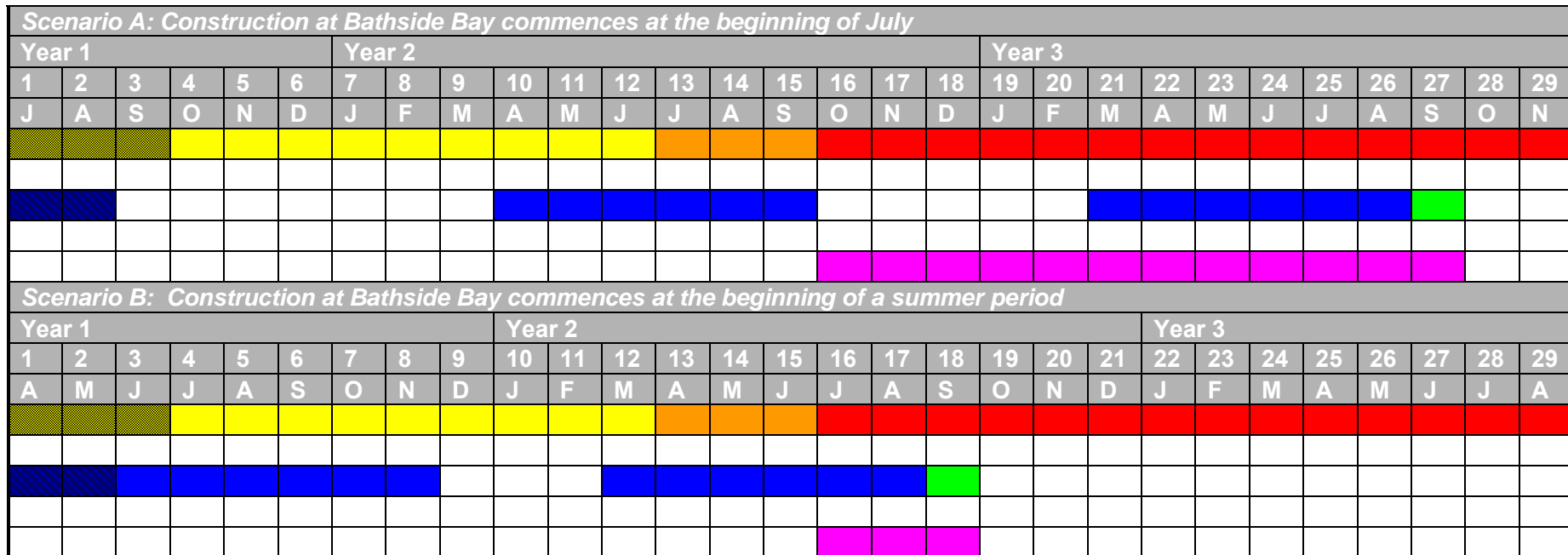
3.3.3 Implications for the Stour and Orwell Estuaries SPA and pSPA









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



	Lead in time prior to construction of small boat harbour (design)
	Construction of small boats harbour at Bathside Bay
	Stripping of silts and commencement of piling at Bathside Bay
	Reclamation work at Bathside Bay
	Lead-in time prior to construction of Little Oakley Managed Realignment (design)
	Construction of Little Oakley Managed Realignment
	Breaching of the seawall at the Little Oakley Managed Realignment site
	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 weather¹ 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.

¹ 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)¹;
- Low water overwintering bird counts and the analysis of high water WeBS data for the system² (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;

¹ 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.

² 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 2m²) 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 (75,000m³ 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

Potential problem	Possible intervention measure
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.

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**APPENDIX 1
FEEDING AND ROOSTING COUNT DATA
BATHSIDE BAY**

ANNEX E

DRAFT COMPENSATION SITE EMMP AS AT 20TH
NOVEMBER 2012

Able Marine Energy Park

Management and Monitoring Plan:

**3. Compensation habitat – Cherry
Cobb Sands RTE/managed
realignment site and associated wet
grassland area**

TABLE OF CONTENTS

TABLE OF CONTENTS	1
1. INTRODUCTION	2
1.1 Process of Finalising Outstanding Targets	2
1.2 Steering Group.....	2
2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS	4
2.1 Intertidal Habitats	4
2.1.1 Baseline North killingholme marsh (NKM)	4
2.1.2 Impacts.....	5
2.1.3 Baseline cherry cobb sands Saltmarsh	7
2.1.4 Impacts.....	8
2.1.5 Baseline for cherry cobb sands intertidal	8
2.1.6 Impacts.....	9
2.2 Terrestrial Habitats.....	10
2.2.1 Baseline for The compensation site	10
2.2.2 Impacts.....	10
2.2.3 Baseline for north killingholme haven pits (nkhp).....	10
2.2.4 Impacts.....	13
3. OBJECTIVES	14
3.1 Construction.....	14
3.1.1 Rationale & Objectives	14
3.2 Regulated Tidal Exchange	19
3.2.1 Rationale & Objectives	19
3.3 Wet Grassland and Open Water Area	28
3.3.1 Rationale & Objectives	28
3.4 Birds.....	41
3.4.1 Rationale & Objectives	41

1. INTRODUCTION

1. The development of the Able Marine Energy Park (AMEP) east of North Killingholme on the Lincolnshire Coast will partly affect the Humber Estuary Special Area of Conservation (SAC) and the Special Protection Area (SPA) / Ramsar site. Measures to compensate for the effects of AMEP on these European sites have been identified, and are to be implemented on the north bank of the Humber Estuary near Cherry Cobb Sands (CCS).
2. This document is an Ecological Management and Monitoring Plan (EMMP) for the compensation sites and it has been drawn up taking account of guidance on management planning produced by the Conservation Management System (CMS) Consortium (www.cmsconsortium.org). It describes the compensation measures that are required and lists specific objectives which are fundamental to their delivery. Further it includes targets and management actions which support the objectives and the monitoring which will be undertaken to confirm progress towards the objectives, and ultimately confirming that they have been achieved. Limits of acceptable change are defined and any necessary remedial actions which will be undertaken should the monitoring show that these limits have not been met.

1.1 Process of Finalising Outstanding Targets

3. The compensation proposals for AMEP are complex, and the objectives and targets / management options included in this version of the EMMP have been subject to extensive discussions with stakeholders. Prior to the DCO being granted, the EMMP will be further refined through continued regular meetings with key stakeholders about targets / management actions and subsequent monitoring requirements which are yet to be agreed.
4. The EMMP is a live working document which will be in place for as long as it is deemed necessary to achieve the agreed objectives set out in it. Updates to it will be overseen by the Steering Group, whose role is explained below and includes undertaking a complete review of the EMMP every five years.

1.2 Steering Group

5. AHPL will have overall responsibility for the implementation of the EMMP. However, the involvement of other stakeholders is essential for the effective working of the EMMP, and hence AHPL will establish a Steering Group whose role will include the following:
 - to monitor the progress of implementation of the EMMP to ensure that it is meeting the objectives;
 - to consider and recommend remedial measures where those objectives are not being met;

- to provide expert views, opinions and feedback to AHPL about key issues through regular meetings and the making of formal recommendations;
 - to help direct and focus the EMMP and its development in an interactive way including through revisions to targets, monitoring requirements and if necessary the adoption of any remedial actions;
 - to undertake a comprehensive review of the EMMP at least every five years;
 - to co-opt members and working groups if necessary;
 - to ensure a transparent and open process to the implementation of the EMMP with an evident audit trail, and regular updates are produced for dissemination to a wider audience (e.g. via AHPL / HINCA websites).
6. AHPL is seeking an inclusive approach and the Steering Group will comprise the following stakeholders in addition to AHPL:
- Natural England;
 - Environment Agency (EA);
 - The Royal Society for the Protection of Birds (RSPB);
 - Marine Management Organisation(MMO);
 - representatives from the local wildlife trusts;
 - representatives from the local authorities;
 - Humber Industry Nature Conservation Association (HINCA); and
 - Two representatives, one from the local residents and one from local interest groups (which can be rotated as required).
7. In addition to the above the Steering Group can co-opt members and form working groups where appropriate to consider specific issues. The chair of the Steering Group will be HINCA, an organisation of some standing in the Humber area (<http://humberinca.co.uk/introduction.php>) for over a decade, and one which the vast majority of other members of the Steering Group are already members.

An agenda will be drawn up in advance of each Steering Group meeting by AHPL and minutes will be produced after the meeting by them for agreement. The compensation proposals are complex and the Steering Group will meet frequently. Until 2018 EMMP meetings will be held at least every quarter, and then the frequency will be subject to review by the Steering Group. The Steering Group will also be able to call special meetings in response to specific issues / concerns identified based on a majority decision amongst the Group.

2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS

2.1 Intertidal Habitats

2.1.1 BASELINE NORTH KILLINGHOLME MARSH (NKM)

8. The baseline is described in EX23.3 Part 2 in terms of historical trends, mud type, benthic community and bird populations. The shore was eroding but has entered a phase of accretion since 2000 after the construction of the Humber International Terminal. As a result, over the last 10 years the intertidal area that lies between the MHWN and MHWS elevations has increased from 3.27 ha to 18.95 ha, an increase of 15.68 ha. The sediments are composed of a high proportion of fine silts giving soft and sloppy mud. The upper shore is subject to colonisation by *Spartina anglica* dominated saltmarsh. Table 1 summarises the benthic population (details of the methodology are given in Annex 10.1 of the Environmental Statement (ES). Biomass is wet (blotted) weight in grams. Further data is provided in the Marine EMMP (MEMMP).

Table 1: Intertidal Abundance and Biomass of Principal Species

abundance								
species	(12 x 0.01m ² samples)	per m ²	species	(12 x 0.01m ² samples)	per m ²	species	(12 x 0.01m ² samples)	per m ²
<i>Tubificoides benedii</i>	268	2233	<i>Tubificoides benedii</i>	271	2258	<i>Streblospio shubsolii</i>	91	758
<i>Hediste diversicolor</i>	114	950	<i>Corophium volutator</i>	202	1683	<i>Corophium volutator</i>	88	733
<i>Corophium volutator</i>	109	908	Nematoda	93	775	Nematoda	21	175
<i>Streblospio shubsolii</i>	50	417	<i>Streblospio shubsolii</i>	50	417	<i>Tubificoides swirencoides</i>	16	133
Nematoda	49	408	<i>Macoma balthica</i>	47	392	<i>Tubificoides benedii</i>	15	125
biomass			biomass			biomass		
Upper shore			Mid shore			Lower shore		
species	(12 x 0.01m ² samples)	per m ²	species	(12 x 0.01m ² samples)	per m ²	species	(12 x 0.01m ² samples)	per m ²
<i>Hediste diversicolor</i>	2.86	23.83	<i>Macoma balthica</i>	1.55	12.92	<i>Macoma balthica</i>	0.21	1.75
<i>Corophium volutator</i>	0.42	3.50	<i>Corophium volutator</i>	0.45	3.75	<i>Corophium volutator</i>	0.13	1.08
<i>Macoma balthica</i>	0.27	2.25	<i>Tubificoides benedii</i>	0.2	1.67	<i>Hediste diversicolor</i>	0.07	0.58
<i>Tubificoides benedii</i>	0.17	1.42	<i>Hydrobia ulvae</i>	0.02	0.17	<i>Mysella bidentata</i>	0.06	0.50
<i>Streblospio shubsolii</i>	0.01	0.08	<i>Streblospio shubsolii</i>	0.01	0.08	<i>Streblospio shubsolii</i>	0.03	0.25
Total biomass per m²		31.08			18.58			4.17

2.1.2 IMPACTS

9. Details of agreed impacts are provided in the Statement of Common Ground (SoCG) on the Shadow Habitat Regulations Assessment (sHRA). Habitat losses are detailed in Annex B and summarised in Table 2.

Table 2: Direct (SAC/ SPA) and Indirect (SPA) habitat loss (ha)

	HABITAT TYPE		
	Saltmarsh	Intertidal Mudflat	Sub-tidal (Estuary)
Short Term	-2	-41.1	-13.5
Medium Term (0-30 years)	3.8	-39	-14
Long Term (0-100 years)	3.8	-44	-9

10. A combination of direct and indirect losses associated with the site together with long term losses in the Humber identified by the Environment Agency provide a requirement to replace a long term loss of 101.5 ha of habitat of which 88 ha is intertidal and 13.5 ha is sub-tidal. This total reflects the SPA habitat losses which are higher than those of the SAC as they include functional loss of use to birds through disturbance. They also reflect the requirement to replace intertidal habitat on 2:1 basis (due to uncertainty) and other habitats on a 1:1 basis.
11. Nine species of bird were identified as likely to be displaced by direct habitat loss and functional disturbance to the extent that an impact on site integrity was anticipated. This assessment was based on peak counts. These peaks were all recorded from the Through the Tide Counts (TTTC) reported in Chapter 11 of the ES. These peaks were all higher than the Five year mean peaks reported from WeBs counts for the period 2004/05-2008/09.

Table 3: Bird Species

Species	Humber Qualifying Population	Humber Min & Max Peaks (WeBS 2004/5-2008/09)	NKM Peak & % of Humber population represented by Peak
Avocet (breeding)	493	374-652	4 (0.8%) TTTC
Bar-tailed Godwit	5926	1490-5926	123 (3.2%) TTTC
Black-tailed Godwit	3887	2435-5323	2566 (66%) TTTC
Curlew	4440	3071-5180	158 (3.6%) TTTC
Dunlin	21518	14733-26305	1029 (4.8%) TTTC
Lapwing	18756	11700-27421	325 (1.7%) TTTC
Redshank	5445	3886-8494	540 (9.9%) TTTC
Ringed Plover	2168	781-2168	210 (9.7%) TTTC
Shelduck	5314	2892-5804	109 (2.0%) TTTC

12. Effects arising from piling on marine mammals and sea lamprey are dealt with in the Marine EMMP (MEMMP).

2.1.3 BASELINE CHERRY COBB SANDS SALTMARSH

13. The baseline is recorded in Annex 35.1 of the Environmental Statement (ES). A description of the saltmarsh that will be affected by the works is included in Annex 34.1 of the ES, and briefly summarised below.
14. The upper saltmarsh in the vicinity of Cherry Cobb Sands varies in width from five metres seaward from the base of the existing sea defences at Stone Creek in the south of the site, up to 330 m at the Outstray in the north of the site (2010 data). In a similar manner, the width of the mid saltmarsh zone also varies from 60 m in the south to around 300 m in the north of the site.

15. There is dense saltmarsh vegetation cover in the upper and mid saltmarsh zones, with little or no signs of erosion, which indicates that the habitat quality is good. These zones are dominated by sea couch grass *Elytrigia atherica* (*Elymus pycnanthus*) with other species of note including sea plantain *Plantago maritima*, red fescue *Festuca rubra* and Orache *atriplex* sp. A network of saltmarsh creeks runs through these zones, allowing water to drain off following high tide as well as allowing freshwater from the land to discharge into the estuary.
16. The lower saltmarsh zone is extensive, stretching up to 800 m from the edge of the mid saltmarsh zone. It is thought that this zone is gradually accreting. The lower saltmarsh is dominated by 'pioneer' species including annual glasswort *Salicornia europea* agg. and common cord grass *Spartina anglica*.

2.1.4 IMPACTS

17. Creation of the compensation site will require the removal of 2ha of saltmarsh for the channel in the immediate term. In the medium to long term there will be no impacts as saltmarsh will accrete as a consequence of the development and compensation site.

2.1.5 BASELINE FOR CHERRY COBB SANDS INTERTIDAL

18. Bird surveys (EX35.14) undertaken between August 2010 and April 2011 by the Institute of Estuarine and Coastal Studies (IECS) in an area which covered both the intertidal habitats at CCS and in the inland farmland which will form the compensation site, showed that the foreshore was used by important numbers of one or more of the qualifying interest species of the SPA/Ramsar site throughout the period August to April. Species such as shelduck, grey plover, curlew, redshank, knot and dunlin were present in numbers usually well in excess of 1% of the Humber Estuary SPA/Ramsar population at both high and low tides in almost all the months surveyed. Curlew was also present on the compensation site fields in important numbers over the autumn passage period (September – October). Other species such as teal, lapwing and golden plover were present in numbers exceeding 1% in October and December to March, with black tailed godwit present in December and January, and bar-tailed godwit in most months between November and April. Passage interest included ringed plover and greenshank both of which were present on the foreshore in important numbers in August, ruff in September, and little egret on the foreshore in October. WeBS counts (see Section 35.7.9 of the ES) show that important numbers of some species can occur even over the summer months (eg ringed plover in May and dunlin in July).
19. EX34.2 provides some information on the temporal and spatial distribution of benthic communities within the Humber estuary, including abundance data for the Cherry Cobb sands area. This is summarised in the Table 4 below:-

Table 4: Prey Abundance at Cherry Cobb Sands

Mean per m ²	2000	2001	2002
<i>Abra tenuis</i>	1367	937	0
<i>Corophium volutator</i>	51	51	0
<i>Crangon crangon</i>	0	25	0
<i>Cyathura carinata</i>	51	0	0
<i>Enchytraeidae</i>	10937	83443	8759
<i>Eteone longa</i>	228	76	152
<i>Hediste diversicolor</i>	582	1367	1190
<i>Hydrobia ulvae</i>	152	0	329
<i>Macoma balthica</i>	3165	4557	6203
<i>Manayunkia aestuarina</i>	3823	25	0
<i>Nematoda</i>	0	39595	0
<i>Nephtys</i>	0	25	0
<i>Nephtys hombergii</i>	0	0	51
<i>Paranais litoralis</i>	101	0	0
<i>Pygospio elegans</i>	0	51	1975
<i>Scrobicularia plana</i>	0	0	456
<i>Streblospio shrubsolii</i>	0	51	0
<i>Tubificoides benedii</i>	14532	6582	1215
Total	34987	136785	20329

20. Key prey species for black-tailed godwit are highlighted in yellow and occur in higher abundance than south shore sites during the same period.

2.1.6 IMPACTS

21. Works to create the compensation site are not predicted to have significant effects on the SPA bird species. This is largely due to the visual and acoustic screening of the works which is expected from the existing sea defence wall, the diversion inland of the coastal footpath which will remove a source of disturbance to birds on intertidal habitats (which may be having effects at present) without increasing the effects on birds on inland fields, and the timing of the works to cover predominantly the summer months. This is a period when the intertidal habitats are typically less well used by waterbirds, the birds have more choice of location in which to forage and roost, and there is more daylight and good benthic invertebrate food availability across the intertidal mudflats. In addition the creation of the new embankment is several hundred metres away from the edge of the intertidal habitat which is very extensive.
22. Mitigation to reduce impacts includes timing of the work so that potentially disturbing activities closest to intertidal bird populations occur April to October.

2.2 Terrestrial Habitats

2.2.1 BASELINE FOR THE COMPENSATION SITE

23. The compensation site comprises the Regulated Tidal Exchange (RTE) and Cherry Cobb Sands Wet Grassland (CCSWG) and is described in EX28.3 parts 3 & 4. The existing baseline is provided in Chapter 35 of the ES but updated in EX28.3 Part 6 to reflect the movement of the wet grassland and roost site from Old Little Humber Farm to CCSWG. The current use of the area is arable farmland. The landscape was assessed as having low ecological value. No water voles were present but colonisation by transient animals cannot be ruled out.
24. A badger survey is reported in Annex 35.8 of the ES and updated by EX35.13. It found two main social groups associated with two main setts and a number of outlying and subsidiary setts, with some evidence of a decline in use between surveys.

2.2.2 IMPACTS

25. These are described in EX28.3 Part 6 EIA Review and it is concluded that ecological impacts will be largely the same as those predicted in the original ES and be negligible or of minor adverse significance only.
26. Badger surveys indicated the proposals would result in the loss of 4 outlying setts associated with the group of badgers based at Sett 28, and 5 outlying setts associated with the group of badgers based at Sett 11. None of the affected setts received high levels of use from badgers in either 2011 or 2012, and none were located close to a key seasonal food source or other resource likely to be crucial to the badgers' survival. Given the availability of alternative setts elsewhere within their range, this loss would be unlikely to have a detrimental impact on badgers. A licence to close outlier setts will be required but overall the increase in foraging habitat will be beneficial.
27. Minor construction impacts could occur for reptiles without mitigation.
28. The greatest change in impacts related to the revised Compensation Scheme is apparent during the operation of the scheme, where there will be minor changes to views from a nearby property (Fair View) because of the widened embankment around the RTE scheme, and a minor change to the landscape as a result of the wind pumps at the wet grassland site.

2.2.3 BASELINE FOR NORTH KILLINGHOLME HAVEN PITS (NKHP)

29. Operational impacts are dealt with in the Terrestrial EMMP (TEMMP).
30. Baseline information on NKHP is in Chapter 11 of the ES and in the sHRA. The site holds significant numbers of the Humber bird population, and these are summarised in Table 5;

Table 5: NKHP TTTC & WeBs Peaks

Species	Humber population	Peak / Mean of Peak count	Proportion Of Humber Population (%)	Month	Data Source
Assemblage	140197	4112	2.9	Aug	TTTC
		3787	2.7	Sep	WeBS
Avocet	493	16	3	Mar	TTTC
		27	5.5	Mar	WeBS
Bar-tailed godwit	(5926)	1	<0.1	Aug,Sep,Oct	TTTC
		-	-	-	WeBS
Black-headed gull	(7865)	41	0.5	Aug	TTTC
		-	-	-	WeBS
Black-tailed godwit*	3887	3 800	97.8	Aug	TTTC
		3 338	85.9	Sep	WeBS
Canada goose	580	-	-	-	TTTC
		1	0.1	Apr	WeBS
Common sandpiper	(46)	1	2.2	Jul,Aug	TTTC
		-	-	-	WeBS
Coot	1166	2	0.2	May,Feb,Mar	TTTC
		3	0.3	Mar	WeBS
Cormorant	(219)	1	0.5	Aug	TTTC
		1	0.3	Sep	WeBS
Curlew*	4440	7	0.2	Oct,Mar	TTTC
		12	0.3	Feb	WeBS
Dunlin	21518	270	1.3	Oct	TTTC
		380	1.8	Nov	WeBS
Golden plover	46926	1	<0.1	Aug	TTTC
		-	-	Feb	WeBS
Great black-backed gull	226	1	0.4	Jan	TTTC
		-	-	-	WeBS
Grey heron	74	3	4.1	Oct	TTTC
		3	4.1	Sep,Oct	WeBS
Knot	41772	12	<0.1	Aug	TTTC
		-	-	-	WeBS
Lapwing*	18756	5	<0.1	Oct	TTTC
		276	1.5	Nov	WeBS
Little egret	38	1	2.6	Jun,Jul	TTTC
		-	-	-	WeBS

Species	Humber population	Peak / Mean of Peak count	Proportion Of Humber Population (%)	Month	Data Source
Little grebe	92	-	-	-	TTTC
		1	0.9	Sep	WeBS
Little ringed plover	6	2	34	Apr	TTTC
		-	-	-	WeBS
Mallard	2096	34	1.6	Oct	TTTC
		71	3.4	Sep	WeBS
Moorhen	146	4	2.7	Jul	TTTC
		2	1.6	Sep	WeBS
Mute swan	288	1	0.3	Jul,Oct,Jan	TTTC
		1	0.3	Feb	WeBS
Oystercatcher	3528	4	0.1	Mar	TTTC
		2	<0.1	Aug	WeBS
Redshank	5445	249	4.6	Aug	TTTC
		215	3.9	Aug	WeBS
Ringed plover	(2168)	-	-	-	TTTC
		1	0.1	Aug	WeBS
Ruff	64	-	-	-	TTTC
		1	0.9	Sep	WeBS
Shelduck	5314	9	0.2	May	TTTC
		7	0.1	Mar	WeBS
Shoveler	145	61	42.1	Oct	TTTC
		29	20	Dec	WeBS
Smew	2	1	50	Jan	TTTC
		-	-	-	WeBS
Snipe	118	6	5.1	Oct	TTTC
		4	3.4	Oct	WeBS
Teal	2865	46	1.6	Oct	TTTC
		30	1.0	Nov	WeBS
Tufted duck	417	1	0.2	Jul	TTTC
		1	0.2	Sep	WeBS
Water rail	7	2	28	Jun	TTTC
		-	-	-	WeBS

2.2.4 IMPACTS

31. No direct impacts are predicted but the loss of intertidal feeding arising from the development may reduce the attractiveness of NKHP as a roost site and lead to displacement resulting in an effect on site integrity.

3. OBJECTIVES

3.1 Construction

3.1.1 RATIONALE & OBJECTIVES

32. Construction impacts at NKM are dealt with in the MEMMP, and those at NKHP in the Terrestrial EMMP (TEMMP).
33. Impacts have been identified during the construction of the compensation site (RTE and CCSWG) and objectives to ensure appropriate mitigation and legal compliance during construction are required.
34. Impacts requiring mitigation have been identified for intertidal birds, breeding birds, reptiles, badgers (licensing of sett closures will be required), and water voles (probably not present but pre-survey required given records of transient populations in locality).
35. The agricultural fields that form the proposed compensation site are only used by curlew in any numbers on a regular basis. It has been agreed with Natural England that the birds currently supported on the agricultural fields that comprise the compensation site can be supported in adjacent fields. Much of the work on the inland embankment will have been completed prior to the main period of use during the autumn passage, and construction work will not be ongoing across the whole 3 km of the new embankment all at once. Hence there will be adjacent fields that will not be subject to disturbance from the works that will be available for the birds to use throughout the period they are likely to be present.
36. The intertidal area was surveyed as described in EX35.14. However this data represents peak counts only over a single non-breeding season. Targets based on WeBs data are difficult to use as the WeBs count area extends from Paull to Cherry Cobb Sands. One option may be to take the peak counts recorded in EX35.14 and apply a natural variability test derived from the standard deviation of the WeBs count data for Autumn (22% of the 5 year mean peak) and winter (42% of the 5 year mean peak). Further discussions with NE will take place to establish a suitable reference point against which disturbance can be measured.
37. The construction of RTE sluices requires piling. If programming of works does not allow piling to be undertaken during April to July then auger piling will be used in conjunction with a method statement agreed with Natural England.
38. Good construction practice and adherence to Pollution Prevention Guidance will be embedded into any works undertaken on site.

Objective C1: Construction will comply with legal requirements and best practice with regard to reptiles and water voles.

Target	<ul style="list-style-type: none"> No killing or injuring of protected species
Management	<ul style="list-style-type: none"> Strim habitat fortnightly to ensure habitat remains unsuitable for colonisation Ecological briefing for workforce (including recognition, contact procedures, action to be taken)
Monitoring	<ul style="list-style-type: none"> Undertake pre-construction survey of suitable habitat for reptiles and water voles
Who	<ul style="list-style-type: none"> Survey by suitably experienced surveyor Briefing by Environmental manager/ Ecological Clerk of Works
When	<ul style="list-style-type: none"> Pre-construction
Limits of Acceptable Change	<ul style="list-style-type: none"> N/A
Remedial Action	<ul style="list-style-type: none"> Cease work if animals found in work area and consult with Environmental Manager
Notes	Likelihood of either reptiles or water voles being present is low given habitat.

Objective C2: Prevent harm to breeding birds.

Target	<ul style="list-style-type: none"> No killing or injuring of nests, eggs, or chicks of wild birds.
Management	<ul style="list-style-type: none"> Remove suitable nesting habitat to north of existing sea wall (i.e. protected from disturbance to birds on intertidal area) during September-March. Strim areas fortnightly to reduce suitability. Ecological briefing for workforce (including recognition, contact procedures, action to be taken) Where potential nesting habitat remains (e.g. close to intertidal) and works take place during April-August site to be checked for nesting birds.
Monitoring	<ul style="list-style-type: none"> Undertake pre-construction survey of suitable habitat for nesting birds
Who	<ul style="list-style-type: none"> Survey by suitably experienced surveyor Briefing by Environmental manager/ Ecological Clerk of Works
When	<ul style="list-style-type: none"> Pre-construction
Limits of Acceptable Change	<ul style="list-style-type: none"> N/A
Remedial Action	<ul style="list-style-type: none"> Cease work if nesting birds found in work area and consult with Environmental Manager. Any active nests not to be disturbed until young have fledged and capable of sustained flight.
Notes	

Objective C3: Ensure construction is legally compliant in relation to badgers

Target	<ul style="list-style-type: none"> • Safe and licensed exclusion of badgers from setts. • Provision of suitable foraging habitat • Provision of 10 earth mounds for sett building at base of RTE northern bund and/or around CCSWG site
Management	<ul style="list-style-type: none"> • Undertake repeat survey to inform licence application. • Licence application (licences are usually only issued for period 1st July-30th November). • Closure of setts under licence. • Adherence to mitigation in licence and EX35.13
Monitoring	<ul style="list-style-type: none"> • Pre-construction to validate 2012 survey • Post construction walkover survey to check colonisation of earth mounds and sett and latrine usage.
Who	<ul style="list-style-type: none"> • Monitoring by suitably experienced consultant • Environmental Manager responsible for licensing issues and adherence to conditions.
When	<ul style="list-style-type: none"> • Repeat survey for licence application February-March 2013 • Licence application June-July 2013. • Creation and planting of mounds, planting of fruit and berry bearing shrubs at wet grassland from winter 2012/13. At RTE this process to take place in winter 2014/15. • Sett closure July-November 2013. • Post construction surveys annually for five years to cease after 3 years if population stable.
Limits of Acceptable Change	<ul style="list-style-type: none"> • 10% reduction in total number of subsidiary or outlying setts used within three years. • 5% reduction in annex setts used within two years • Cessation of use of any main sett within one year
Remedial Action	<ul style="list-style-type: none"> • Bait survey to inform analysis • If declines associated with foraging resource introduce supplementary feeding during periods of drought or other hardship • Increase foraging resource (further planting)
Notes	<p>Vegetation on mounds, particularly that at CCSWG should be unsuitable for raptors and corvids (i.e. should comprise weak stemmed and low growing cover such as raspberry and bramble). No planting should be undertaken on top of any bunds to avoid providing hunting perches for raptors and corvids.</p>

Objective C4: Minimise construction disturbance to SPA populations

Target	<ul style="list-style-type: none"> No disturbance to feeding or roosting birds on the intertidal area
Management	<ul style="list-style-type: none"> Construction work will begin with sea wall area and bunds nearest to proposed CCSWG roost site to provide visual and acoustic screen. This will be carried out during April-October. Piling will be undertaken between April-July (or if this cannot be achieved augur piling will be used). During November-March all work will take place within screen provided by sea wall.
Monitoring	<ul style="list-style-type: none"> Numbers of birds within the compensation site and intertidal area will be counted on a monthly basis. The reference target will be agreed with NE.
Who	<ul style="list-style-type: none"> Suitably experienced surveyor for monitoring. Ecological manager/ Ecological Clerk of Works to manage construction.
When	<ul style="list-style-type: none"> Monitoring During construction
Limits of Acceptable Change	<ul style="list-style-type: none"> To be agreed with NE (see discussion under rationale)
Remedial Action	<ul style="list-style-type: none"> Review construction methods
Notes	See Rationale regarding reference data issues

3.2 Regulated Tidal Exchange

3.2.1 RATIONALE & OBJECTIVES

39. In order to provide for birds displaced from NKM by construction of AMEP a compensation package that consists of a wet grassland and roost site in close proximity to existing and newly created intertidal feeding areas will be provided.
40. The RTE will be constructed to provide initially 88 ha of mudflat and a long term mudflat resource of a minimum of 44 ha.
41. Targets for the mudflat relate to its sediment quality and benthic communities. In turn these underpin its ability to provide functional feeding habitat for displaced bird species (see objective B1)
42. Long term sustainable mudflat will require managing to maintain principal parameters, and the construction of the four cell RTE structure reflects the need to maintain sufficient mudflat habitat even when being managed.
43. Benthic targets are currently based on mean biomass levels recorded in the 2010 survey plus a 20% increment as suggested by NE during the hearing of 12th/13th November 2012 to reflect possible overwinter losses.
44. Management will be targeted to produce suitable sediment types and maintain wetness both to assist feeding birds and reduce saltmarsh encroachment.
45. The warping up phase will be used to inform future management and allow an operations manual to be produced based on experience of the live system.

Objective RTE1: Construction of site and sluices

Target	<ul style="list-style-type: none"> • Delivery of site to include four RTE fields each of 18ha size, with ponds and channel areas of about 1.5ha per field, operational sluices to enable impoundment of a field at near peak spring tide level and operational sluices to enable drainage of impounded water from one field to another. • Leakage into underlying soils to be less than 200mm over a 10 day period from an initial impounded depth of water of 1,000mm.
Management	<ul style="list-style-type: none"> • Construction to be undertaken by appointed contractor, managed by APHL
Monitoring	<ul style="list-style-type: none"> • Topographic survey to define extent of site • Engineering analysis to confirm sluice performance and leakage into underlying soils and through bund
Who	<ul style="list-style-type: none"> • Survey by suitably qualified surveyor • Analysis by suitably qualified engineer
When	<ul style="list-style-type: none"> • Prior to and during the construction period
Limits of Acceptable Change	<ul style="list-style-type: none"> • The RTE part of the site must provide a minimum of 66ha of mudflat area. This could be provided in three or more fields. Sluices to be sized accordingly. • Initial level of the RTE fields to be between +1.9m OD and +2.0m OD.
Remedial Action	<ul style="list-style-type: none"> • Over consolidation of field surface to reduce leakage.
Notes	

Objective RTE2: Warping up of RTE fields

Target	<ul style="list-style-type: none"> • Warping up of RTE fields by an average of 100mm depth of marine muds
Management	<ul style="list-style-type: none"> • By site managers: <ul style="list-style-type: none"> ○ After construction inlet sluices for the RTE fields are in general to be operated fully open to facilitate rapid accretion of muds across the RTE fields. ○ After the first winter period following breaching of the realignment site the sluices are to be operated in normal operational mode to avoid extended drying of the mudflat resource over the neap tide period.
Monitoring	<ul style="list-style-type: none"> • Levels over the RTE fields are to be monitored using a combination of water level monitoring, marked stakes and LiDAR or other monitoring techniques. Method statement to be prepared for the surveying.
Who	<ul style="list-style-type: none"> • Survey by suitably qualified surveyor
When	<ul style="list-style-type: none"> • Basic survey of field levels at monthly intervals during warping-up, LiDAR surveys on opportune basis of 1 to 3 year interval
Limits of Acceptable Change	<ul style="list-style-type: none"> • If average mud levels in the field achieve 100mm before the end of the first winter period after breaching sluices are to begin to be operated in normal operational mode.
Remedial Action	<ul style="list-style-type: none"> • If warping up is seen to be occurring very slowly the three additional outlet sluices could be opened up to increase exchange.
Notes	

Objective RTE3: Operating Manual for water level management

Target	<ul style="list-style-type: none"> • Operating Manual for water level management by site managers
Management	<ul style="list-style-type: none"> • By site manager and suitably qualified engineer: <ul style="list-style-type: none"> ○ During the initial warping up phase sluice operation, impoundment and flushing are to be trialled ○ Operating Manual to be developed and used as the basis for operational management of site during remainder of warping up period. ○ Operational Manual to be reviewed after first year of operations.
Monitoring	<ul style="list-style-type: none"> • Water level monitoring • Recording of sluice settings
Who	<ul style="list-style-type: none"> • By site managers assisted by suitably qualified surveyor
When	<ul style="list-style-type: none"> • Operating Manual to be prepared within 6 months of site being breached. • Operating Manual to be reviewed within 18-24 months of site being breached. • Operating Manual to be reviewed every 24 months thereafter.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Operating Manual provides the basis for adaptive management of water levels within the RTE fields. In combination with the sediment management plan for the RTE fields this provides the means of maintaining the sustainable compensatory mudflat resource.
Remedial Action	<ul style="list-style-type: none"> • Review of Operating Manual and modification of operating procedures
Notes	

Objective RTE4: Sediment Management for RTE fields

Target	<ul style="list-style-type: none"> • Development and implementation of sediment management plan for RTE fields
Management	<ul style="list-style-type: none"> • By site manager and suitably qualified engineer: <ul style="list-style-type: none"> ○ To be developed following observation of rates and patterns of mud accretion in the RTE fields. ○ To be optimised over time to optimise mudflat functionality in the RTE fields based on the results of other monitoring. • Dredging and bed levelling to be undertaken by suitably experienced organisation
Monitoring	<ul style="list-style-type: none"> • Bed level monitoring • Photographic records • Particle size and density of accumulating material • Accumulation in channels and pond areas
Who	<ul style="list-style-type: none"> • By site managers assisted by suitably qualified surveyor
When	<ul style="list-style-type: none"> • Sediment management plan to be developed within 24-36 months of site being breached. • Implementation of plan, possibly involving initial trials, to be undertaken 5-10 years after breaching of site. • Sediment management plan to be reviewed every 24 months thereafter.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Sediment management provides the basis for adaptive management of mudflat levels within the RTE fields. In combination with the water level management this provides the means of maintaining the sustainable compensatory mudflat resource.
Remedial Action	<ul style="list-style-type: none"> • Trialling and implementation of sediment management measures earlier than expected. • Methods and techniques expected to evolve over time. Could involve floating and/or land based techniques.
Notes	

Objective RTE5: Monitoring of bathymetry outside the RTE fields

Target	<ul style="list-style-type: none"> • Topographic monitoring of realignment site, Cherry Cobb Sands Creek, entrance to Stine Creek and wider Foul Holme Sands environment
Management	<ul style="list-style-type: none"> • By site manager
Monitoring	<ul style="list-style-type: none"> • Survey by LiDAR of local and wider area at 1-3 year intervals • Regular (1-2 monthly) photographic surveys of realignment site, Cherry Cobb Sands Creek and Stone Creek form fixed points. • Topographic surveys at up to a total of five sections across Cherry Cobb Sands Creek and the entrance to Stone Creek
Who	<ul style="list-style-type: none"> • Site Manager and suitably qualified surveyor
When	<ul style="list-style-type: none"> • At regular intervals as outlined above. • Photographic record and topographic surveys to commence at time of consent to establish baseline conditions
Limits of Acceptable Change	<ul style="list-style-type: none"> • Changes in Cherry Cobb Sands channel cross section to be within limits assessed in 2nd Interim Report on compensation site or recorded natural variability whichever is the greater. • Siltation in the entrance to Stone Creek that can be attributed to development or operation of the compensation site to be assessed for removal by AHPL.
Remedial Action	<ul style="list-style-type: none"> • Modifications to monitoring locations as required and in agreement with EAG • Bed levelling or dredging in the entrance to Stone Creek.
Notes	

Objective RTE6: The RTE site will contain similar infaunal communities to those found at NKM as defined by characteristic species in abundance and biomass (WWg/m²)

Target	<ul style="list-style-type: none"> Similar faunal community to that found at North Killingholme Marshes (provisional targets based on May 2010 characterisation data) An average Wet Weight per m² in September of 28.6g of <i>Hediste diversicolor</i>, 15.5g of <i>Macoma balthica</i> and 4.5g of <i>Corophium volutator</i>. 																
Management	<ul style="list-style-type: none"> Breach of sea defence to be made if possible within the peak benthic larval recruitment phase (March – May) Bed levelling to be conducted post spawning/recruitment phase of key species; 																
Monitoring	<ul style="list-style-type: none"> Quantitative targets to be defined and agreed following completion of full baseline (pre-construction) surveys. Possible metrics to include: Abundance and biomass dominance (key species such as <i>Hediste diversicolor</i>, <i>Macoma balthica</i> and <i>Corophium volutator</i>). Provisional biomass target (WWg/m²) based on May (2010) characterisation (in line with NE guidance a nominal increase of 20% is included within the figures below as this is considered to provide for the autumn peak); <table border="1" data-bbox="472 1182 1302 1429"> <thead> <tr> <th>Species</th> <th>High shore</th> <th>Mid shore</th> <th>Low shore</th> </tr> </thead> <tbody> <tr> <td><i>Hediste diversicolor</i></td> <td>28.60</td> <td>n/a</td> <td>0.7</td> </tr> <tr> <td><i>Macoma balthica</i></td> <td>2.70</td> <td>15.50</td> <td>2.10</td> </tr> <tr> <td><i>Corophium volutator</i></td> <td>4.20</td> <td>4.50</td> <td>1.3</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Overall benthic invertebrate biomass (wet weight / m²) to exceed agreed thresholds; Abundance of specific size classes of key species (e.g. <i>Macoma balthica</i> > 2 mm <20mm, <i>Hediste diversicolor</i>) to exceed agreed thresholds; Biotope composition to align with the NKM and wider Humber complex: LS.LMu.Mest.HedMac (<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in littoral sandy mud) in the upper shore and LS.LMu.MEst.HedMacScr (<i>Hediste diversicolor</i>, <i>Macoma balthica</i> and <i>Scrobicularia plana</i> in littoral sandy mud). Samples taken to support the compensation site benthic invertebrate monitoring programme will be collected by means of hand coring, Guidelines to be used in the design and subsequent 	Species	High shore	Mid shore	Low shore	<i>Hediste diversicolor</i>	28.60	n/a	0.7	<i>Macoma balthica</i>	2.70	15.50	2.10	<i>Corophium volutator</i>	4.20	4.50	1.3
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<i>Macoma balthica</i>	2.70	15.50	2.10														
<i>Corophium volutator</i>	4.20	4.50	1.3														

	reporting of benthic monitoring are the Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (Ware and Kenny, 2011) and the Marine Monitoring Handbook (Davies et al, 2001) unless statutory agency advice indicates an alternative approach.
Who	•
When	<ul style="list-style-type: none"> • Monitoring to be undertaken annually in May and September (spring/autumn) for the first five years • Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains materially unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Community must be characterised by the target species with a minimum AFDW biomass (conversion factors to be used in line with standard guidance) • Intertidal mudflats across 60 ha
Remedial Action	<ul style="list-style-type: none"> • Alter sluice management to ensure adequate larval transport and suspended sediment transportation into the cells.
Notes	It should be noted that the taxonomic richness and abundance found at the NKM site had significantly lower numbers than would be ordinarily associated with LS.LMu.Mest.HedMac and as such is considered an impoverished variant of the biotope.

Objective RTE2: The RTE site will contain similar sediment distribution patterns to those found at NKM as defined by Particle Size Distribution (PSD)

Target	<ul style="list-style-type: none"> Sediment distribution to provide Sandy mud and mud as found at Transect 3 of the characterisation survey. (79%-95% mud, 4.5%-20% sand) to provide the envelope of Particle Size Distribution
Management	<ul style="list-style-type: none"> Management of warping up and sluice gates to maintain desired sediment and fluidity of sediment
Monitoring	<ul style="list-style-type: none"> Samples taken to support the sediment monitoring programme will be collected by means of hand coring, When the full distribution has been constructed the sample should be assigned a description based on the Folk classification system (Folk, 1974) and/or the Wentworth classification system (Wentworth, 1922). Guidelines to be used in the design and subsequent reporting of benthic monitoring are the Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (Ware and Kenny, 2011) and the Marine Monitoring Handbook (Davies et al, 2001) unless statutory agency advice indicates an alternative approach.
Who	<ul style="list-style-type: none">
When	<ul style="list-style-type: none"> Monitoring for sediment to be undertaken annually in autumn for the first five years Monitoring to occur during the autumn survey once every three years thereafter if limits of acceptable change have not been exceeded in the first five years Return to annual monitoring for three years following exceeding the limits of acceptable change
Limits of Acceptable Change	<ul style="list-style-type: none"> A shift of 2 classifications within the folk system i.e. from mud to sand; OR a shift outside of the desired sediment envelope as defined by the NKM PSD data.
Remedial Action	<ul style="list-style-type: none"> Sluice gate management and dredging of material
Notes	

3.3 Wet Grassland and Open Water Area

3.3.1 RATIONALE & OBJECTIVES

46. There are no similar sized RTE schemes which have been created, and especially ones designed to support birds.
47. Creation of wet grassland is a well-established process, and hence there is greater certainty about the ability to develop it, and also about the biomass that will be available as a result for shorebirds and especially black-tailed godwits.
48. Wet grassland is a habitat type which is known to be used by foraging black-tailed godwits, especially as the winter progresses and intertidal food resources can become depleted. There is little grassland around the Humber Estuary at present and its provision will provide a valuable additional food resource, which will also be available to the birds at high tide.
49. The provision of the roost site (formed by islands in the open water area at the southern end of the wet grassland site) close to existing mudflats at CCS will mirror the close proximity of NKHP to the mudflats at NKM. The close proximity between a secure roost site and feeding resources is thought to be important in the use of the NKM foreshore by black-tailed godwits, especially during the autumn moulting period. The roost site at CCS is expected to facilitate more extensive use of CCS by black-tailed godwits.
50. The wet grassland and open water areas at CCS are therefore included as part of the compensation package to provide additional foraging and roosting habitat in case of any under performance of the RTE.
51. Objectives are therefore based around the construction, management and maintenance of both the roost site and wet grassland to deliver suitable functionality for black-tailed godwits in particular.

Objective WG1: The site will contain wide, open expanses of wet grassland habitat with unobscured views of the surrounding area

Target	<ul style="list-style-type: none"> Wet or damp grassland vegetation community across 26ha of the CCSWGS
Management	<ul style="list-style-type: none"> Sowing with an appropriate seed mix and leaving uncut and ungrazed for 3 to 6 months, as appropriate 0.2 livestock units per hectare per year in April to June inclusive in Year 1; AND 0.3 livestock units per hectare per year in April to June inclusive in all subsequent years; OR Equivalent management by cutting the grassland No fertilisers to be used except if needed to boost earthworm biomass No herbicides to be used except if needed to control problem plant species
Monitoring	<ul style="list-style-type: none"> 60 permanent quadrats to be established measuring 1m x 1m within the wet grassland area Plant species and abundance to be recorded for each quadrat Mapping of the extent of wet or damp grassland
Who	<ul style="list-style-type: none">
When	<ul style="list-style-type: none"> Monitoring to undertaken annually in June for the first five years Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> At least one species characteristic of wet or damp grasslands must be present in 50 of the 60 permanent quadrats Wet grassland vegetation community across 20ha of the CCSWGS
Remedial Action	<ul style="list-style-type: none"> Raise sluice heights to increase soil moisture content, providing incidence or extent of flooding does not exceed limits of acceptable change
Notes	

Target	<ul style="list-style-type: none"> No scrub (including bramble) or trees across the entirety of the CCSWGS
Management	<ul style="list-style-type: none"> 0.2 livestock units per hectare per year in April to June inclusive in Year 1; AND 0.3 livestock units per hectare per year in April to June inclusive in all subsequent years; OR Equivalent management by cutting the grassland
Monitoring	<ul style="list-style-type: none"> Mapping of the extent of the woody vegetation
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Monitoring to undertaken annually in June for the first five years Monitoring to occur in June once every three years thereafter if limits of acceptable change have not been exceeded in the first five years
Limits of Acceptable Change	<ul style="list-style-type: none"> No more than 5% scrub or trees across the entirety of the CCSWGS
Remedial Action	<ul style="list-style-type: none"> Cutting down vegetation and treatment of stumps with herbicide

Objective WG2: The site should contain open water with at least one island suitable for roosting black-tailed godwits at high tide

Target	<ul style="list-style-type: none"> An open water area of 4 to 5ha in size and an average depth of 0.35m to 0.7m in depth, according to season
Management	<ul style="list-style-type: none"> Topping up with water from external drains to maintain water level and extent to target levels, as and when required Adjustment of sluice height to retain water at the appropriate depth, during the winter period Adjustment or cessation of irrigation rate to keep extent and depth of open water within target levels, during the late summer/autumn period
Monitoring	<ul style="list-style-type: none"> Mapping the extent of the open water area Recording the depth of the water within the open water area
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Monitoring of water extent and depth to occur a minimum of twice weekly during the first year; and Monitoring of water extent and depth to occur a minimum of twice monthly, and more frequently during periods of irrigation, in the next four years; Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> No less than 3ha of open water extent No less than 0.25m average depth
Remedial Action	<ul style="list-style-type: none"> Topping up with water from external drains and cessation of irrigation Re-instating the integrity of the slowly or impermeable lining of the open water area, if necessary

Target	<ul style="list-style-type: none"> No more than 10% dense stands of rushes (<i>Juncus</i> spp), tall sedges (<i>Carex</i> spp), reeds (<i>Phragmites australis</i>, <i>Phalaris arundinacea</i>, <i>Glyceria maxima</i>, <i>Typha</i> spp) within the open water area
Management	<ul style="list-style-type: none"> Cutting dense stands of rushes, sedges and reeds in late summer/Autumn, if present
Monitoring	<ul style="list-style-type: none"> Mapping the extent of rushes, tall sedges and reeds within the open water area
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Monitoring to undertaken annually in June for the first five years Monitoring to occur in June once every three years thereafter if limits of acceptable change have not been exceeded in the first five years
Limits of Acceptable Change	<ul style="list-style-type: none"> No more than 20% dense stands of rushes, tall sedges and reeds within the open water area
Remedial Action	<ul style="list-style-type: none"> Cutting or excavating and removal of stands of rushes, tall sedges and reeds to give a maximum of 5% cover within the open water area
Notes	<ul style="list-style-type: none"> Cutting and removal of swamp vegetation to be undertaken outside the bird breeding season

Target	<ul style="list-style-type: none"> The open water area is to contain freshwater for the purpose of irrigation
Management	<ul style="list-style-type: none"> Only extracting freshwater from the external drains to top up the open water area, which may require adjustments in the extraction point and timing
Monitoring	<ul style="list-style-type: none"> Measuring salinity within the external drains Measuring salinity within the open water area
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Monitoring of salinity to occur continuously using data loggers during the first year Monitoring of salinity to occur continuously during the late summer/autumn period for the next four years Monitoring can cease if the limits of acceptable change have not been exceeded in the first five years
Limits of Acceptable Change	<ul style="list-style-type: none"> Salinity of the open water area less than 1‰
Remedial Action	<ul style="list-style-type: none"> Adjust extraction regime to return salinity of the open water area to within acceptable limits

Target	<ul style="list-style-type: none"> • Two vegetation free islands within the open water area
Management	<ul style="list-style-type: none"> • Islands to be capped with butyl rubber and shells/cobbles/gravel to limit vegetation growth • Removal of vegetation annually in June, if limits of acceptable change are exceeded
Monitoring	<ul style="list-style-type: none"> • Mapping of the extent of the vegetation on each island
Who	<ul style="list-style-type: none"> • Environmental manager
When	<ul style="list-style-type: none"> • Monitoring to be undertaken annually in June for the first five years • Monitoring to occur in June once every three years thereafter if limits of acceptable change have not been exceeded in the first five years
Limits of Acceptable Change	<ul style="list-style-type: none"> • Up to 25% short perennial or ephemeral vegetation but no shrubs, trees or tall ruderal vegetation in the period July to March
Remedial Action	<ul style="list-style-type: none"> • Cut and treat shrubs, trees or tall ruderal vegetation as appropriate; OR • Remove and replace shells/cobbles/gravel cap if islands are repeatedly colonised and management becomes difficult

Objective WG3: The soil will 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

Target	<ul style="list-style-type: none"> • Soil penetration resistance less than 6kg on average in each month from July to March
Management	<ul style="list-style-type: none"> • Maintenance of damp but unflooded grassland through appropriate sluice management and irrigation
Monitoring	<ul style="list-style-type: none"> • Monitoring to be undertaken at 100 standard sample locations spread across CCSWGS
Who	<ul style="list-style-type: none"> • Environmental manager
When	<ul style="list-style-type: none"> • Monitoring to occur once per month from July to November annually for 5 years; and • Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Soil penetration resistance less than 8kg on average in each month from July to March
Remedial Action	<ul style="list-style-type: none"> • Increase irrigation rate in order to increase soil moisture content and reduce soil penetration resistance • Raise sluice heights to increase soil moisture content and reduce soil penetration resistance

Target	<ul style="list-style-type: none"> • Soil moisture content greater than 100% of dry weight on average in each month from July to March
Management	<ul style="list-style-type: none"> • Maintenance of damp but unflooded grassland through appropriate sluice management and irrigation
Monitoring	<ul style="list-style-type: none"> • Monitoring to be undertaken at 100 standard sample locations spread across CCSWGS
Who	<ul style="list-style-type: none"> • Environmental manager
When	<ul style="list-style-type: none"> • Monitoring to occur once annually in the month of September for 5 years; and • Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Soil moisture content greater than 80% of dry weight on average in each month from July to March
Remedial Action	<ul style="list-style-type: none"> • Increase irrigation rate in order to increase soil moisture content • Raise sluice heights to increase soil moisture content

Objective WG4: The site should be largely free of winter flooding to prevent floodwaters from killing soil invertebrates.

Target	<ul style="list-style-type: none"> • Less than 10% flooding across the wet grassland area at any time (excluding the scrape and open water area)
Management	<ul style="list-style-type: none"> • Appropriate sluice height and irrigation flow rate adjustment
Monitoring	<ul style="list-style-type: none"> • Mapping the extent of flooding
Who	<ul style="list-style-type: none"> • Environmental manager
When	<ul style="list-style-type: none"> • Minimum of twice weekly during the first year; and • Minimum of twice monthly, and more frequently during periods of irrigation, in the next four years; • Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Less than 20% flooding across the wet grassland area at any time (excluding the scrape and open water area)
Remedial Action	<ul style="list-style-type: none"> • Appropriate sluice height and irrigation flow rate adjustment to enable flood waters to drain away

Objective WG5: The site will have a high density of macro-invertebrate fauna to provide food for wading birds.

Target	<ul style="list-style-type: none"> Average earthworm biomass levels of 65gm⁻² (wet weight) in less than 5 years and maintained thereafter
Management	<ul style="list-style-type: none"> Maintenance of damp but unflooded grassland through appropriate sluice management and irrigation
Monitoring	<ul style="list-style-type: none"> Annual collection of 100 soil samples measuring 25 x 25 x 10cm at standard sample locations, with subsequent soil biomass calculations
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Annually in September until target is achieved and then for three years thereafter Monitoring may cease if earthworm biomass levels greater than target levels for more than three consecutive years
Limits of Acceptable Change	<ul style="list-style-type: none"> Minimum average earthworm biomass levels of 50gm⁻² (wet weight) after 3 years
Remedial Action	<ul style="list-style-type: none"> Addition of organic matter as a top dressing to promote biomass increase Adjustments to soil moisture content or extent of flooding as appropriate
Notes	<ul style="list-style-type: none"> Biomass target is derived from approximate average of natural, unflooded wet grasslands (Ausden et al, 2001)¹

¹ Ausden, M., Sutherland, W. J. and James, R. (2001), The effects of flooding lowland wet grassland on soil macroinvertebrate prey of breeding wading birds. *Journal of Applied Ecology*, 38: 320–338.

Objective WG6: The wet grassland will be managed to give a suitable sward for wading birds throughout the months of August to March

Target	<ul style="list-style-type: none"> • Average sward height of 10cm across the CCSWGS each month from July to March
Management	<ul style="list-style-type: none"> • 0.2 livestock units per hectare per year in April to June inclusive in Year 1; AND • 0.3 livestock units per hectare per year in April to June inclusive in all subsequent years; OR • Equivalent management by cutting the grassland
Monitoring	<ul style="list-style-type: none"> • Measurement of sward height at 100 sampling points
Who	<ul style="list-style-type: none"> • Environmental manager
When	<ul style="list-style-type: none"> • Monitoring to occur once per month from July to November annually for 5 years; and • Monitoring can cease if the target is achieved for three consecutive years after the first five years of monitoring provided that the management regime remains unchanged.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Average sward height of 15cm across the CCSWGS each month from July to March
Remedial Action	<ul style="list-style-type: none"> • Increase livestock density to achieve shorter swards at the end of June; OR • Increase length of time livestock are present on CCSWGS to end July; OR • Introduce rotational grazing/cutting from July to September across the CCSWGS; OR • Cut grass once in August/early September.

Target	<ul style="list-style-type: none"> No more than 10% dense stands of rushes (<i>Juncus</i> spp), tall sedges (<i>Carex</i> spp), reeds (<i>Phragmites australis</i>, <i>Phalaris arundinacea</i>, <i>Glyceria maxima</i>) or tall ruderal vegetation (thistles, docks etc) in the North and Middle Fields (including the scrape)
Management	<ul style="list-style-type: none"> 0.2 livestock units per hectare per year in April to June inclusive in Year 1; AND 0.3 livestock units per hectare per year in April to June inclusive in all subsequent years; OR Equivalent management by cutting the grassland
Monitoring	<ul style="list-style-type: none"> Mapping of the extent of the species listed above
Who	<ul style="list-style-type: none"> Environmental manager
When	<ul style="list-style-type: none"> Monitoring to undertaken annually in June for the first five years Monitoring to occur in June once every three years thereafter if limits of acceptable change have not been exceeded in the first five years Return to annual monitoring for three years following exceeding the limits of acceptable change
Limits of Acceptable Change	<ul style="list-style-type: none"> No more than 15% cover of dense stands of rushes, tall sedges, reeds or tall ruderal vegetation in the North and Middle Fields (including the scrape)
Remedial Action	<ul style="list-style-type: none"> Flailing the areas dominated by unwanted vegetation twice in the year that the limit of acceptable change is exceeded; OR Herbicide application for severe infestations of rushes

3.4 Birds

3.4.1 RATIONALE & OBJECTIVES

52. The objective is to maintain populations of displaced birds. Previous sections describe objectives, management actions, and monitoring of the compensation package required to achieve this.
53. The compensation package is centred on a secure wet roost that will allow birds to exploit existing mudflat resources on the north shore immediately as well as the new wet grassland and RTE as these develop functionality.
54. The development of the full package will be incremental and how birds respond to it will require monitoring of all potential resources available to them.
55. These resources include the mudflat remaining at NKM. The total area is 77ha of which 31.5ha will be directly lost to AMEP and 11.6ha predicted to be functionally lost to disturbance. Use of the remaining area will need to be part of the monitoring programme.
56. Early provision of the roost at CCS will require monitoring of the existing mudflat between Paull and Cherry Cobb for evidence of increased use and potential competition effects.
57. The reference area for monitoring bird numbers will therefore include not only the developing RTE and wet grassland but also the remaining mudflat at NKM and existing intertidal area between Paull and Cherry Cobb Sands.
58. As the requirement of the legislation is to maintain the overall coherence of the Natura 2000 network the reference figure for the displaced species is the overall number of birds on the Humber of each species in the first instance.
59. As the compensation site develops functionality it will be required to support up to the peak count (see Table 3) of the birds displaced from NKM within the range of natural variability. Functionality from construction for the CCSWG will be reached with 2-4 years and up to 6 years of the RTE.
60. Natural variability is defined as the standard deviation from the peak five year mean. As the peak figures were derived from and compared with WeBs data for 2004/05-2008/09 these can be used to derive the variability. It is likely the reference figure will need to be updated during the lifetime of the plan and a rolling 5 year peak mean could be substituted with the agreement of NE.
61. As there is a danger that rapid declines could be masked by natural variability then remedial action would be required after any one year where declines exceeded natural variability, or after two years of consecutive decline even where this was within the range of natural variability.

Objective B1: The Humber wide populations of displaced species (see Table 3) remain within the range of natural variability

Target	<ul style="list-style-type: none"> No change in Humber waterbird assemblage and populations of the nine displaced species outside of range of natural variability. When RTE & CCSWG reach full functionality (i.e. when biomass and physical targets are met) they support peak counts of each species as identified in Table 3.
Management	<ul style="list-style-type: none"> Provide secure roost in first instance at CCS Develop RTE and CCSWG
Monitoring	<ul style="list-style-type: none"> Through the Tide Counts at NKM, CCS, CCSWG and RTE
Who	<ul style="list-style-type: none"> Suitably experience surveyors
When	<ul style="list-style-type: none"> Twice monthly on a spring and a neap tide
Limits of Acceptable Change	<ul style="list-style-type: none"> Any one year where declines exceeded natural variability Two years of consecutive decline even where this was within the range of natural variability
Remedial Action	<ul style="list-style-type: none"> Review data to ascertain if population is being maintained within Humber Review data on national population to ascertain if population maintained within UK If evidence of range decline provide additional compensation

ANNEX F
DRAFT TERRESTRIAL EMMP AS AT
20TH NOVEMBER 2012

Able Marine Energy Park
Environmental Management and Monitoring Plan
Terrestrial Works

1. INTRODUCTION	2
1.1 Background and Aims of the Terrestrial EMMP	2
1.2 Process of Finalising Outstanding Targets	2
1.3 Steering Group.....	2
2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS	4
2.1 Habitat.....	4
2.1.1 Baseline.....	4
2.1.2 Impacts.....	4
2.2 Water Vole	6
2.2.1 Baseline.....	6
2.2.2 Impacts.....	6
2.3 Bats.....	6
2.3.1 Baseline.....	6
2.3.2 Impacts.....	7
2.4 Great Crested Newts.....	7
2.4.1 Baseline.....	7
2.4.2 Impacts.....	7
2.5 Breeding Birds.....	8
2.5.1 Baseline.....	8
2.5.2 Impacts.....	8
3. OBJECTIVES.....	13
3.1 Water Vole	13
3.1.1 Rationale & Objectives.....	13
3.2 Bats.....	14
3.2.1 Rationale & Objectives.....	14
3.3 Great Crested Newts.....	15
3.3.1 Rationale & Objectives.....	15
3.4 Breeding Birds.....	17
3.4.1 Rationale & Objectives.....	17
3.5 SPA Birds.....	22
3.5.1 Rationale & Objectives.....	22
3.6 Noise and Visual Disturbance	24
3.6.1 Rationale & Objectives.....	24

1. INTRODUCTION

1.1 Background and Aims of the Terrestrial EMMP

The development of the Able Marine Energy Park (AMEP) east of North Killingholme on the Lincolnshire Coast will partly affect the Humber Estuary Special Area of Conservation (SAC) and the Special Protection Area (SPA) / Ramsar site, as well as habitats (some of which is designated at a local level) and species inland from the new quay. Measures to mitigate for the effects of AMEP on these habitats and species have been identified, and are to be implemented in areas within the AMEP site boundary.

This document is an Ecological Management and Monitoring Plan (EMMP) for the terrestrial works and it has been drawn up taking account of guidance on management planning produced by the Conservation Management System (CMS) Consortium (www.cmsconsortium.org). It describes the mitigation measures that are required and lists specific objectives which are fundamental to their delivery. Further it includes targets and management actions which support the objectives and the monitoring which will be undertaken to confirm progress towards the objectives, and ultimately confirming that they have been achieved. Limits of acceptable change are defined and any necessary remedial actions which will be undertaken if the monitoring shows that these limits have not been met.

1.2 Process of Finalising Outstanding Targets

The mitigation proposals for AMEP are complex, and the objectives and targets / management options included in this version of the EMMP have been subject to extensive discussions with stakeholders. Prior to the DCO being granted, the EMMP will be further refined through continued regular meetings with key stakeholders about targets / management actions and subsequent monitoring requirements which are yet to be agreed.

The EMMP is a live working document which will be in place for as long as it is deemed necessary to achieve the agreed objectives set out in it. Updates to it will be overseen by the Steering Group, whose role is explained below and includes undertaking a complete review of the EMMP every five years.

1.3 Steering Group

AHPL will have overall responsibility for the implementation and delivery of the EMMP. However, the involvement of other stakeholders is essential for the effective working of the EMMP, and hence AHPL will establish a Steering Group whose role will include the following:

-
- to monitor the progress of implementation of the EMMP to ensure that it is meeting the objectives;
 - to provide expert views, opinions and feedback to AHPL about key issues including through regular meetings and the making of formal recommendations;
 - to help direct and focus the EMMP and its development in an interactive way including through revisions to targets, monitoring requirements and if necessary the adoption of any remedial actions;
 - to undertake a comprehensive review of the EMMP at least every five years;
 - to co-opt members and working groups if necessary;
 - to ensure a transparent and open process to the implementation of the EMMP with an evident audit trail, and regular updates produced for dissemination to a wider audience (eg via AHPL / HINCA websites).

AHPL is seeking an inclusive approach and the Steering Group will comprise the following stakeholders in addition to AHPL:

- Natural England;
- Environment Agency (EA);
- The Royal Society for the Protection of Birds (RSPB);
- Marine Management Organisation(MMO);
- representatives from the local wildlife trusts;
- representatives from the local authorities;
- Humber Industry Nature Conservation Association (HINCA); and
- Two representatives, one from the local residents and one from local interest groups.

In addition to the above, the Steering Group can co-opt members and form working groups where appropriate to consider specific issues. The chair of the Steering Group will be HINCA, an organisation of some standing in the Humber area for over a decade, and one which the vast majority of other members of the Steering Group are already members (www.humberinca.co.uk).

An agenda will be drawn up in advance of each Steering Group meeting by AHPL and minutes will be produced after the meeting by them for agreement. The compensation proposals are complex and it is likely that there will be a requirement for frequent Steering Group meetings. Until 2018 EMMP meetings will be held at least every quarter, and then the frequency will be subject to the Steering Group review. The Steering Group will also be able to call special meetings in response to specific issues / concerns identified based on a majority decision amongst the Group.

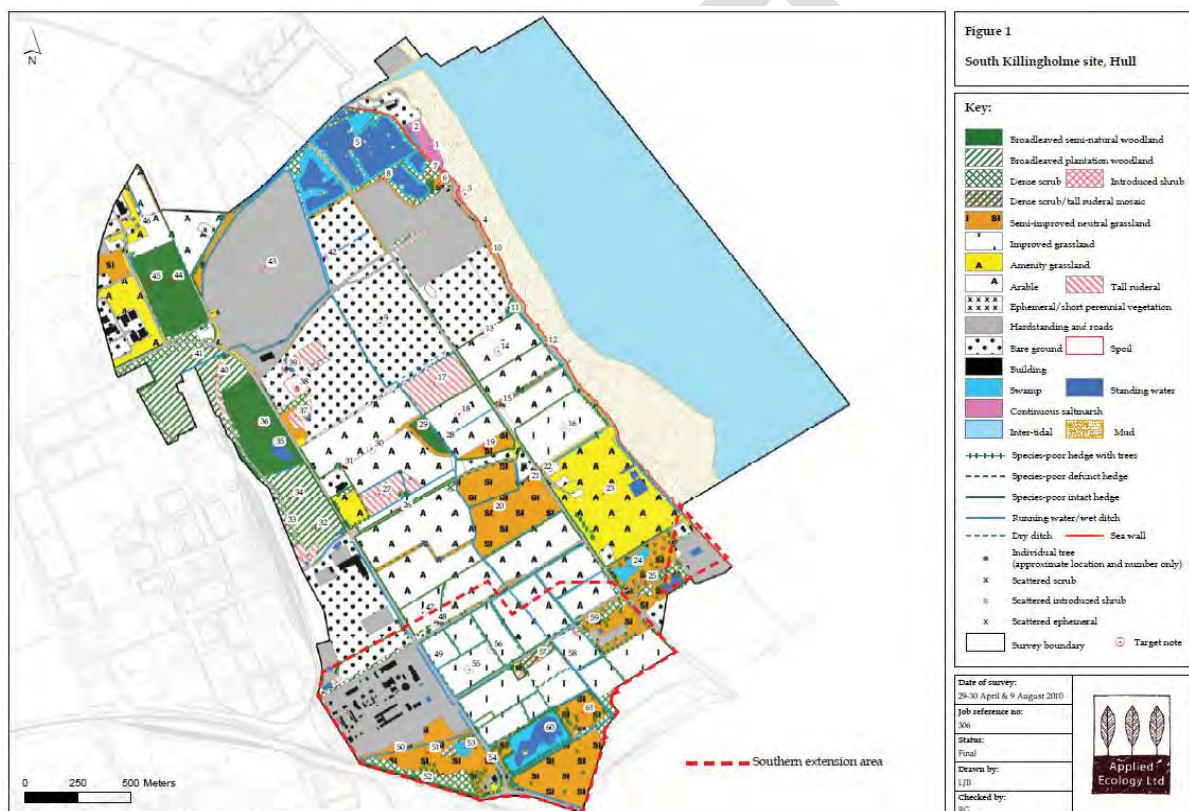
2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS

2.1 Habitat

2.1.1 BASELINE

An area of arable, pasture and farmland mosaic habitat will be lost as a direct result of the proposed AMEP development. The majority of the semi-naturalised habitat will be removed and replaced with gravel or hard standing. The main habitats are mapped in Figure 1 below.

Figure 1: Phase 1 Habitat Survey Map



2.1.2 IMPACTS

Table 1 summarises the habitat that will be affected by AMEP.

Table 1: Summary of Habitat Loss

Habitat Type	Loss (ha)
Broadleaved semi-natural woodland	1.35
Dense scrub	2.47
Semi-improved natural grassland	22.11
Improved grassland	13.94
Tall ruderals	10.78
Swamp	1.15
Standing water	0.31
Arable fields	54.78
Amenity grassland	3.68
Ephemeral/ short perennial vegetation	0.96
Hard standing	54.22
Buildings	0.47
Bare ground	60.12
Hedgerow	1.136 (km)

The losses of the terrestrial habitats outlined above do not constitute significant losses within the context of the local or regional areas although some of these habitats are either BAP or LBAP listed. The loss of habitats does have an effect on the species supported by those habitats and mitigation is required both for habitat loss and for the species affected by that loss.

The only habitat of local value to be lost is the Station Road Local Wildlife Site (LWS) which consists of a neutral grassland strip, associated elm hedge and field ponds supporting great crested newts. This habitat will require to be replaced and this will be achieved separately

for the great crested newts and their ponds and terrestrial habitat (see Great Crested Newt objectives below) and will be delivered through Mitigation Area B.

The neutral grassland component of the Station Road LWS will be accommodated in the northern operational buffer zone of Mitigation Area A.

Where habitat loss leads to impacts on protected species these have been dealt with through species specific mitigation.

The loss of fields that support SPA birds requires mitigation and is dealt with separately under the heading SPA birds. This mitigation is provided in Mitigation Area A.

Construction and operation, particularly noise and visual impacts, have potential to increase disturbance to the roost site at North Killingholme Haven Pits that supports significant numbers (i.e. greater than 1%) of SPA bird populations. The control measures for this are presented under the Noise and Visual Impact objective.

2.2 Water Vole

2.2.1 BASELINE

Water vole surveys were conducted in 2006 and 2010. In 2006, five areas of the site were identified for their potential to support water voles during the Extended Phase 1 survey. Surveys conducted in 2010 identified a total of 82 breeding females of which 22 were within the development site and 60 were in ditches that included Mitigation Area A but extend to the south of the AMEP site (see EX11.26 – Water Vole Mitigation).

2.2.2 IMPACTS

In total 2.5 km of drainage ditch will be removed as part of the AMEP development process. Of the drainage ditches to be removed, 1.82 km is currently unsuitable or of low value to water vole. The remaining 0.68 km of ditch to be replaced, is currently of moderate suitability for water vole.

2.3 Bats

2.3.1 BASELINE

Bat surveys as part of the AMEP application were undertaken in 2006, 2010 (July / August) and 2011 (May). Six species of bat (Common pipistrelle, *Nyctalus* sp., *Myotis* sp., Soprano pipistrelle, Brown long-eared and *Nathusius* pipistrelle) were identified foraging and commuting within the AMEP development site area. The commonest species recorded were common pipistrelles, and only at one location was the number of contacts regarded as frequent (near Killingholme pits). Other species were either occasional or rare, with contacts largely relating to occasional commuting passes. No evidence of occupied resting or

roosting places was found within the development site (see EX 11.19 AMEP Bat Surveys Supplementary Note). As a result, no significant impacts to bats are predicted, however temporary loss of foraging habitat may occur (see EX 20.3 Additional Landscape Masterplan).

2.3.2 IMPACTS

The AMEP development will result in the loss of habitat which is suitable for bat foraging and commuting including the small woodland at the Old Copse and hedgerows. Consequently mitigation objectives are proposed to replace hedges, ditches and foraging areas; allow safe access over roads to existing woodland at Burkinshaw's Covert, provide roost sites, and control light pollution (see Table 1 above for habitat loss).

2.4 Great Crested Newts

2.4.1 BASELINE

Surveys conducted in 2006, 2010 and 2011 identified 25 ponds within the AMEP development site boundary. A further four ponds with potential to support breeding populations of Great Crested Newts were identified within a radius of 500 m of the site boundary. Presence/ absence surveying of ponds within the development site confirmed a medium population of Great Crested Newts within two of the surveyed ponds, forming a meta-population. Twelve ponds within the development boundary could not be assessed due to accessibility difficulties.

Two of the surveyed ponds were found to accommodate a medium Great Crested Newt meta-population of approximately 19 individuals. The ponds are located centrally within the AMEP development site boundary, in an area of land currently in arable production.

2.4.2 IMPACTS

Ten ponds within the AMEP development site are planned for removal; following a walk over survey in 2011 three of these were found to no longer exist. Both ponds where the meta-population of Great Crested Newts were identified will be removed as part of the development.

2.5 Breeding Birds

2.5.1 BASELINE

Two dedicated breeding bird surveys were undertaken at the AMEP site, a Breeding Bird Survey (BBS) in 2010 and a Common Bird Census (CBC) in 2011. Both these surveys were undertaken in addition to a previously collected Catley breeding bird survey undertaken for East Halton and Killingholme from a five visit Common Bird Census (CBC) undertaken between April – June 2007 (Catley, 2007) and data collected from 2006 across the site by Just Ecology (2006) (see Environmental Statement *Annex 11.5*). Lincolnshire Bird Club records (1998-2005 All Species Records) were also used to inform the breeding bird baseline.

2.5.2 IMPACTS

The AMEP development will cause the loss of dense scrub, standing water, ephemeral/ short perennial vegetation, species poor hedgerow, tall ruderal vegetation, semi-natural woodland and 100 ha of arable/ semi- improved grassland which provides breeding opportunities for birds present within the development site. The effects on birds are summarised in Table 2, which is taken from Percival, 2012. The third column, unmitigated impacts, assumes that there will be a complete loss of the bird populations within the existing industrial areas, within the current arable/grassland areas that will become industrial areas, and where coastal reclamation occurs. The final columns provide information on residual impacts once mitigation has been applied and an explanation of the mitigation that will be provided.

Table 2: Baseline Data and Impact of Breeding birds

Species	Total number of pairs in site footprint	Percival (2012) Predicted changes prior to mitigation	Predicted residual impact after mitigation applied	Predicted No. of pairs post mitigation	Explanation
Mute Swan		-1	0		The provision of ponds in Mitigation Area B will provide breeding opportunities and mitigate predicted losses.
Greylag Goose	1	0	0	1	Species is not present within the development site prior to construction; therefore no losses are predicted.
Shelduck	10	-10		3	The provision of shelduck nest boxes within

Ringed Plover	3	-3	0	3	losses. The provision of a gravel area on the northern area of the development site will provide breeding opportunity and mitigate predicted losses.
Lapwing	8	-7	(assuming 1 pair per 38ha)	2	The provision of wet grassland within Mitigation Area A will provide breeding opportunities and partially mitigate predicted losses.
Stock Dove	14	-12	(assuming 1 pair per ha)	5	The removal of woodland within the development site will limit breeding opportunity. However, hedgerow creation, farmland bird mixes, provision of nest boxes and enhancement will provide partial mitigation of predicted losses.
Woodpigeon	150	-75	(assuming 10 pairs a hectare)	105	The removal of woodland within the development site will limit breeding opportunity. However, hedgerow creation and enhancement will provide partial mitigation of predicted losses.
Collared Dove	0	0	-45	0	Species is not present within the development site prior to construction; therefore no losses are predicted.
Great Spotted Woodpecker	0	0	0	0	Species is not present within the development site prior to construction; therefore no losses are predicted.
Skylark	42	-28	(assuming 10 pairs based on 0.25 - 0.5 pairs per ha)	0	The removal of open arable land within the development site will limit breeding and foraging opportunity. The creation of wet grassland within Mitigation Area A will provide sub-optimal habitat which may assist mitigation of predicted losses.
Swallow	19	-17	-18	24	The construction of new buildings within the development site may provide new nesting opportunities. Cattle grazing, wet grassland, muddy scrapes and ponds within Mitigation Area B will provide improved feeding.
Meadow Pipit	19	-16	-13	19	Wet grassland with uncultivated margin and wetland edges will provide some mitigation for loss of farmland.
Yellow Wagtail	9	-6	0	6	Mitigation Area A with set scrapes and cattle grazing will provide optimal conditions sufficient to offset losses and potentially provide net gain. However, given low background population we have predicted no net loss on a precautionary basis rather than net gain.
Pied Wagtail	10	-10	-4	9	The provision of newly created and enhanced hedgerows within the development site will provide potential breeding opportunity and mitigate predicted losses.
Wren	22	-16	0	6	The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Dunnock	7	-5	55	22	The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Robin	6	-4	26	55	The creation and enhancement of hedgerows within the development site will provide
				26	

Blackbird	14	-10	23		breeding opportunities and mitigate predicted losses.
				23	The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Song Thrush	3	-2	13		The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
				13	The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Mistle Thrush	5	-5	2		The creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
				2	Species is not present within the development site prior to construction; therefore no losses will be predicted.
Grasshopper Warbler	0	0	0		The creation and enhancement of ditches within the development area will provide breeding opportunities and mitigate predicted losses. Likely to colonise Mitigation Area B.
Sedge Warbler	28	-21	-9		As ponds mature in Mitigation Area B some colonisation possible. However, as this is uncertain given this species preference for larger stands of reed the worst case scenario has been reported.
				19	Provision of hedges, scrub, and rough grassland will reduce but not eliminate impacts on this species.
Reed Warbler	11	-9	-9		As for Blackcap, although this bird tends to prefer more parkland types of landscape which provision of standards within hedges may mimic.
				2	Requires dense scrub, preferably with bramble and this will take time to establish. Longer term some colonisation possible but due to uncertainty worst case scenario reported.
Blackcap	6	-5	-2		A density of 50 pairs/ km ² assumed for Mitigation Area A and 3 pairs/ km ² for ditches and hedgerow in the industrial part of the site.
				4	Provision of hedgerows with standards will produce some parkland type habitat.
Garden Warbler	4	-4	-1		Prefers patchwork of scrub trees with understory of grass to breed. May respond to ditch and hedgerow provision but as this is uncertain worst case scenario reported.
				3	Species is not present within the development site prior to construction; therefore no losses will be predicted.
Lesser Whitethroat	9	-5	-5		Improvements at Chase Hill, hedgerows and insect rich rough grazing will moderate losses.
				4	The provision of Tit nest boxes will provide breeding opportunities and mitigate predicted losses.
Whitethroat	46	-36	-9		The provision of Tit nest boxes will provide breeding opportunities and mitigate predicted losses.
				35	Species is not present within the development site prior to construction; therefore no losses are predicted.
Chiffchaff	1	-1	0		The removal of woodland within the development site will limit breeding opportunity. No planned mitigation measures will directly benefit the species. May be able to utilise
				1	
Willow Warbler	3	-3	-3		
				0	
Spotted Flycatcher	0	0	0		
				0	
Long-tailed Tit	6	-5	-3		
				3	
Blue Tit	17	-12	60		
				60	
Great Tit	12	-10	20		
				20	
Willow Tit	0	0	0		
				0	
Treecreeper	1	-1	-1		
				0	

Magpie		-8	0	11	hedgerow with standards to compensate for woodland losses but as some uncertainty worst case scenario reported. Provision of standard trees will provide nesting opportunities sufficient to offset losses.
Carrion Crow	11	-10	0	11	Provision of standard trees will provide nesting opportunities sufficient to offset losses.
Starling	11	0	0	11	Species is not present within the development site prior to construction; therefore no losses are predicted. Likely to benefit from wet grassland and cattle grazing, may colonise.
House Sparrow	1	0	1	1	Species only recorded in mitigation area; therefore no losses are predicted.
Tree Sparrow	24	-18	(assuming 2 pairs / 10 ha)	44	The combination of nest boxes, ditches and hedges and increased winter survival through the provision of winter bird crop indicates potentially optimal conditions leading to increased populations.
Chaffinch	34	-25	65	65	The creation and enhancement of hedgerows within the development site will provide breeding opportunities and is likely to increase population.
Greenfinch	0	0	0	0	Species is not present within the development site prior to construction; therefore no losses are predicted. Mitigation is likely to improve habitat for this species and colonisation possible.
Goldfinch	24	-19	-12	12	The provision of ponds within Mitigation Area B and the creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Linnet	59	-54	(assuming 5 pairs per km ²)	20	The provision of ponds within Mitigation Area B and the creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Bullfinch	4	-4	0	4	The provision of ponds within Mitigation Area B and the creation and enhancement of hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.
Yellowhammer	11	-7	3	3	Increase in hedgerows, uncultivated grass strips and winter bird cover will benefit this species and lead to a net gain.
Reed Bunting	18	-12	3	3	The provision of ponds within Mitigation Area B and newly created and enhanced hedgerows within the development site will provide breeding opportunities and mitigate predicted losses.

3. OBJECTIVES

3.1 Water Vole

3.1.1 RATIONALE & OBJECTIVES

2.5 km of ditch will be lost due to site construction, thus resulting in loss of water vole habitat if left unmitigated.

Objective WV1: The site will have sufficient suitable ditch habitat to sustain or enhance water vole populations.

Target	<ul style="list-style-type: none"> • Create and enhance suitable water vole habitat throughout the development site, resulting in a net increase in suitable water vole habitat of approximately 2.03 km
Management	<ul style="list-style-type: none"> • Creation or realignment of 2.71 km of drainage ditch throughout the development site • Design of ditch to provide a habitat of high suitability for water vole. This will include 2-5m swathes of vegetation on both banks, presence of aquatic and emergent macrophytes, gently sloping banks, permanent slow running water, and soils suitable for burrowing. • Creation and realignment works will take place 3 months prior to the removal of any existing water vole habitat, to allow for the establishment of the new drainage ditches • Incremental strimming of existing sites will be undertaken after this time to displace water voles into new habitat. If this is unsuccessful animals will be trapped and relocated under licence. • Retention of the majority of drains with high or moderate water vole activity and enhancement of these through removal of excessive in-drain and overhanging vegetation
Monitoring	<ul style="list-style-type: none"> • Water vole survey to determine population size and distribution • Survey of ditches to ensure continued suitability for water vole
Who	<ul style="list-style-type: none"> • Suitably qualified surveyor • Responsibility of the Environmental Manger to commission surveys

When	<ul style="list-style-type: none"> Monitoring Annually between April and October for up to five years If population remains with the Limits of Acceptable Change after three years, monitoring can cease if agreed by the Steering Group.
Limits of Acceptable Change	<ul style="list-style-type: none"> Population of water voles is maintained at least 78 breeding females (ie does not decrease by >5%)
Remedial Action	<ul style="list-style-type: none"> Careful removal of excessive surrounding vegetation where it is resulting in overshadowing Removal of excessive aquatic vegetation in drains Control of mink

3.2 Bats

3.2.1 RATIONALE & OBJECTIVES

Although the site currently provides sub-optimal habitat for bats, temporary loss of foraging habitat and disruption to commuting routes is predicted to occur as a result of the works. The objectives are designed to ensure mitigation is put in place and its effectiveness monitored. Targets relate to maintaining the species diversity of the baseline, although nathusius pipistrelle was recorded as a possible record only and is not included within the diversity target.

Objective B1: The site will provide suitable foraging, commuting and roosting habitat for bats

Target	<ul style="list-style-type: none"> Creation and enhancement of bat habitat including green corridors and roosting opportunities Sustaining the diversity of species and levels of activity present in the baseline During tree removal ensure all legal requirements are met
Management	<ul style="list-style-type: none"> Pre tree removal all suitable trees will be checked by a licensed batworker either by climbing or emergence surveys to ensure no roosts are present. If tree roosts are present a licence application accompanied by an appropriate method statement will be made to NE. Enhancement of existing hedgerows and drains Creation of new hedgerows Planting of trees to provide future roosting opportunities

	<ul style="list-style-type: none"> • Installation of bat boxes in suitable trees • Creation of foraging areas linked to green corridors • Direction of site lighting away from green corridors and foraging areas to minimise disturbance • Creation of green bridge to allow safe access over road to Burkinshaw's covert and increase connectivity
Monitoring	<ul style="list-style-type: none"> • Bat activity surveys: Single walked transect undertaken during suitable conditions (light winds, dry, mild >10°C) undertaken within the same two week period annually. Supplemented by passive detectors at fixed points (including green road crossing, NKHP foraging area, central hedge and ditch). • Bat boxes checks for signs of use
Who	<ul style="list-style-type: none"> • Suitably qualified and licensed surveyor • Responsibility of the Environmental Manger to commission surveys
When	<ul style="list-style-type: none"> • Transect surveys annually between May and September for up to five years repeated within same two week period each year • Bat box surveys September each year (when young can reasonably be expected to be Volant) • If five or more species are recorded each year, and activity levels and patterns remain equal to or greater than the original baseline monitoring can cease after three years
Limits of Acceptable Change	<ul style="list-style-type: none"> • If bat activity falls below baseline levels in two consecutive years. • If species diversity falls below four species per annum.
Remedial Action	<ul style="list-style-type: none"> • Review survey data to establish potential causes. • Relocation of unused bat boxes • Additional habitat enhancement

3.3 Great Crested Newts

3.3.1 RATIONALE & OBJECTIVES

The works will result in the loss of pond habitat from the site, including two confirmed breeding ponds and one pond which may be used for foraging. In addition, terrestrial habitat in the 250 m surrounding the development will be lost.

Objective GCN1: Maintain breeding population by providing suitable alternative ponds and associated terrestrial habitat.

<p>Target</p>	<ul style="list-style-type: none"> • Creation of six replacement ponds, four measuring 100 m² and two measuring 400 m² to more than compensate for the loss of 114.5 m² of lost habitat • Maintain population of minimum 19 great crested newts including at least one breeding female. • Comply with licence
<p>Management</p>	<ul style="list-style-type: none"> • Construction of new ponds in Mitigation Area B between Chase Hill Wood and Rosper Road, approximately 1 km from existing breeding ponds in accordance with Natural England guidance • Replacement of the two existing breeding ponds with four new ponds • Replacement of the foraging pond with two new ponds • Design and planting specification of the replacement ponds to reflect those of the breeding ponds to be removed and agreed by Natural England • Pond creation will occur one year in advance of capture and translocation works to ensure establishment of suitable conditions • Location of new ponds at a site which has connectivity to 10 ha of established broadleaf wood, allowing a larger meta-population to be supported • Enhancement of surrounding terrestrial habitat through conversion of existing arable field surrounding the new ponds to permanent species-rich grassland • Enhancement of surrounding hedgerows and verges for wildlife • Creation of refugia within the core 50 m surrounding each pond • Installation of amphibian-proof barrier around woodland edge to minimise road mortality
<p>Monitoring</p>	<ul style="list-style-type: none"> • Monitoring of existing and new ponds to monitor metapopulation size and continued utilisation of new ponds • Recording of pond physical attributes including photographic records

Who	<ul style="list-style-type: none"> • Licensed GCN surveyor • Responsibility of the Environmental Manager to commission surveys
When	<ul style="list-style-type: none"> • Six visits annually between March and June for up to five years • If population remains above 20 animals including at least one gravid female for three consecutive years, monitoring can cease with agreement of Steering Group.
Limits of Acceptable Change	<ul style="list-style-type: none"> • A medium metapopulation of newts of not less than 15 animals continue to inhabit the area • At least one gravid female must be present
Remedial Action	<ul style="list-style-type: none"> • Review survey data • Maintenance of surrounding terrestrial habitat as permanent species-rich grassland • Removal of fish from ponds • Discouragement of water fowl from ponds • Clearance of overhanging vegetation to reduce shading • Clearing of excessive in-pond vegetation

3.4 Breeding Birds

3.4.1 RATIONALE & OBJECTIVES

Mitigation Areas A and B are provided, together with enhancement of boundary features, hedgerows, and ditches to offset the loss of breeding birds. The management objectives relate to specific areas, and habitat and management monitoring will be site specific. Monitoring of bird territories will be undertaken over the whole site as breeding birds are likely to rely on a range of features over the site; for example granivores may use hedges or bird boxes to breed in, insect rich grassland to find food for juveniles, but rely on farmland bird cover crops for winter survival. As a consequence bird targets are set across the whole site rather than split into individual sites. Breeding bird targets have been set for 3 years after mitigation has been implemented, to reflect the need for habitat to mature, whilst balancing a need for early intervention if mitigation is not succeeding.

The baseline and impact assessment indicated predicted changes in bird populations, Table 3 below presents targets based on those predictions. Generally the 3 year target is approximately 50% of the 5 year target. Targets are set on either existing population levels

or predicted populations, whichever is lower. Targets are subject to natural variability, and in assessing if a target has been reached or not external factors such as national population trends would need to be applied.

Table 3: Bird Targets for AMEP Site Post-construction.

Species	Total number of pairs in site footprint	Predicted No. of pairs post mitigation	Pairs 3yrs	Pairs 5 yrs
Mute Swan	1	1	1	1
Shelduck	10	3	1	3
Mallard	16	10	5	10
Shoveler	1	1	0	1
Red-legged Partridge	13	6	3	6
Pheasant	21	8	4	8
Sparrowhawk	2	1	0	1
Kestrel	1	1	0	1
Water Rail	1	1	0	1
Moorhen	6	6	3	6
Oystercatcher	4	2	2	2
Little Ringed Plover	2	2	2	2
Ringed Plover	3	3	3	3
Lapwing	8	2	1	2
Stock Dove	14	5	2	5
Woodpigeon	150	105	52	105
Skylark	42	24	12	24
Swallow	19	19	10	19
Meadow Pipit	19	6	3	6
Yellow Wagtail	9	9	4	9
Pied Wagtail	10	6	3	6
Wren	22	22	11	22
Duncock	7	55	7	7
Robin	6	26	6	6
Blackbird	14	23	14	14
Song Thrush	3	13	3	3
Mistle Thrush	5	2	1	2
Sedge Warbler	28	19	9	19
Reed Warbler	11	2	1	2
Blackcap	6	4	2	4
Garden Warbler	4	3	1	3

Lesser Whitethroat	9	4	2	4
Whitethroat	46	35	16	35
Chiffchaff	1	1	0	1
Long-tailed Tit	6	3	1	3
Blue Tit	17	60	17	17
Great Tit	12	20	12	12
Magpie	11	11	5	11
Carrion Crow	11	11	5	11
House Sparrow	1	1	0	1
Tree Sparrow	24	44	24	24
Chaffinch	34	65	34	34
Goldfinch	24	12	6	12
Linnet	59	20	10	20
Bullfinch	4	4	2	4
Yellowhammer	11	3	2	3
Reed Bunting	18	3	2	3

Objective BB1: Manage Mitigation Area A to assist in reducing impacts on breeding birds arising from AMEP

Target	<ul style="list-style-type: none"> • Provide 16.7ha core wet grassland as part of a 47.8ha site bounded by hedgerow and grassland within the southern part of the AMEP site
Management	<ul style="list-style-type: none"> • Wet grassland detail design to be agreed but likely to include following: <ul style="list-style-type: none"> ○ Sowing with an appropriate seed mix and leaving uncut and ungrazed for 3 to 6 months, as appropriate ○ 0.2 livestock units per hectare per year in April to June inclusive in Year 1 and 0.3 livestock units per hectare per year in April to June inclusive in all subsequent years, or ○ Equivalent management by cutting the grassland ○ No fertilisers to be used except if needed to boost earthworm biomass ○ No herbicides to be used except if needed to control problem plant species ○ Provision of wader scrape(s) • Enhancement of hedgerows on boundary • Tree belt to screen highway traffic • Unmanaged field boundary strips 2-5 metres wide under and adjacent

	<p>to hedges.</p> <ul style="list-style-type: none"> • 150 m grassland buffer around the core area • Grassland to include 50 m operational buffer on the northern side-operational buffer to be managed as a species rich neutral grassland with grazing or cutting regime that allows sward of 5cm-20cm April-August and 5cm-15cm September-March.
Monitoring	<ul style="list-style-type: none"> • Common Bird Census (CBC) monitoring and mapping with six visits • 60 permanent quadrats to be established measuring 1m x 1m within the wet grassland area • Plant species and abundance to be recorded for each quadrat • Mapping of the extent of wet or damp grassland; and species rich grassland including average sward heights
Who	<ul style="list-style-type: none"> • Suitable ecological surveyor organised by the site Environmental Manager
When	<ul style="list-style-type: none"> • Annually for five years. Option to cease surveying after this point if bird populations monitored within development have met minimum number of pairs target detailed in Table 3.
Limits of Acceptable Change	<ul style="list-style-type: none"> • 3 year targets not met and failure cannot be explained by national trends.
Remedial Action	<ul style="list-style-type: none"> • Review data to identify which species most at risk • Review management for those species • Supplementary winter feeding

Objective BB2. Manage Mitigation Area B to assist in reducing impacts on breeding birds arising from AMEP

Target	<ul style="list-style-type: none"> • Species rich grassland and six new ponds within the triangular shaped area of land between Chase Hill Wood and Rosper Road.
Management	<ul style="list-style-type: none"> • Conversion of existing arable field to species rich grassland • Enhancement of existing roadside and field drains • Enhancement of the existing hedgerows around Area B • Creation of six new ponds (two ponds of 400 m² and four ponds of 100 m²)
Monitoring	<ul style="list-style-type: none"> • Common Bird Census (CBC) monitoring and mapping with six visits annually.
Who	<ul style="list-style-type: none"> • Suitable ecological surveyor organised by the site Environmental Manager
When	<ul style="list-style-type: none"> • Annually for five years. Option to cease surveying after this point if bird populations monitored within development have met minimum number of pairs target detailed in table 3.
Limits of Acceptable Change	<ul style="list-style-type: none"> • 3 year targets not met and failure cannot be explained by national trends.
Remedial Action	<ul style="list-style-type: none"> • Review data to identify which species most at risk • Review management for those species • Control of sycamore • Supplementary winter feeding

Objective BB3: Enhancement of the AMEP development site out with Mitigation Area A and Mitigation Area B to assist in reducing impacts on breeding birds arising from AMEP.

Target	<ul style="list-style-type: none"> Habitat Improvement throughout site.
Management	<ul style="list-style-type: none"> Nest boxes erected on suitable mature trees in Chase Hills LNR Autumn/winter food source from berry bearing plants Wild flowers, herbs and legumes Single, annual, late cut with vegetation removed Plots of biannual farmland granivore seed mix, left unharvested to provide over winter food along edges of amenity areas and habitat corridors.
Monitoring	<ul style="list-style-type: none"> Common Bird Census (CBC) monitoring and mapping with six visits annually.
Who	<ul style="list-style-type: none"> Suitable ecological surveyor organised by the site Environmental Manager
When	<ul style="list-style-type: none"> Annually for five years. Option to cease surveying after this point if bird populations monitored within development have met minimum number of pairs target detailed in table 3.
Limits of Acceptable Change	<ul style="list-style-type: none"> 3 year targets not met and failure cannot be explained by national trends.
Remedial Action	<ul style="list-style-type: none"> Review data to identify which species most at risk Review management for those species Supplementary winter feeding

3.5 SPA Birds

3.5.1 RATIONALE & OBJECTIVES

Ornithological surveys revealed within the AMEP development site >1 % of the Humber Estuary population of Curlew roost and feed within improved grassland fields. As Curlew is an SPA species the rationale for Mitigation Area A is to provide wet grassland habitat for wintering birds (particularly Curlew).

Objective SPA1: Mitigation Area A supports SPA populations of Curlew

Target	<ul style="list-style-type: none"> • Support up to a peak count of 72 curlew at least once per annum
Management	<ul style="list-style-type: none"> • Wet grassland (as at objective BB1) • Wader scrapes • Appropriate use of seed mix • Appropriate livestock grazing • Appropriate fertiliser and herbicide strategy • Noise will not exceed 65dB L_{Amax} anywhere in the core area of mitigation Area A as a result of AMEP, unless otherwise agreed with Natural England based on the findings of the monitoring programme and taking account of noise level duration. • No storage at a height greater than 10m from ground level within the 60m operational buffer strip adjacent to Mitigation Area 'A'
Monitoring	<ul style="list-style-type: none"> • Monthly Counts of birds using field at high tide. Counts to include details of any disturbance and disturbance response behaviour (especially alert and flushing distances). • Monitoring of invertebrate biomass, probe resistance, and sward height • Noise monitoring (details to be agreed with NE)
Who	<ul style="list-style-type: none"> • Suitable ecological surveyor organised by the site Environmental Manager
When	<ul style="list-style-type: none"> • Monthly counts August-April for minimum of five years. If site regularly supports over 2% of SPA curlew population after this time Steering group can agree cessation of counting or more infrequent intervals between years. • Soil resistance and sward height estimation monthly August-April. • Soil biomass surveys every August.
Limits of Acceptable Change	<ul style="list-style-type: none"> • Counts of ≥ 1 % occur in less than 3 months between August-April • Noise exceeds agreed limits as a consequence of AMEP

Remedial Action	<ul style="list-style-type: none"> • Review data and establish if any obvious causes of failure to reach target. • Review functioning of wet grassland and commission further biomass surveys • Consider inoculation with worms or worm rich turves if biomass low • Increase noise management controls.
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3.6 Noise and Visual Disturbance

3.6.1 RATIONALE & OBJECTIVES

Noise and visual impacts are expected from the AMEP development upon nearby terrestrial noise and visually sensitive receptors. Consequently, consultations are underway with Natural England regarding restrictions for noise level and container storage height in relation to North Killingholme Haven Pits and Mitigation Area A.

Objective 1: Reduce visual and noise disturbance to acceptable level in relation to North Killingholme Haven Pits.

Target	<ul style="list-style-type: none"> • No disturbance to SPA species roosting, feeding or breeding at NKHP
Management	<ul style="list-style-type: none"> • Will cover construction and operation • Include noise monitoring programme and protocol agreed with Natural England • Noise will not exceed 65dB L_{Amax} at the boundary of NKHP as a result of AMEP, unless otherwise agreed with Natural England based on the findings of the monitoring programme and taking account of noise level duration. • Agree visibility splays and resultant height / distance restrictions on container storage adjacent to NKHP and Mitigation Area A with NE.
Monitoring	<ul style="list-style-type: none"> • A combined noise and bird monitoring programme is to be developed with Natural England, including agreed monitoring locations. • Collate monthly WeBS data.
Who	<ul style="list-style-type: none"> • Noise monitoring specialist • Competent and experienced bird surveyor / specialist

	<ul style="list-style-type: none"> • Landscape architect to produce visibility splays • Surveys and monitoring to be managed by Environmental Manager
When	<ul style="list-style-type: none"> • To be agreed with Natural England as part of the development of the monitoring approach
Limits of Acceptable Change	<ul style="list-style-type: none"> • Noise levels from AMEP exceed agreed levels and also are recorded to disturb birds • Any one year where decline of a single species is greater than natural variability, or any two years of consecutive decline in peak means.
Remedial Action	<ul style="list-style-type: none"> • Review AMEP activities and disturbance management approach • Check for external causes of decline in numbers • Increase management of NKHP e.g. supplementary feeding, improve roosting sites.

ANNEX G

DRAFT MARINE EMMP AS AT 20TH NOVEMBER 2012

**Able Marine Energy Park
Environmental Management and Monitoring Plan1:
Marine Works**

TABLE OF CONTENTS

TABLE OF CONTENTS	1
1. INTRODUCTION	2
1.1 Background and Aims of the Marine EMMP (MEMMP)	2
1.2 Process of Finalising Outstanding Targets	2
1.3 Steering Group.....	2
2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS	4
2.1 Sediment Parameters.....	4
2.2 Intertidal Estuarine Habitat (Saltmarsh).....	8
2.3 Intertidal Estuarine Habitat (Benthos).....	10
2.4 Subtidal Estuarine Habitat (Benthos).....	18
2.5 Fish Communities	23
2.6 Temperature and Suspended Sediments	25
3. OBJECTIVES	27
3.1 Introduction	27
3.2 Sediment Parameters.....	27
3.3 Intertidal Habitat (Saltmarsh).....	28
3.4 Intertidal Habitat (Benthos).....	29
3.5 Subtidal Habitat (Benthos).....	32
3.6 Fish Communities	35
3.7 Marine Mammals.....	37
4. TARGET SETTING AND TRIGGERS	40
5. TABULATED ACTION PLANS	41
6. REFERENCES	57
APPENDIX 1.....	58

1. INTRODUCTION

1.1 Background and Aims of the Marine EMMP (MEMMP)

1. The development of the Able Marine Energy Park (AMEP) east of North Killingholme on the Lincolnshire Coast will partly affect the Humber Estuary Special Area of Conservation (SAC) and the Special Protection Area (SPA) / Ramsar site. Measures to mitigate for the effects of AMEP on these habitats and species have been identified, and will be implemented in areas affected by AMEP.
2. This Environmental Management and Monitoring Plan for marine works (MEMPP) and it has been drawn up taking account of guidance on management planning produced by the Conservation Management System (CMS) Consortium (www.cmsconsortium.org). It describes the mitigation measures that are required and lists specific objectives which are fundamental to their delivery. Further it includes targets and management actions which support the objectives and the monitoring which will be undertaken to confirm progress towards the objectives, and ultimately confirming that they have been achieved. Limits of acceptable change are defined and any necessary remedial actions which will be undertaken should the monitoring show that these limits have not been met.

1.2 Process of Finalising Outstanding Targets

3. The mitigation proposals for AMEP are complex, and the objectives and targets / management options included in this version of the MEMMP have been subject to extensive discussions with stakeholders. Prior to the DML being granted, the MEMMP will be further refined through continued regular meetings with key stakeholders about targets / management actions and subsequent monitoring requirements which are yet to be agreed.
4. The MEMMP is a live working document which will be in place for as long as it is deemed necessary to achieve the agreed objectives set out in it. Updates to it will be overseen by the Steering Group, whose role is explained below and includes undertaking a complete review of the MEMMP every five years.

1.3 Steering Group

5. AHPL will have overall responsibility for the implementation of the MEMMP. However, the involvement of other stakeholders is essential for the effective working of the MEMMP, and hence AHPL will establish a Steering Group whose role will include the following:
 - to monitor the progress of implementation of the MEMMP to ensure that it is meeting the objectives;
 - to consider and recommend remedial measures where those objectives are not being met;

- to provide expert views, opinions and feedback to AHPL about key issues through regular meetings;
 - to help direct and focus the MEMMP and its development in an interactive way including through revisions to targets, monitoring requirements and if necessary the adoption of any remedial actions;
 - to undertake a comprehensive review of the MEMMP at least every five years;
 - to co-opt members and working groups if necessary;
 - to ensure a transparent and open process to the implementation of the MEMMP with an evident audit trail, and regular updates are produced for dissemination to a wider audience (e.g. via AHPL / HINCA websites).
6. AHPL is seeking an inclusive approach and the Steering Group will comprise the following stakeholders in addition to AHPL:
- Natural England;
 - Environment Agency (EA);
 - The Royal Society for the Protection of Birds (RSPB);
 - Marine Management Organisation(MMO);
 - representatives from the local wildlife trusts;
 - representatives from the local authorities;
 - Humber Industry Nature Conservation Association (HINCA); and
 - Two representatives, one from the local residents and one from local interest groups (which can be rotated as required).
7. In addition to the above the Steering Group can co-opt members and form working groups where appropriate to consider specific issues. The chair of the Steering Group will be HINCA, an organisation of some standing in the Humber area (<http://humberinca.co.uk/introduction.php>) for over a decade, and one which the vast majority of other members of the Steering Group are already members.
8. An agenda will be drawn up in advance of each Steering Group meeting by AHPL and minutes will be produced after the meeting by them for agreement. The compensation proposals are complex and the Steering Group will meet frequently. Until 2018 the Steering Group meetings will be held at least every quarter, and then the frequency will be subject to review by the Steering Group.
9. The Steering Group will have power to lay down procedure for calling emergency meetings.

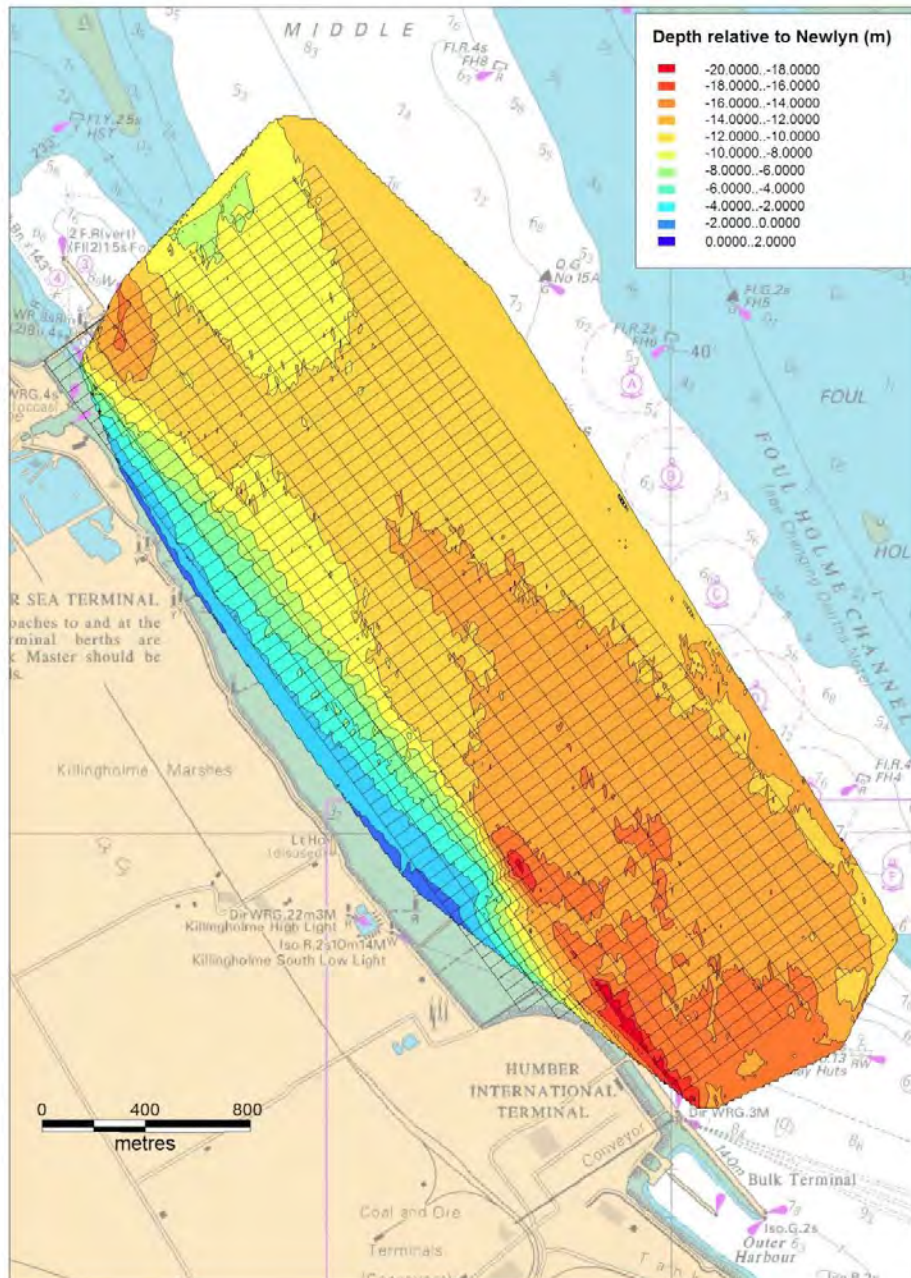
2. ENVIRONMENTAL BASELINE AND IDENTIFIED IMPACTS

10. The following main environmental topic sections provide an overview of relevant headline environmental baseline data gathered from the Environmental Statement and associated documents.
11. Where these data form specific monitoring and management target(s) then these are identified. Document references are provided for additional context and information where necessary.
12. Impacts raised by the relevant Defra agencies are summarised in relation to the environmental topic sections.

2.1 Sediment Parameters

2.1.1 BASELINE

13. A survey of subtidal bathymetry was undertaken in March 2010; this is graphically summarised in Figure 1. Further information (including figures changes to intertidal profiles since 2000) is available in EX 28.3 Prt 2 (Baseline of North Killingholme Foreshore) and in Annex 9.1 of the ES.



Note: The lower extent of the intertidal zone is denoted by the seaward extent of the 2m to -4mAOD contour range (-4mAOD = -0.1mCD)

Figure 1: Subtidal Bathymetry (2010)

14. Sediment particle size analysis was undertaken at the same locations as the benthic intertidal and subtidal sites from the 2010 study (see Annex 7.2 to the ES). The baseline findings are given here for the intertidal zone (Table 1) and subtidal zone (Table 2). Sample locations were as per the benthic station locations (see Section 2.3 and 2.4 below).

Table 1: Intertidal Sediment Particle Size Data (2010)

Transect	Shore position	Mean ϕ	Mean μm	% Gravel	% Sand	% Mud	Sediment name	Textural group
1	Upper	5.880	16.98	0.0%	14.5%	85.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
1	Middle	6.255	13.10	0.0%	10.5%	89.5%	Very Fine Sandy Fine Silt	Sandy Mud
1	Lower	5.772	18.31	0.0%	19.0%	81.0%	Very Fine Sandy Very Coarse Silt	Sandy Mud
2	Upper	6.379	12.02	0.0%	7.5%	92.5%	Medium Silt	Mud
2	Middle	6.326	12.47	0.0%	6.9%	93.1%	Medium Silt	Mud
2	Lower	4.617	40.74	0.0%	48.5%	51.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
3	Upper	6.774	9.139	0.0%	4.5%	95.5%	Fine Silt	Mud
3	Middle	5.461	22.70	0.0%	20.6%	79.4%	Very Fine Sandy Very Coarse Silt	Sandy Mud
3	Lower	5.893	16.83	0.0%	14.5%	85.5%	Very Fine Sandy Coarse Silt	Sandy Mud
4	Upper	6.616	10.20	0.0%	5.5%	94.5%	Medium Silt	Mud
4	Middle	5.864	17.17	0.0%	15.5%	84.5%	Very Fine Sandy Very Coarse Silt	Sandy Mud
4	Lower	5.908	16.65	0.0%	12.4%	87.6%	Very Fine Sandy Coarse Silt	Sandy Mud
5	Upper	6.416	11.71	0.0%	7.5%	92.5%	Medium Silt	Mud
5	Middle	5.847	17.38	0.0%	16.0%	84.0%	Very Fine Sandy Very Coarse Silt	Sandy Mud
5	Lower	5.839	17.47	0.0%	17.3%	82.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
6	Upper	6.654	9.930	0.0%	5.2%	94.8%	Medium Silt	Mud
6	Middle	5.608	20.51	0.0%	20.3%	79.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
6	Lower	5.618	20.36	0.0%	23.8%	76.2%	Very Fine Sandy Very Coarse Silt	Sandy Mud
7	Upper	6.122	14.36	0.0%	8.4%	91.6%	Coarse Silt	Mud
7	Middle	4.828	35.22	0.0%	42.4%	57.6%	Very Fine Sandy Very Coarse Silt	Sandy Mud
7	Lower	5.878	17.01	0.0%	16.8%	83.2%	Very Fine Sandy Medium Silt	Sandy Mud
8	Upper	6.459	11.37	0.0%	6.9%	93.1%	Medium Silt	Mud
8	Middle	5.605	20.54	0.0%	19.9%	80.1%	Very Fine Sandy Very Coarse Silt	Sandy Mud
8	Lower	6.050	15.09	0.0%	11.5%	88.5%	Very Fine Sandy Coarse Silt	Sandy Mud
9	Upper	6.249	13.15	0.0%	8.7%	91.3%	Medium Silt	Mud
9	Middle	5.764	18.41	0.0%	17.3%	82.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
9	Lower	6.148	14.10	0.0%	10.4%	89.6%	Very Fine Sandy Coarse Silt	Sandy Mud
10	Upper	6.120	14.37	0.0%	13.3%	86.7%	Very Fine Sandy Fine Silt	Sandy Mud
10	Middle	6.087	14.71	0.0%	13.3%	86.7%	Very Fine Sandy Medium Silt	Sandy Mud
10	Lower	5.133	28.49	0.0%	29.3%	70.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Upper	5.541	21.48	0.0%	19.3%	80.7%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Middle	5.158	28.00	0.0%	29.8%	70.2%	Very Fine Sandy Very Coarse Silt	Sandy Mud
11	Lower	6.041	15.19	0.0%	12.6%	87.4%	Very Fine Sandy Coarse Silt	Sandy Mud
12	Upper	6.687	9.708	0.0%	6.7%	93.3%	Fine Silt	Mud
12	Middle	5.397	23.73	0.0%	23.2%	76.8%	Very Fine Sandy Very Coarse Silt	Sandy Mud
12	Lower	5.879	16.99	0.0%	14.1%	85.9%	Very Fine Sandy Very Coarse Silt	Sandy Mud

15. The baseline bathymetry and hydrography study (Annex 9.1 to the ES) indicates that typical suspended sediment concentrations near to AMEP measured in September 2010 range from 100 mg/l at slack water on a neap tide to 400-500 mg/l during the neap tide ebb flow. Concentrations during the spring tides reached 1,600 mg/l during peak flood flow and were in excess of 800 mg/l on the ebb flow. Again, these values will vary on an intra-annual basis due to natural processes.

Table 2: Subtidal Sediment Particle Size Data (2010)

Station No.	Mean ϕ	Mean μm	% Gravel	% Sand	% Mud	Sediment name	Textural group
1	2.492	177.8	0.0%	95.9%	4.1%	Moderately Sorted Fine Sand	Sand
2	5.849	17.35	0.0%	21.2%	78.8%	Very Fine Sandy Medium Silt	Sandy Mud
3	4.907	33.34	0.0%	43.5%	56.5%	Very Fine Sandy Medium Silt	Sandy Mud
4	3.797	71.95	0.0%	70.9%	29.1%	Very Coarse Silty Fine Sand	Muddy Sand
5	6.236	13.26	0.0%	14.4%	85.6%	Very Fine Sandy Fine Silt	Sandy Mud
6	2.944	130.0	0.0%	77.5%	22.5%	Fine Silty Medium Sand	Muddy Sand
7	4.274	51.68	0.0%	60.4%	39.6%	Very Coarse Silty Very Fine Sand	Muddy Sand
8	5.910	16.64	0.0%	18.8%	81.2%	Very Fine Sandy Fine Silt	Sandy Mud
9	5.770	18.33	0.0%	20.3%	79.7%	Very Fine Sandy Fine Silt	Sandy Mud
10	5.014	30.96	0.0%	41.0%	59.0%	Very Fine Sandy Fine Silt	Sandy Mud
11	6.056	15.03	0.0%	15.0%	85.0%	Very Fine Sandy Fine Silt	Sandy Mud
12	1.879	271.8	1.6%	83.8%	14.6%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
13	3.305	101.2	0.0%	70.5%	29.5%	Fine Silty Medium Sand	Muddy Sand
14	6.071	14.88	0.0%	14.2%	85.8%	Very Fine Sandy Fine Silt	Sandy Mud
15	3.181	110.3	0.2%	71.1%	28.7%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
16	3.366	97.02	2.2%	60.5%	37.3%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
17	4.474	44.99	0.7%	44.5%	54.9%	Slightly Very Fine Gravelly Medium Sandy Medium Silt	Slightly Gravelly Sandy Mud
18	3.405	94.39	0.0%	69.9%	30.1%	Fine Silty Medium Sand	Muddy Sand
19	2.909	133.2	3.0%	69.6%	27.3%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
20	3.296	101.8	0.9%	68.2%	30.9%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
21	3.734	75.15	0.0%	59.8%	40.2%	Fine Silty Medium Sand	Muddy Sand
22	2.681	155.9	0.5%	78.7%	20.8%	Slightly Very Fine Gravelly Fine Silty Medium Sand	Slightly Gravelly Muddy Sand
23	3.122	114.9	2.9%	65.0%	32.0%	Slightly Very Fine Gravelly Very Coarse Silty Medium Sand	Slightly Gravelly Muddy Sand
24	2.315	201.0	0.0%	83.6%	16.4%	Fine Silty Medium Sand	Muddy Sand
25	4.969	31.92	0.0%	43.2%	56.8%	Very Fine Sandy Very Coarse Silt	Sandy Mud
26	2.490	177.9	6.7%	72.2%	21.1%	Very Fine Gravelly Fine Silty Medium Sand	Gravelly Muddy Sand
27	3.671	78.50	7.6%	52.3%	40.1%	Medium Gravelly Fine Silty Medium Sand	Gravelly Muddy Sand
28	4.338	49.45	0.0%	47.5%	52.5%	Medium Sandy Very Coarse Silt	Sandy Mud
29	0.220	858.5	46.7%	31.0%	22.3%	Fine Silty Sandy Coarse Gravel	Muddy Sandy Gravel
30	0.162	893.7	22.7%	70.6%	6.7%	Fine Gravelly Coarse Sand	Gravelly Sand

2.1.2 IMPACTS

NE (SHRA)

- Capital and maintenance dredging indirectly impacting on intertidal and subtidal habitats and associated benthic communities.

MMO

- Capital and maintenance dredging leading to changes in sediment conditions.

EA

- Capital and maintenance dredging leading to a reduction of Ecological Potential under WFD.
- Capital and maintenance dredging resulting in a reduction in flood protection standards. Understood to be addressed within a separate Flood Risk Management Plan.

Other

- Capital and maintenance dredging deleteriously affecting the operation of the E.ON and C.RO intake and outfall operation.

2.2 Intertidal Estuarine Habitat (Saltmarsh)

2.2.1 BASELINE

Small areas of saltmarsh were identified adjacent to the proposed AMEP site (Figure 2). Further information on these can be found in EX 28.3 Prt 2 and in Annex 10.1 to the ES.

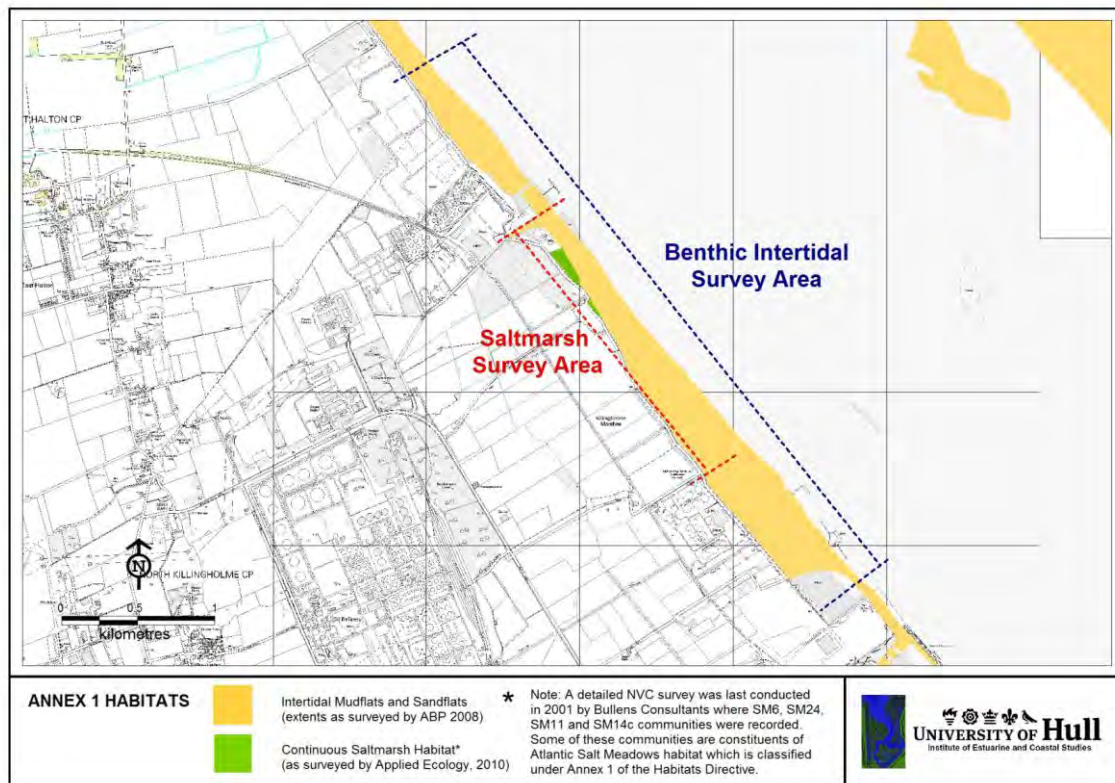


Figure 2: Saltmarsh Area

16. In the vicinity of the AMEP site a very small patch of saltmarsh was recorded on the seaward side of the seawall, close to the mouth of the main drain onto the foreshore and also adjacent to the North Killingholme Haven Pits. During the Phase 2 Survey undertaken in 2006, a number of different saltmarsh communities were identified within this area including sea couch (*Elymus pycnanthus*), saltmarsh rush (*Juncus gerardii*) and couch (*Elymus repens*).
17. Killingholme Marshes foreshore is undergoing a process of change and saltmarsh is beginning to establish quite extensively due to the foreshore rising within the tidal range (EX28.3 Prt 2).

2.2.2 IMPACTS

NE (SHRA)

- No direct impacts identified.

MMO

- No direct impacts identified.

EA

- Capital and maintenance dredging leading to a reduction of Ecological Potential under WFD.

2.3 Intertidal Estuarine Habitat (Benthos)

2.3.1 BASELINE

18. Baseline data are available from a site characterisation study undertaken at the AMEP site in May 2010. A total of 36 intertidal samples were taken along 12 intertidal transects with one sample taken using a 0.01m² corer at each of three stations along each transect. The location of sampling stations is shown in Figure 3; and the raw data are presented as Tables 3 and 4.
19. The most commonly occurring species in the intertidal samples were the oligochaete *T. benedii*, Nematoda, the polychaete *Streblospio shrubsolii* and the amphipod crustacean *Corophium volutator*. These species were present in most of the samples and were present at higher abundances than all other species throughout the survey area. The bivalve *M. balthica* was widespread and the polychaete *H. diversicolor* was present at most of the upper shore stations.
20. *T. benedii* was the dominant species at the upper and mid shore intertidal stations. *S. shrubsolii* was dominant at the lower shore intertidal stations where the sediments were presumably sandier.
21. Species richness (number of species recorded) ranged from 2-9 species/sample (mean = 5.8). Abundance (number of individuals/sample) ranged from 5-197 (mean = 46.4) and biomass ranged from <0.001 to 1.37 g/sample (mean = 0.18 g/sample) and was generally higher at stations where *H. diversicolor* was found.
22. All species found were typical for the intertidal area of the middle region of the Humber Estuary, with moderate abundance and diversity of mostly common species. There were no species of particular conservation importance although those present were key prey species for birds.
23. AHPL will undertake a pre-construction baseline survey of the area. This baseline survey will be designed using the characterisation survey to inform suitable sample locations to provide a random stratified survey design.
24. This survey will use a three replicate methodology and follow standard methods following the JNCC Marine Monitoring Handbook, 2001 (Davies *et al.*). However The EA's Marine Team (Peterborough) will be consulted to ensure that the methods used are WFD compliant.

Table 3: Raw biomass data (g.sample⁻¹) from North Killingholme intertidal monitoring (2010)

Taxon	Site 1			Site 2			Site 3			Site 4			Site 5			Site 6		
	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower
TURBELLARIA													0.00					
NEMATODA	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00
<i>Eteone flava/longa</i>																		
<i>Hediste diversicolor</i>	0.28						1.36						0.26					
<i>Nephtys hombergii</i>																		
<i>Scoloplos armiger</i>						0.00												
<i>Pygospio elegans</i>						0.00		0.00					0.00				0.00	
<i>Streblospio shubsolei</i>	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Tharyx sp.</i>														0.00			0.00	
<i>Tharyx killariensis</i>																		0.00
<i>Capitella capitata (sp. complex)</i>		0.00																
<i>Arenicola (juvenile)</i>												0.00			0.00			
<i>Manayunkia aestuarina</i>	0.00	0.00					0.00						0.00					
<i>Paranais litoralis</i>					0.00	0.00	0.00			0.00			0.00					
<i>Heterochaeta costata</i>				0.00									0.00					
<i>Tubificoides benedii</i>	0.03	0.12	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.00	0.02	0.00	0.00	0.03	0.00	0.00
<i>Tubificoides swirencoides</i>								0.00	0.00		0.00	0.00						
Enchytraeidae																		
<i>Corophium (juvenile)</i>								0.00										
<i>Corophium volutator</i>				0.02			0.00	0.09		0.08	0.03			0.09		0.00	0.01	
<i>Diastylis rathkei</i>																		
<i>Hydrobia ulvae</i>	0.00	0.02		0.00														
<i>Mytilus edulis</i>																	0.00	
<i>Mysella bidentata</i>																		0.06
TELLINACEA (juvenile)	0.00	0.00		0.00		0.00									0.00	0.00		
<i>Macoma balthica</i>	0.09	0.12	0.03		0.10	0.08		0.39	0.03	0.04	0.01						0.01	0.00
<i>Abra tenuis</i>	0.00	0.00	0.00															

Table 3 (continued): Raw biomass data (g.sample⁻¹) from North Killingholme intertidal monitoring (2010)

Taxon	Site 7			Site 8			Site 9			Site 10			Site 11			Site 12		
	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower
TURBELLARIA																		
NEMATODA	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00	
<i>Eteone flava/longa</i>		0.00																
<i>Hediste diversicolor</i>				0.34			0.03				0.07		0.15			0.43		
<i>Nephtys hombergii</i>														0.00				
<i>Scoloplos armiger</i>																		
<i>Pygospio elegans</i>							0.00										0.00	
<i>Streblospio shubsolei</i>	0.00	0.00	0.00		0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	
<i>Tharyx sp.</i>		0.00			0.00													
<i>Tharyx killariensis</i>																		
<i>Capitella capitata (sp. complex)</i>																		
<i>Arenicola (juvenile)</i>																		
<i>Manayunkia aestuarina</i>	0.00												0.00			0.00		
<i>Paranais litoralis</i>	0.00																	
<i>Heterochaeta costata</i>				0.00									0.00					
<i>Tubificoides benedii</i>	0.03	0.01	0.00	0.01	0.04	0.00	0.00	0.00		0.00	0.00	0.00	0.00			0.01	0.00	
<i>Tubificoides swirencoides</i>								0.00										
Enchytraeidae													0.00			0.00		
<i>Corophium (juvenile)</i>																		
<i>Corophium volutator</i>	0.05	0.00		0.03	0.03		0.19	0.00	0.00		0.01	0.02	0.01	0.15		0.04	0.03	0.11
<i>Diastylis rathkei</i>															0.00			
<i>Hydrobia ulvae</i>																		
<i>Mytilus edulis</i>																		
<i>Mysella bidentata</i>																		
TELLINACEA (juvenile)												0.00					0.00	
<i>Macoma balthica</i>	0.11	0.16		0.01	0.03	0.00	0.00	0.00	0.00	0.01	0.01		0.01	0.51	0.07		0.22	
<i>Abra tenuis</i>																		

Table 4: Raw abundance data (individuals.sample⁻¹) from North Killingholme intertidal monitoring (2010)

Taxon	Site 1			Site 2			Site 3			Site 4			Site 5			Site 6		
	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower
TURBELLARIA													1					
NEMATODA	5	35	1		10	5	6	8	1	3	3	1	2	7			11	3
<i>Eteone flava/longa</i>																		
<i>Hediste diversicolor</i>	12						26						5					
<i>Nephtys hombergii</i>																		
<i>Scoloplos armiger</i>									1									
<i>Pygospio elegans</i>						1		3				1					1	
<i>Streblospio shubsolei</i>	6	9		1	4		6	4	6	2	4	2	3	2	2	4	6	15
<i>Tharyx sp.</i>														4			2	
<i>Tharyx killariensis</i>																		1
<i>Capitella capitata (sp. complex)</i>		1																
<i>Arenicola (juvenile)</i>											1				1			
<i>Manayunkia aestuarina</i>	1	1					32						2					
<i>Paranais litoralis</i>					6	1	5			9			6					
<i>Heterochaeta costata</i>				2									1					
<i>Tubificoides benedii</i>	38	136	1	2	12	1	43	4	2	55	5	1	38	4	1	50	10	1
<i>Tubificoides swirencoides</i>								1	15		1	1						
Enchytraeidae																		
<i>Corophium (juvenile)</i>								1										
<i>Corophium volutator</i>				3			2	34		12	10			32		1	10	
<i>Diastylis rathkei</i>																		
<i>Hydrobia ulvae</i>	4	6		1														
<i>Mytilus edulis</i>																	1	
<i>Mysella bidentata</i>																		1
TELLINACEA (juvenile)	13	1		1		1									1	2		
<i>Macoma balthica</i>	2	5	2		4	4		9	2	1	2						4	1
<i>Abra tenuis</i>	3	3	1															

Table 4 (continued): Raw abundance data (individuals.sample⁻¹) from North Killingholme intertidal monitoring (2010)

Taxon	Site 7			Site 8			Site 9			Site 10			Site 11			Site 12		
	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower	Upper	Mid	Lower
TURBELLARIA																		
NEMATODA	2	2		2	5	1	6	3	1		4	4	20		1	3	5	3
<i>Eteone flava/longa</i>		1																
<i>Hediste diversicolor</i>				24			4				3	13				30		
<i>Nephtys hombergii</i>														1				
<i>Scoloplos armiger</i>																		
<i>Pygospio elegans</i>								1										2
<i>Streblospio shubsolei</i>	12	6	9		1	15		5	4	6	2	6	9	6	5	1	1	27
<i>Tharyx sp.</i>		2			2													
<i>Tharyx killariensis</i>																		
<i>Capitella capitata (sp. complex)</i>																		
<i>Arenicola (juvenile)</i>																		
<i>Manayunkia aestuarina</i>	1												5			1		
<i>Paranais litoralis</i>	5																	
<i>Heterochaeta costata</i>				1									3					
<i>Tubificoides benedii</i>	30	16	1	6	56	1	1	3			4	3	5	2			19	3
<i>Tubificoides swirencoides</i>								1										
Enchytraeidae													2			1		
<i>Corophium (juvenile)</i>																		
<i>Corophium volutator</i>	10	1		13	12		52	4	2		2	15	3	70		13	27	71
<i>Diastylis rathkei</i>															1			
<i>Hydrobia ulvae</i>																		
<i>Mytilus edulis</i>																		
<i>Mysella bidentata</i>																		
TELLINACEA (juvenile)												1					1	
<i>Macoma balthica</i>	3	3		1	3	1	2	2	1	3	1		1	6	3		8	
<i>Abra tenuis</i>																		

25. Data from this pre-construction survey will be used to provide appropriate targets, taking into account seasonal variation as defined within the spring 2010 survey.

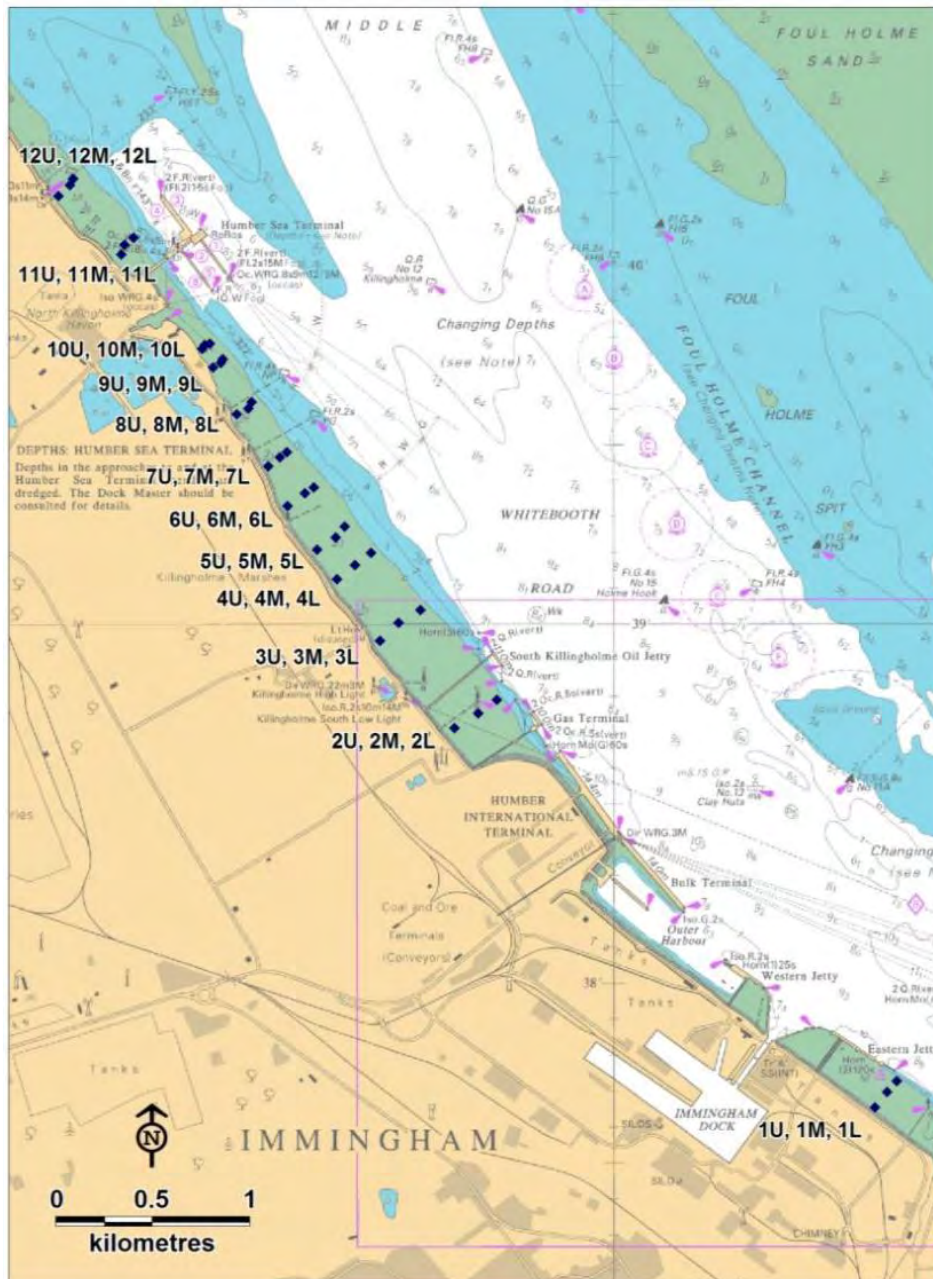


Figure 3: Intertidal benthic invertebrate sampling stations (Characterisation Study 2010)

26. Figure 4 (below) provides suggested biotopes and the spatial extent of the biotopes based on the sediment, benthic community and bathymetric data for the area. Further details are provided in document EX11.14.

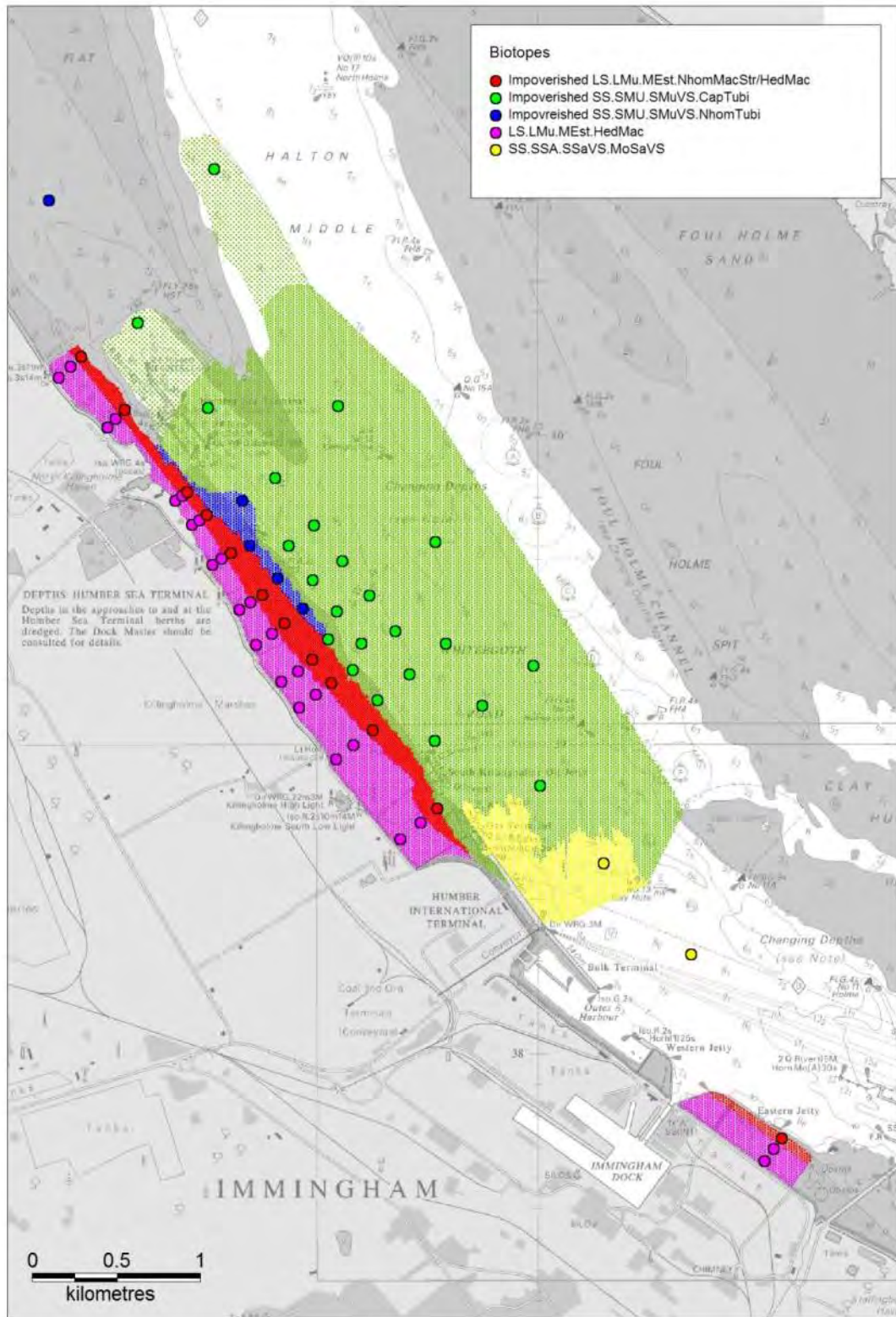


Figure 4: Biotope Location and Possible Extent based on Bathymetry

2.3.2 IMPACTS

NE (SHRA)

- Medium to longer term changes to habitat arising from the quay presence (transformation of intertidal mudflat to saltmarsh).
- Permanent loss of intertidal habitat (31.5ha). Addressed within the CEMMP.
- All requirements in relation to SPA birds are addressed within the CEMMP and TEMMP.

MMO

- Capital and maintenance dredging leading to smothering of intertidal benthos.

EA

- Capital and maintenance dredging leading to a reduction of Ecological Potential under WFD.

2.4 Subtidal Estuarine Habitat (Benthos)

2.4.1 BASELINE

27. A total of thirty subtidal benthic samples were taken across the area that will be developed as the berthing pocket, approach channel and turning circle during May 2010 using a 0.1 m² Hamon grab (details of methods and results are provided in Annex 10.1 to the ES).
28. The sampling positions are shown in Figure 5 and co-ordinates are provided in Table 5.

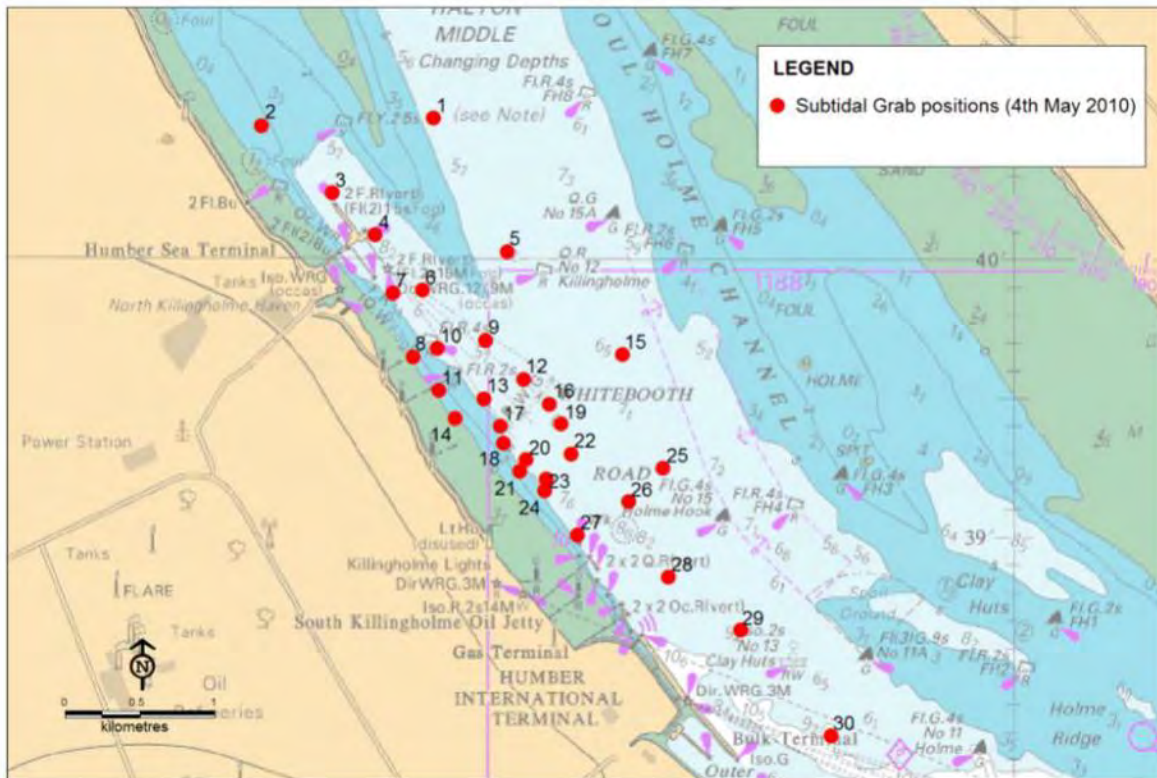


Figure 5: Subtidal Benthic Invertebrate Sampling Stations (2010)

Table 5: Subtidal Benthic Sampling Position Co-ordinates (2010)

Station No.	Date	Time	Sea State	Attempt	Depth (m)	Position (WGS 84)		Description
						Lat	Long	
1	04/05/2010	11:36	Calm	1st	10.4	53.67483	0.22367	Muddy sand
2	04/05/2010	11:44	Calm	1st	7.9	53.67433	0.24100	Mud
3	04/05/2010	11:58	Calm	2nd	14.1	53.67033	0.23383	Mud
4	04/05/2010	12:05	Calm	1st	12.6	53.66783	0.22950	Muddy sand
5	04/05/2010	12:13	Calm	1st	12.6	53.66683	0.21617	Mud & clay
6	04/05/2010	12:18	Calm	1st	11.3	53.66450	0.22467	Muddy sand
7	04/05/2010	12:25	Calm	1st	11.5	53.66433	0.22767	Mud
8	04/05/2010	12:28	Calm	1st	7.7	53.66050	0.22567	Mud
9	04/05/2010	12:43	Calm	1st	12.2	53.66100	0.22317	Clay with surface layer of sand
10*	04/05/2010	12:40	Calm	1st	12.3	53.66150	0.21833	Sandy mud
11*	04/05/2010	13:40	Calm	1st	13.6	53.65917	0.21450	Sandy mud
12*	04/05/2010	12:50	Calm	1st	10.9	53.65800	0.21850	Medium sand
13	04/05/2010	13:07	Calm	1st	8.5	53.65850	0.22300	Muddy sand
14	04/05/2010	13:22	Calm	1st	7	53.65683	0.22133	Mud
15	04/05/2010	13:44	Calm	1st	11	53.65633	0.21683	Medium sand
16	04/05/2010	13:37	Calm	1st	12.8	53.65767	0.21183	Sand with compacted clay
17*	04/05/2010	13:28	Calm	1st	11.6	53.66067	0.20450	Muddy sand
18*	04/05/2010	14:20	Calm	3rd	10.6	53.65650	0.21067	Medium sand
19*	04/05/2010	13:56	Calm	1st	10.5	53.65433	0.21417	Muddy sand
20	04/05/2010	14:09	Calm	1st	10	53.65533	0.21650	Medium sand
21	04/05/2010	14:29	Calm	3rd	9.4	53.65367	0.21483	Muddy sand
22	04/05/2010	15:02	Calm	1st	10.2	53.65250	0.21233	Sand with compacted clay
23	04/05/2010	14:58	Calm	1st	10.9	53.65317	0.21217	Muddy sand with coal fragments
24	04/05/2010	14:53	Calm	3rd	11.3	53.65467	0.20967	Muddy sand with coal fragments
25	04/05/2010	15:14	Calm	2nd	11.2	53.65383	0.20033	Sandy mud
26	04/05/2010	15:18	Calm	1st	12.5	53.65183	0.20383	Sand with coal fragments
27	04/05/2010	15:29	Calm	1st	12.9	53.64983	0.20900	Sand with coal fragments
28	04/05/2010	15:36	Calm	2nd	12.1	53.64733	0.19983	Clay with a surface layer of sand
29	04/05/2010	15:44	Calm	1st	12.9	53.64417	0.19250	Clay with a surface layer of sand
30	04/05/2010	16:03	Calm	4th	11.6	53.63783	0.18333	Sand with shell & coal fragments

* Sample collected from contaminant analysis

29. Details of the findings are given in Annex 10.1 to the ES. However Tables 6 to 8 provide abundance and biomass data for quick reference.
30. In summary, the survey results indicate a species richness that ranged from 0-17 (including colonial taxa) (mean = 4) with values of five or less being recorded from all but two stations. The most widespread species (occurring in the greatest number of samples) was the polychaete *Capitella capitata* with the barnacles *Balanus improvisus* and *Elminius modestus* being the most abundant species.
31. Abundance ranged from 0-184 individuals/sample (mean = 15) with abundance in most samples being less than 20 individuals. Biomass ranged from <0.001 to 15.5 g/sample (mean = 0.56) with values at most stations being <0.05 g.

Table 6: Raw abundance data from North Killingholme subtidal monitoring (2010)

MCS Code	TAXON	TAXON Qualifier	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
D 158	Tubulariidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	p	-	-	-	-	-	-	-	
D 433	Sertularia		p	p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	p	p	-	P	-	-	-	-	
D 510	Hartlaubella gelatinosa		p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	P	-	P	-	-	-	-	-	-	
D 662	ACTINARIA		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1
F 1	PLATYHELMINTHES		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	6	2	
HD 1	NEMATODA		-	6	-	-	-	-	-	3	-	1	5	-	-	1	-	-	-	3	-	-	4	-	-	2	-	-	-	-	-	-	
K 45	Pedicellina		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	p	-	-	-	-	-	
P 117/118	Eteone flava/fonga	aggregate	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P 499	Nephtys hombergii		-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P 672	Scoloplos armiger		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	
P 753	Polydora cornuta		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	
P 799	Streblospio shrubsolii		-	3	-	-	-	-	3	11	-	-	22	-	-	5	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
P 845	Tharyx	species A	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P 907	Capitella capitata	species complex	2	-	3	1	-	-	-	1	-	-	2	1	-	1	-	2	6	-	2	7	-	2	9	14	8	4	-	-	-	-	
P 919	Mediomastus fragilis		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P 931	Arenicola marina		9	-	4	42	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	7	1	1	-	-	-	
P 1083	Protodriloides chaetifer		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
P 1490	Tubificoides benedii		-	-	-	1	-	-	1	1	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P 1498	Tubificoides pseudogaster		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
P 1500	Tubificoides swirencoides		-	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Q 53	ACARI		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
R 14	CIRRIPIEDIA	indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
R 68	Elminius modestus		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	
R 78	Balanus improvisus		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	124	-	-	-	-	-	-	-	-	-	
R 142	COPEPODA	indeterminate	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	3	-	2	10	1	1	2	-	-	
S 76	Neomysis integer		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
S 86	Schistomysis kervillei		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
S 471	Gammarus	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
S 481	Gammarus salinus		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	
S 616	Corophium volutator		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
S 1197	Bodotria scorioides		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	
S 1253	Diastylis rathkei typica		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
W 1696	Mytilus edulis	juvenile	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	1	-	-	-	-	-	
W 2007	TELLINACEA	juvenile	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
W 2029	Macoma balthica		-	-	1	1	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Y 112	Walkeria uva		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	p	-	-	-	-	-	-	
Y 137	Bowerbankia		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	p	-	p	P	-	-	-	-	
Y 176	Electra crustulenta		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	P	-	-	-	-	
Y 177	Electra monostachys		p	-	-	-	-	-	-	-	-	P	P	P	-	-	p	-	-	-	-	-	P	-	p	p	p	-	-	-	-	-	
Y 187	Flustra foliacea		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	p	-	-	-	
Y 222	Amphiblestrum auritum		p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Y 255	Bicellanella ciliata		-	-	-	-	-	-	p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Quantitative			3	3	3	4	0	1	5	6	1	1	4	3	1	5	1	1	1	4	0	2	13	2	2	3	4	5	3	1	2	4	
Colonial			4	1	0	0	0	0	1	0	0	2	1	1	0	0	1	0	0	0	1	0	4	0	4	4	3	4	1	0	0	0	
Total Taxa			7	4	3	4	0	1	6	6	1	3	5	4	1	5	2	1	1	4	1	2	17	2	6	7	7	9	4	1	2	4	
Total Abundance			12	10	8	45	0	1	9	18	1	1	39	4	1	9	1	1	2	15	0	3	184	4	3	13	32	14	6	2	7	5	

Table 7: Raw biomass data from North Killingholme subtidal monitoring (2010)

MCS Code	TAXON	TAXON Qualifier	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
D	158	Tubulariidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
D	433	<i>Sertularia</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
D	510	<i>Hartlaubella gelatinosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
D	662	ACTINIARIA		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.750	-	-	-	-	-	-	-	-	0.000	
F	1	PLATYHELMINTHES		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.000		
HD	1	NEMATODA		-	0.000	-	-	-	-	0.000	-	0.000	0.000	-	-	0.000	-	-	-	0.000	-	-	0.000	-	-	0.000	-	-	-	0.000	0.000		
K	45	<i>Pedicellina</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	117/118	<i>Eteone flava/longa</i>	aggregate	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	499	<i>Nephtys hombergii</i>		-	-	-	-	-	-	0.015	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	672	<i>Scoloplos armiger</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.030	-	-	-	-	-	-	-	-	-	-	-		
P	753	<i>Polydora cornuta</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-		
P	799	<i>Streblospio shrubsalii</i>		-	0.000	-	-	-	-	0.001	0.003	-	0.007	-	-	0.001	-	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-		
P	845	<i>Tharyx</i>	species A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	907	<i>Capitella capitata</i>	species complex	0.001	-	0.000	0.000	-	-	-	-	0.000	-	-	0.003	0.000	-	0.000	-	0.002	0.001	-	0.002	0.008	-	0.001	0.007	0.027	0.001	0.003	-	-	
P	919	<i>Mediomastus fragilis</i>		-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	931	<i>Arenicola marina</i>		0.004	-	0.002	0.012	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	-	1.100	0.000	0.000	-	-		
P	1083	<i>Protodriloides chaetifer</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000		
P	1490	<i>Tubificoides benedii</i>		-	-	-	0.000	-	-	0.000	0.000	-	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
P	1498	<i>Tubificoides pseudogaster</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-		
P	1500	<i>Tubificoides swirencoides</i>		-	-	-	-	-	-	-	-	-	0.000	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Q	53	ACARI		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-		
R	14	CIRRIPIEDIA	indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000		
R	68	<i>Elminius modestus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.368	-	-	-	-	-	-	-	-		
R	78	<i>Balanus improvisus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.135	-	-	-	-	-	-	-	-		
R	142	COPEPODA	indeterminate	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-	-	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	-		
S	76	<i>Neomysis integer</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.009		
S	86	<i>Schistomysis kervillei</i>		-	-	-	-	-	0.018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
S	471	<i>Gammarus</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-		
S	481	<i>Gammarus salinus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
S	616	<i>Corophium volutator</i>		-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.067		
S	1197	<i>Bodotria scarpioidea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000	0.000	-	-	-	-	-	-	-		
S	1253	<i>Diastylis rathkei typica</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-		
W	1696	<i>Mytilus edulis</i>	juvenile	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.019	-	-	-	0.000	-	-	-	-		
W	2007	TELLINACEA	juvenile	-	-	-	-	-	-	-	-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
W	2029	<i>Macoma balthica</i>		-	-	0.004	0.006	-	-	-	-	0.044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	112	<i>Walkeria uva</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	137	<i>Bowerbankia</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	176	<i>Electra crustulenta</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	177	<i>Electra monostachys</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	187	<i>Flustra foliacea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	222	<i>Amphiblestrum auritum</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Y	255	<i>Bicellariella ciliata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			Quantitative	3	3	3	4	0	1	5	6	1	1	4	3	1	5	1	1	1	4	0	2	13	2	2	3	4	5	3	1	2	4
			Colonial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Total Taxa	3	3	3	4	0	1	5	6	1	1	4	3	1	5	1	1	1	4	0	2	13	2	2	3	4	5	3	1	2	4
			Total Biomass	0.005	0.000	0.007	0.018	0.000	0.018	0.017	0.050	0.000	0.000	0.014	0.003	0.000	0.002	0.000	0.000	0.002	0.032	0.000	0.002	15.285	0.000	0.001	0.007	1.128	0.068	0.003	0.000	0.009	0.000

Table 8: % Dominance, abundance and biomass (subtidal survey, 2010)

MCS Code	TAXON	TAXON Qualifier	Total Abundance	%
R 78	<i>Balanus improvisus</i>		124	28
P 931	<i>Arenicola marina</i>		69	15
P 907	<i>Capitella capitata</i>	species complex	65	14
P 799	<i>Streblospio shrubsolei</i>		45	10
HD 1	NEMATODA		25	6
R 142	COPEPODA	indeterminate	22	5
R 68	<i>Elminius modestus</i>		14	3
W 1696	<i>Mytilus edulis</i>	juvenile	14	3
P 753	<i>Polydora cornuta</i>		13	3
P 1490	<i>Tubificoides benedii</i>		12	3
F 1	PLATYHELMINTHES		11	2
P 672	<i>Scoloplos armiger</i>		5	1
D 662	ACTINIARIA		4	1
P 1500	<i>Tubificoides swirencoides</i>		4	1
W 2029	<i>Macoma balthica</i>		4	1
P 499	<i>Nephtys hombergii</i>		2	0
S 481	<i>Gammarus salinus</i>		2	0
S 1197	<i>Bodotria scorpioides</i>		2	0
P 117/118	<i>Eleone flava/longa</i>	aggregate	1	0
P 845	<i>Tharyx</i>	species A	1	0
P 919	<i>Mediomastus fragilis</i>		1	0
P 1083	<i>Protodriloides chaetifer</i>		1	0
P 1498	<i>Tubificoides pseudogaster</i>		1	0
Q 53	ACARI		1	0
R 14	CIRRIPIEDIA	indeterminate	1	0
S 76	<i>Neomysis integer</i>		1	0
S 86	<i>Schistomysis kervillei</i>		1	0
S 471	<i>Gammarus</i>	juvenile	1	0
S 616	<i>Corophium volutator</i>		1	0
S 1253	<i>Diastylis rathkei typica</i>		1	0
W 2007	TELLINACEA	juvenile	1	0
D 158	Tubulariidae		0	0
D 433	<i>Sertularia</i>		0	0
D 510	<i>Hartlaubella gelatinosa</i>		0	0
K 45	<i>Pedicellina</i>		0	0
Y 112	<i>Walkeria uva</i>		0	0
Y 137	<i>Bowerbankia</i>		0	0
Y 176	<i>Electra crustulenta</i>		0	0
Y 177	<i>Electra monostachys</i>		0	0
Y 187	<i>Flustra foliacea</i>		0	0
Y 222	<i>Amphiblestrum auritum</i>		0	0
Y 255	<i>Bicellariella ciliata</i>		0	0
Total Abundance			450	100
Total Quantitative Species			31	

MCS Code	TAXON	TAXON Qualifier	Total Biomass	%
R 78	<i>Balanus improvisus</i>		10.135	60.79
D 662	ACTINIARIA		3.750	22.49
R 68	<i>Elminius modestus</i>		1.368	8.20
P 931	<i>Arenicola marina</i>		1.119	6.71
S 481	<i>Gammarus salinus</i>		0.067	0.40
P 907	<i>Capitella capitata</i>	species complex	0.056	0.34
W 2029	<i>Macoma balthica</i>		0.054	0.32
P 672	<i>Scoloplos armiger</i>		0.030	0.18
W 1696	<i>Mytilus edulis</i>	juvenile	0.019	0.11
P 499	<i>Nephtys hombergii</i>		0.018	0.11
S 86	<i>Schistomysis kervillei</i>		0.018	0.11
P 799	<i>Streblospio shrubsolei</i>		0.012	0.07
S 76	<i>Neomysis integer</i>		0.009	0.05
P 1490	<i>Tubificoides benedii</i>		0.007	0.04
S 1253	<i>Diastylis rathkei typica</i>		0.003	0.02
P 753	<i>Polydora cornuta</i>		0.003	0.02
R 142	COPEPODA	indeterminate	0.001	0.01
HD 1	NEMATODA		0.001	0.00
P 117/118	<i>Eleone flava/longa</i>	aggregate	0.001	0.00
S 616	<i>Corophium volutator</i>		0.001	0.00
F 1	PLATYHELMINTHES		0.000	0.00
P 1500	<i>Tubificoides swirencoides</i>		0.000	0.00
S 1197	<i>Bodotria scorpioides</i>		0.000	0.00
P 845	<i>Tharyx</i>	species A	0.000	0.00
P 919	<i>Mediomastus fragilis</i>		0.000	0.00
P 1083	<i>Protodriloides chaetifer</i>		0.000	0.00
P 1498	<i>Tubificoides pseudogaster</i>		0.000	0.00
Q 53	ACARI		0.000	0.00
R 14	CIRRIPIEDIA	indeterminate	0.000	0.00
S 471	<i>Gammarus</i>	juvenile	0.000	0.00
W 2007	TELLINACEA	juvenile	0.000	0.00
D 158	Tubulariidae		0.000	0.00
D 433	<i>Sertularia</i>		0.000	0.00
D 510	<i>Hartlaubella gelatinosa</i>		0.000	0.00
K 45	<i>Pedicellina</i>		0.000	0.00
Y 112	<i>Walkeria uva</i>		0.000	0.00
Y 137	<i>Bowerbankia</i>		0.000	0.00
Y 176	<i>Electra crustulenta</i>		0.000	0.00
Y 177	<i>Electra monostachys</i>		0.000	0.00
Y 187	<i>Flustra foliacea</i>		0.000	0.00
Y 222	<i>Amphiblestrum auritum</i>		0.000	0.00
Y 255	<i>Bicellariella ciliata</i>		0.000	0.00
Total Biomass			16.672	100
Total Quantitative Species			31	

<p>% dominance, total abundance from the subtidal surveys (quantitative species only)</p>	<p>% dominance, total biomass from the subtidal surveys (quantitative species only)</p>
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2.4.2 IMPACTS

NE (SHRA)

- The effects of capital and maintenance dredging and disposal on subtidal habitat and benthic communities.
- Loss of 13.5ha of subtidal habitat. Addressed within the Compensation EMMP (CEMMP).

MMO

- Capital and maintenance dredging leading to smothering of subtidal benthos.

EA

- Capital and maintenance dredging leading to a reduction of Ecological Potential under WFD.

2.5 Fish Communities

2.5.1 BASELINE

2.5.1.1 Intertidal

32. Two intertidal fish and shellfish surveys were conducted in the immediate area around the project site in May/June and October/November 2010 each comprising four fixed fyke net positions in the intertidal and eight 2m beam trawls over subtidal habitat (details of methods and results are provided in Annex 10.1 to the ES).

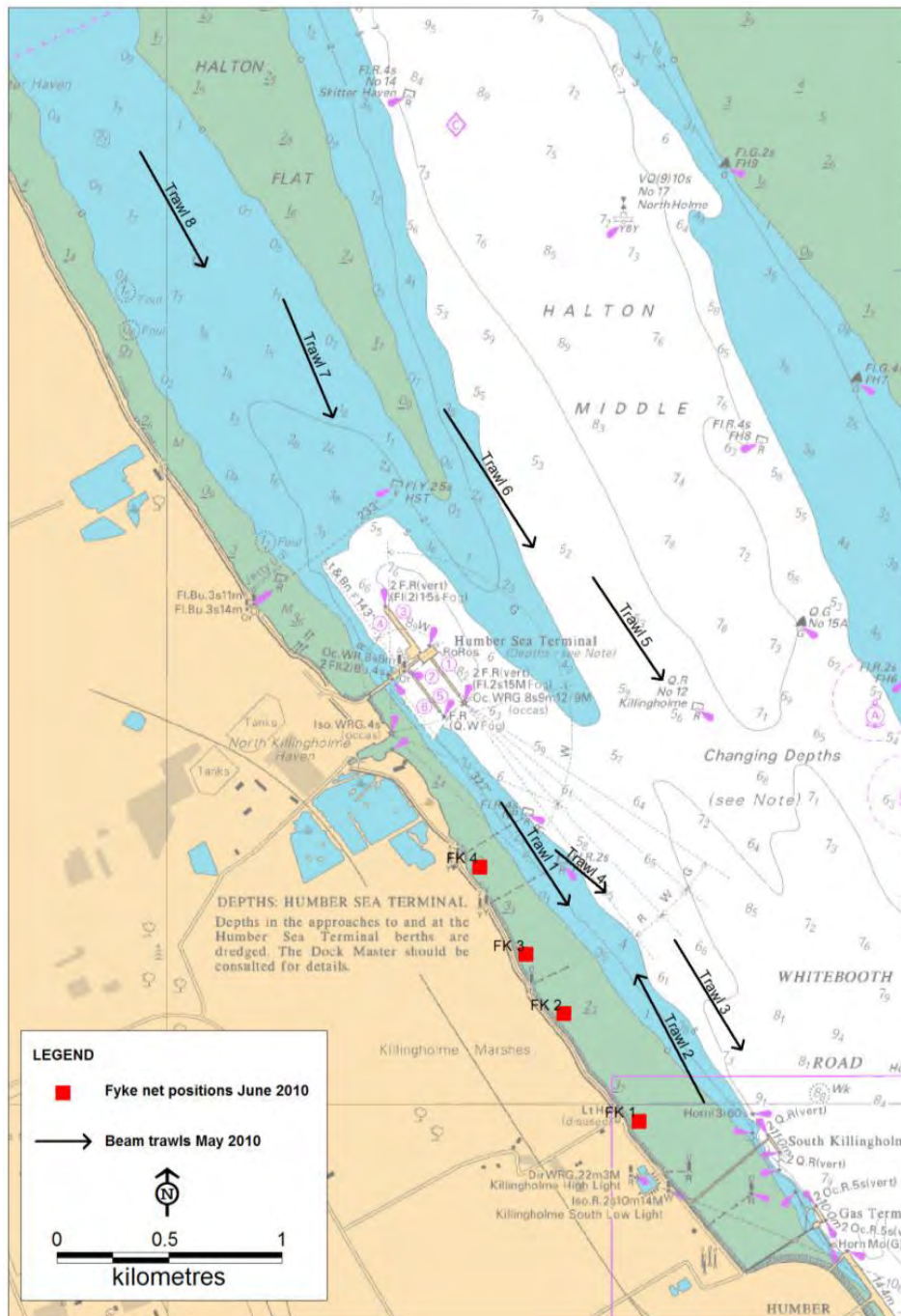


Figure 6: Location of the Intertidal and Subtidal Fish Sampling Positions

Table 9: Intertidal and Subtidal Sampling Locations (2010)

Site No.	Position (WGS 84)		Deployment		Retrieval	
	Lat (N)	Long (W)	Date	Time	Date	Time
FK 1	53.64932	0.2182	08/06/2010	17:00	09/06/2010	17:30
FK 2	53.65362	0.22324	08/06/2010	17:41	09/06/2010	18:15
FK 3	53.65599	0.22579	08/06/2010	18:30	09/06/2010	19:00
FK 4	53.65948	0.22891	08/06/2010	19:16	09/06/2010	19:48

Weather conditions: Overcast and breezy with showers

Trawl No.	Start Position		End Position		Date	Time in	Time Out	Water depth (m)	Sea state
	Lat	Long	Lat	Long					
T 1	53.66217	0.22750	53.65800	0.22300	05/05/2010	09:00	09:10	12	Calm
T 2	53.65017	0.21383	53.65517	0.21833	05/05/2010	09:17	09:30	11.3	Calm
T 3	53.65667	0.21583	53.65217	0.21133	05/05/2010	09:42	09:53	10.2	Calm
T 4	53.66017	0.22383	53.65850	0.22050	05/05/2010	10:01	10:13	12.1	Calm
T 5	53.67117	0.22133	53.66700	0.21667	05/05/2010	10:26	10:36	12.2	Calm
T 6	53.67233	0.22533	53.67783	0.23133	05/05/2010	10:45	10:55	10	Calm
T 7	53.68217	0.24217	53.67750	0.23883	05/05/2010	11:01	11:10	8.9	Calm
T 8	53.68817	0.25183	53.68350	0.24750	05/05/2010	11:20	11:29	8.3	Calm

Weather conditions: Dry with sunny spells and light breeze

Intertidal sampling locations

Subtidal sampling locations

33. Figure 6 and Table 9 provide details of the fish community sampling locations with further details provided in Annex 10.1 to the ES.
34. The summer catch was dominated by benthic flatfishes (flounder and sole) most probably year class 1+ flounder (born the year before) and mostly year class 0+ sole (born in present year), which highlights the role of the area (typical mudflat) as a flatfish nursery. Sand goby was recorded but due to the small size of this fish it is normally misrepresented in fyke net catches.
35. Whiting, common sole, five-bearded rockling and flounder dominated the fyke net catches (intertidal) during the autumn survey. Common sole juveniles and whiting were also present.
36. Given the background information available for the Humber Estuary and adjacent coastal area, and the gear selectivity profile of fyke nets, the fish and shellfish assemblage found during the surveys was considered normal. However, the summer abundance was low compared to previous survey programs.

2.5.1.2 Subtidal

37. Two subtidal beam trawl surveys were conducted in the subtidal area in the vicinity of the project site in May/June 2010 and October/November 2010.
38. Sole caught in the summer subtidal assessment were substantially larger than those found in the fyke nets, showing a segregation of sole year classes and indicating a distinct habitat dependency between 0+ sole and older juveniles. This segregation was not observed in autumn, although sole juveniles were present.
39. Similar to the intertidal assessment, the subtidal assemblage is consistent with previous results for the area with a real dominance of sand goby in both the summer and autumn surveys. Interestingly flounder (the more abundant species in the intertidal catch) was

recorded only once in the summer survey and six times in the autumn survey. This observation suggests the greater importance of the intertidal zone for flounder. Whiting were also common in the autumn survey, although not so in the summer survey. Common sole juveniles and whiting were also present.

2.5.2 IMPACTS

NE (SHRA)

- Lamprey movements concluded to not be impacted so not included specifically in this document.

MMO

- Capital and maintenance dredging leading to smothering of subtidal benthos.

EA

- Capital and maintenance dredging leading to a reduction of Ecological Potential under WFD.

2.6 Temperature and Suspended Sediments

2.6.1 BASELINE

40. Temperature data will be monitored in relation to DML requirements concerning piling activity mitigation for marine mammals (no adverse effect on marine mammals with agreed mitigation measures, as specified in the DML, applied). Suspended sediments will be monitored in relation to potential impacts on local water intakes/outfalls.
41. No baseline data were collected, but there is provision for specific impact monitoring (see Section 3). Some relevant baseline information is available relating to a series of water quality parameters.
42. A survey of water quality to inform the EIA process was conducted in May/June 2010 within the Humber Estuary with sampling locations across the intertidal and subtidal zone in the vicinity of the AMEP development (presented as Annex 7.2 to the Environmental Statement).
43. Data were collected throughout the day covering the full range of tidal conditions, ebb, flood and slack water.
44. The data showed little variability in temperature data, with variation of less than 1 C (17.8–18.7°C). However temperature will vary over the year outwith these parameters.
45. The baseline bathymetry and hydrography study (Annex 9.1 to the Environmental Statement) indicates that typical suspended sediment concentrations near to AMEP measured in September 2010 range from 100 mg/l at slack water on a neap tide to 400-500 mg/l during the neap tide ebb flow. Concentrations during the spring tides reached 1,600

mg/l during peak flood flow and were in excess of 800 mg/l on the ebb flow. Again, these values will vary on an intra-annual basis due to natural processes.

3. OBJECTIVES

3.1 Introduction

46. Objectives and targets have been derived with reference to a number of information sources, including the SoCG, the DCO/DML and dialogue with the Regulatory Authorities and tables to action these are presented in the following text. See Section 4 for further detail.

3.2 Sediment Parameters

3.2.1 RATIONALE & OBJECTIVES

47. Rationale: Monitoring is necessary to ensure that elevated levels of suspended solids arising from the capital and maintenance dredging activities are identified within the EX8.10, as these have the potential to affect subtidal and intertidal conditions and communities (e.g. mudflat elevation), as well as fish utilisation (e.g. barrier effects, behavioural responses).
48. They also have the potential to impact on the operation and maintenance of the adjacent E.ON and C.RO cooling water intake and outfall. Accretion rates along the pipeline relating to elevated suspended solids will also require monitoring.
49. Legal Requirement: E.ON and C.RO have cooling water intake and discharge points immediately north of the proposed quay and have expressed concerns regarding the level of suspended sediment caused by the development which may have an impact upon the operation of their cooling water pipelines and systems. The requirement to monitor suspended solids is included within Schedule 11 to the DCO, necessitating that a monitoring scheme be established for monitoring sedimentation along the lines of and in front of the E.ON and C.RO cooling water intake and outfall facilities.
50. There will also be requirements under WFD compliance monitoring as well as the Humber Estuary EMS Conservation Objectives.
51. Objective(s): During dredging ensure sediment levels remain within limits agreed under the DML in relation to C.RO and E.ON intake/outfall operation. To corroborate predictions on intertidal accretion/erosion from EX8.10 and ES.

3.2.2 MONITORING

3.2.2.1 Suspended Solids and Accretion Monitoring

52. Suspended solids monitoring will be undertaken using automatic monitoring equipment installed on the same specialised 1250mm diameter buoy as used for the water quality monitoring.
53. Turbidity (suspended solids) monitoring will be carried out using a YSI 6600 multi sonde which will also be used to monitor temperature & dissolved oxygen (as above).

54. The sensor within the sonde can monitor turbidity within a range from -0 to 1000 NTU with an accuracy of. $\pm 2\%$ of reading or 0.3 NTU whichever is greater.
55. Suspended solids monitoring will be carried out for a prolonged period prior to the start of dredging and piling works to give sufficient time to ascertain suspended solids levels and from which to agree trigger levels with both E.ON and C.RO. The monitoring will continue up to and including first maintenance dredging.
56. Accretion monitoring will also be undertaken to identify change in the intertidal mudflat elevation, with a monitoring scheme to be established for the monitoring of the foreshore and sediment levels around the quay.
57. A specific monitoring scheme will be drafted for this purpose and will be submitted to the Marine Management Organisation and subject to approval in writing by the MMO, in consultation with the Environment Agency, C.RO and E.ON UK plc.

3.2.2.2 Elevation Change Monitoring

58. Elevation changes in the intertidal zone are covered under Section 3.3 Intertidal Habitat (Saltmarsh).

3.2.2.3 Bathymetric Change Monitoring

59. EA requirements associated with changes to the bathymetry and associated sediment characteristics are covered in Section 3.5 Subtidal Benthos.

3.3 Intertidal Habitat (Saltmarsh)

3.3.1 RATIONALE & OBJECTIVES

60. Rationale: Monitoring is necessary to identify any changes to saltmarsh community and extent in the wider AMEP area of impact. Impacts may arise from modification to erosion and deposition patterns on the intertidal zone relating to the influence of the quay and from capital and maintenance dredging.
61. Legal Requirement: WFD compliance and the Humber Estuary EMS Conservation Objectives.
62. Objective(s): To record changes in extent and composition of saltmarsh.

3.3.2 MONITORING

63. A LiDAR survey will be undertaken by Able in the month prior to the commencement of works seaward of the EA flood defences, including an area 500 m up and down the estuary at not greater than 50 m line spacing. These surveys shall be repeated at six month intervals for a minimum of 10 years and will provide an indication of the extent of saltmarsh

vegetation (gain and loss). Details of the LiDAR survey, reporting and action triggers are given in Appendix 1 to this document, with the survey area given in Figure 7 below.

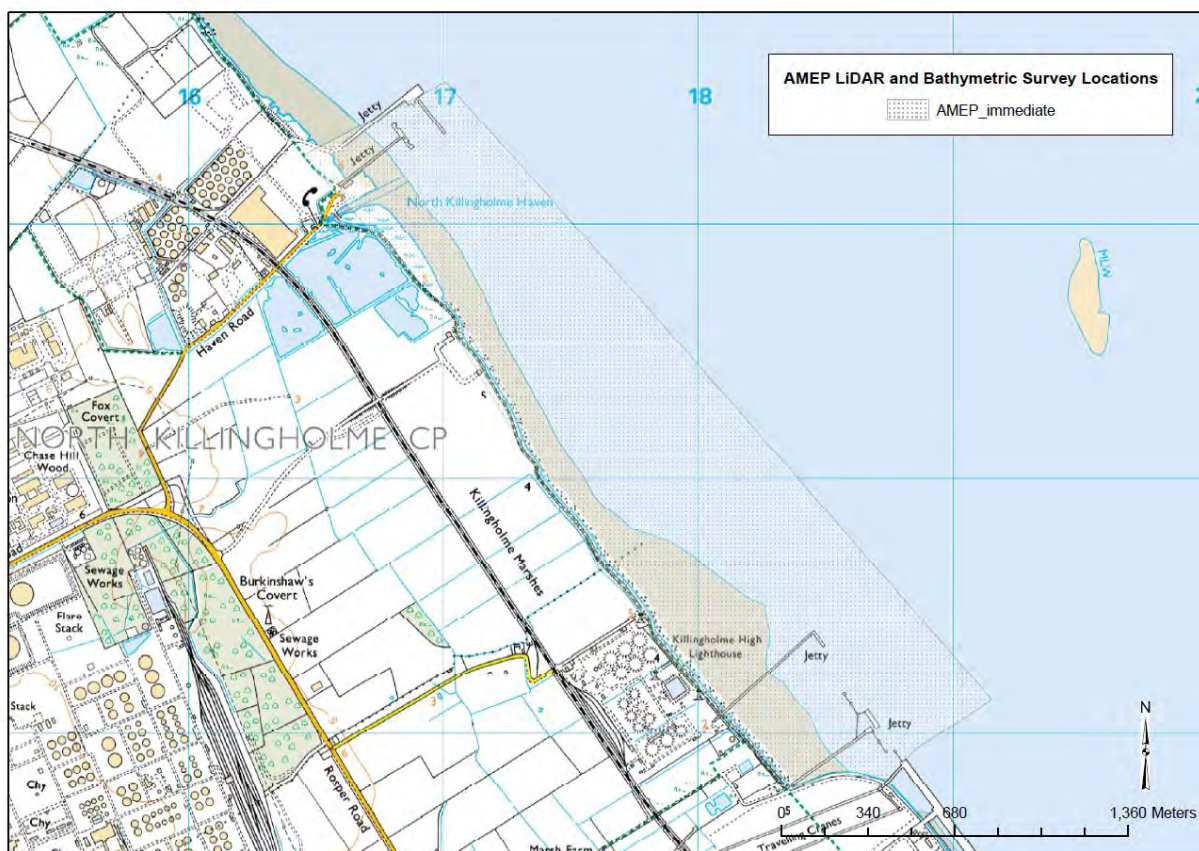


Figure 7: LiDAR Survey Area (in relation to saltmarsh monitoring requirements)

64. Approach and reporting of the LiDAR survey will be as laid out in the Environment Agency's proposals (reproduced as Appendix 1 to this document).
65. An NVC survey will be carried out annually across the identified areas of saltmarsh using standard methods (Rodwell, 2006).

3.4 Intertidal Habitat (Benthos)

3.4.1 RATIONALE & OBJECTIVES

66. Rationale: Monitoring is necessary to identify any changes to the intertidal area and extent in the wider AMEP area of impact, and in particular, the associated benthic community as defined during the characterisation and baseline surveys. Direct loss from the AMEP footprint is addressed in the CEMMP, however indirect impacts may arise from modification to erosion and deposition patterns on the intertidal zone relating to the influence of the quay and from capital and maintenance dredging. These impacts may take the form of actual habitat loss through erosion (or accretion to a level that the zone becomes saltmarsh), but

may also occur in the form of a substantial shift in community attributes (both physical and biological), above natural variation.

67. Legal Requirement: WFD compliance and the Humber Estuary EMS Conservation Objectives.
68. Objective(s): To identify deleterious change to intertidal benthic invertebrate fauna.
69. It should however be noted that a comprehensive baseline intertidal benthic survey will be undertaken pre-construction, and the metrics associated with this study used to update the characterisation data and to populate specific monitoring metrics. Standard univariate and multivariate analysis shall be used to define the diversity, abundance and biomass of the intertidal faunal community alongside multivariate analysis to characterise the communities present.

3.4.2 MONITORING

3.4.2.1 General

70. Samples taken to support the intertidal benthic invertebrate monitoring programme will be collected by means of hand coring.
71. Guidelines to be used in the design and subsequent reporting of benthic monitoring are the *Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites* (Ware and Kenny, 2011) and the *Marine Monitoring Handbook* (Davies *et al*, 2001) unless statutory agency advice indicates an alternative approach.
72. Should WFD-specific guidance become available then this will be incorporated, and during the derivation of the detailed survey methods and MMO licensing, approval of techniques for WFD compliance will be sought from the EA's Marine team.

3.4.2.2 Survey

73. The intertidal areas that remain to the north and to the south of the quay development (i.e. at Killingholme Marshes foreshore adjacent to North Killingholme Haven Pits and the foreshore near to South Killingholme Haven) will comprise the survey area; effectively Sectors A and E (as monitored for the baseline assessments); and a non-impacted south bank control area will also be surveyed (e.g. within 1 km of the quay development).
74. Ongoing monitoring surveys will be carried out at the same time of year as the baseline survey. If the same month cannot be accommodated then sampling in the same season will at least be ensured. This will allow temporal compatibility between the data sets and reduce the effects of inter-seasonal variation in any comparisons made. This is considered particularly important in relation to the timing of peak abundance and biomass relating to the worm *Hediste diversicolor* and the bivalve *Macoma balthica*.

75. As part of the overall quality assurance strategy the continued validity of stations selected as representative of impacted and reference conditions will be ensured through regular evaluations. Therefore, some allowance will be made for the possible modification in locations in response to unanticipated anthropogenic or natural influences.
76. All surveys will be logged in a pre-designed field log or electronic datasheet. Each log-sheet will be clearly laid out, providing prompts for all the information required.
77. For each area, sampling will be undertaken at three stations along each of three transects across the foreshore, effectively covering the upper, mid- and lower-intertidal (i.e. a total of nine sampling stations within each of three areas).
78. Although approximately evenly spaced, one or more transects (and station) locations will be positioned within an area known to be preferred by Black-tailed Godwit as a foraging resource.
79. Four replicate samples will be taken at each station, three of which will be subsequently analysed for species composition, abundance, size class and biomass etc with the fourth being used for an assessment of sediment particle size and organic content.
80. Sampling will be carried out using hand-held corers (e.g. 0.01 m² sampling area) to a depth of c.15 cm. Sample locations along transects will be recorded using DGPS to allow for greater station fidelity between years.
81. In addition to core sampling, observational monitoring will be conducted at each sampling station:
 - Recording obvious sediment surface conditions (e.g. algae coverage, evidence of drying, casts, etc.);
 - Recording the character and composition of surface sediments; and
 - Providing a photographic record of the sampling station.
82. All sites will be monitored on a biannual basis; monitoring in the spring will be used to compare against the original site characterisation data, whilst monitoring in the autumn, when productivity and biomass is highest, will show the amount of food that is available to overwintering/passage birds and in particular, Black-tailed Godwit.
83. A full (spring and autumn) pre-construction baseline survey of the Cherry Cobb Sands intertidal and the proposed north bank control site will be carried out using a similar methodology to augment existing baseline characterisation data.
84. Monitoring will continue for a period of at least ten years following completion of the works.

3.4.2.3 Analysis

85. In order to provide analytical quality assurance, invertebrate identification, biomass and particle size analysis will be performed by laboratories that are members of the NMBAQC scheme.
86. Laboratory analyses will include species (identified to highest taxonomic detail), abundance, size class and biomass (WWTB), with standard AFDW conversion factors applied (using, for example, Rumohr *et al.*, 1987; Ricciardi and Bourget, 1998; and Eleftheriou and Basford, 1989).
87. Sediment particle size analysis and organic content will also be measured.
88. Standard univariate statistical analyses, either parametric (e.g., ANOVA, t-test) or non-parametric (e.g., Kruskal-Wallis test, Mann-Whitney test, PERMANOVA) will then be applied to the data of abundance, richness, biomass, evenness, diversity and biomass-to-abundance ratio.
89. In line with WFD requirements, the IQI (infaunal quality index) will be calculated for benthic samples, the three parameters which feed into this are:
 - number of taxa;
 - AZTI* Marine Biotic Index (AMBI); and
 - Simpson's Evenness.
90. Multivariate analysis will be also carried out using cluster analysis (combined with similarity profile routine, SIMPROF) and ordination techniques (e.g., MDS, PCO) in order to identify different community types and gradients in the assemblage distribution/variation, as well as applying the SIMPER routine to identify the species which contribute most to the differentiations between groups. Bio-Env routine and linkage trees (BEST) in Primer will be used to explore the relationship between biotic (community) patterns and substrate characteristics.
91. Analysis will also be integrated with the findings of the intertidal LiDAR surveys described in Section 3.3, as elevation change can influence benthic community structure.

3.5 Subtidal Habitat (Benthos)

3.5.1 RATIONALE & OBJECTIVES

92. Rationale: Monitoring is necessary to identify any changes to the subtidal area and extent in the wider AMEP area of impact, and in particular, the associated benthic community as defined during the characterisation and baseline surveys. Direct loss from the AMEP footprint is addressed in the CEMMP, however indirect impacts may arise from modification to erosion and deposition patterns on the subtidal zone relating to the influence of the quay and from capital and maintenance dredging. These impacts may take the form of actual

habitat loss through erosion but may also occur in the form of a substantial shift in community attributes (both physical and biological), above natural variation.

93. Legal Requirement: WFD compliance monitoring and Humber Estuary EMS Conservation Objectives.
94. Objective(s): To identify deleterious change to subtidal benthic invertebrate fauna due to dredging and dredge disposal e.g. including WFD compliance. To derive baselines for dredging and disposal impacts and to validate boundaries of disposal grounds.

3.5.2 MONITORING

3.5.2.1 General

95. The subtidal benthic monitoring will be carried out using the same framework as defined for benthic intertidal samples in Section 3.3.
96. Samples for the subtidal invertebrate monitoring will be taken using a 0.1 m² Hamon grab. Guidelines to be used in the design and subsequent reporting of benthic monitoring are the *Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites* (Ware and Kenny, 2011) and the *Marine Monitoring Handbook* (Davies *et al*, 2001) unless statutory agency advice indicates an alternative approach.
97. Should WFD-specific guidance become available then this will be incorporated, and during the derivation of the detailed survey methods and MMO licensing, approval of techniques for WFD compliance will be sought from the EA's Marine team.

3.5.2.2 Survey

98. The initial impact of operational dredging on the subtidal benthic invertebrate assemblages within the berthing pocket, approach channel and turning circle will be monitored.
99. A total of 15 stations (nine stations within the combined area of the proposed berthing pocket, approach channel and turning circle plus a further three stations outside of the dredged area in the subtidal region between the berthing pocket and the Humber Sea Terminal and three more in the subtidal region to the south-east of the proposed dredging area) will be monitored.
100. Additional sampling stations will be located at the site of WFD sampling stations identified as being potentially affected by the dredge spoil removal and dumping plumes in the Lower Humber Estuary WFD zone.
101. Samples will be collected using a 0.1 m² Hamon grab or similar.
102. Three replicate benthic samples will be collected from each station for subsequent invertebrate analysis, with a further replicate for particle size analysis and organic content. Each sample will be analysed for species composition, abundance and biomass together

with an assessment of sediment particle size and organic content. Dedicated sediment particle size and organic content will be carried out on the fourth replicate.

103. Monitoring of subtidal benthos will only cover the first round of maintenance dredging. Any longer-term monitoring requirements will be determined by the EAG.
104. In addition, and prior to the commencement of any marine disposal activities, in order to be meet WFD compliance, a scheme for the protection and enhancement of benthic invertebrates through the monitoring and management of disposal activities within, and immediately surrounding, the disposal sites of the Lower Humber water body, will be submitted to and agreed in writing with the EA. The scheme will include the following:
 - A timetable for when monitoring shall be undertaken;
 - A detailed monitoring methodology;
 - An evaluation of the contribution the disposal activities make to the overall ecological potential of the Lower Humber water bodies.
105. The monitoring will ensure that all WFD monitoring locations within the identified potential area of impact from the operations will be assessed for WFD compliance.

3.5.2.3 Analysis

106. In order to provide analytical quality assurance, invertebrate identification, biomass and particle size analysis will be performed by laboratories that are members of the NMBAQC scheme.
107. Laboratory analyses will include species (identified to highest taxonomic detail), abundance, size class and biomass (WWTB), with standard AFDW conversion factors applied. Sediment particle size analysis and organic content will also be measured.
108. Standard univariate statistical analyses, either parametric (e.g., ANOVA, t-test) or non-parametric (e.g., Kruskal-Wallis test, Mann-Whitney test, PERMANOVA) will then be applied to the data of abundance, richness, biomass, evenness, diversity and biomass-to-abundance ratio.
109. In line with WFD requirements, the IQI (infaunal quality index) will be calculated for benthic samples, the three parameters which feed into this are:
 - number of taxa;
 - AZTI* Marine Biotic Index (AMBI); and
 - Simpson's Evenness.
110. Multivariate analysis will be also carried out using cluster analysis (combined with similarity profile routine, SIMPROF) and ordination techniques (e.g., MDS, PCO) in order to identify different community types and gradients in the assemblage distribution/variation, as well as applying the SIMPER routine to identify the species which contribute most to the

differentiations between groups. Bio-Env routine and linkage trees (BEST) in Primer will be used to explore the relationship between biotic (community) patterns and substrate characteristics.

3.5.2.4 Bathymetric Survey

111. Additional bathymetric surveys will be taken to assess potential impacts at dredge disposal sites and across the wider estuary. These will be as laid out in the Environment Agency's proposals (reproduced as Appendix 1 to this document) with the surveys to ensure WFD compliance. The area of subtidal bathymetric survey will be as shown in Figure 8.

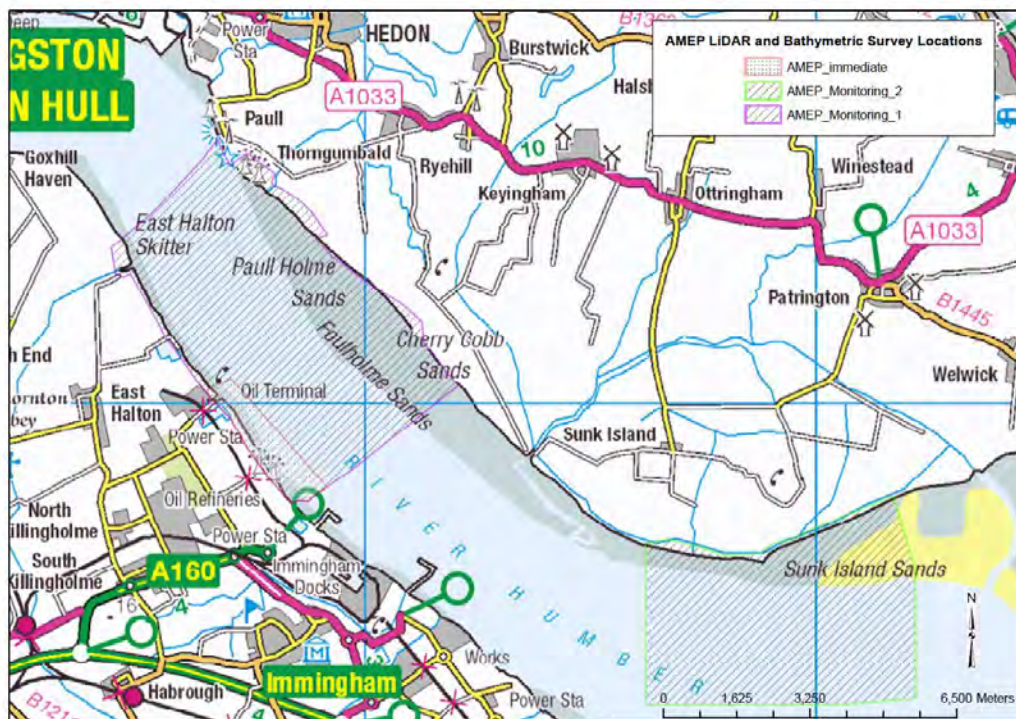


Figure 8: Bathymetric Survey Area (in relation to subtidal monitoring requirements)

3.6 Fish Communities

3.6.1 RATIONALE & OBJECTIVES

112. Rationale: Monitoring is necessary to identify any changes to the fish communities in the vicinity of the AMEP. Impacts may arise from capital and maintenance dredging, changes to habitat type and elevation relating to the presence of the quay. These impacts may take the form of a change in community attributes (e.g. species composition and size class abundance), above natural variation.
113. Legal Requirement: WFD compliance monitoring and Humber Estuary EMS Conservation Objectives.

114. Objective(s): That there is no significant change to baseline community attributes resulting from the AMEP development within a degree of natural variability.

3.6.2 MONITORING

3.6.2.1 General

115. Fish sampling on the intertidal will be undertaken by fyke netting whilst subtidal fish sampling will be by means of beam trawling. In both instances WFD compliant methods will be employed as detailed in the 'UK TAG transitional water assessment methods: fish fauna' as available on the UK WFD TAG (technical Advisory Group) website at: <http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/Transitional%20fish.pdf>.

3.6.2.2 Intertidal

116. Bi-annual (six-monthly) fyke net surveys of the intertidal mudflat will be undertaken. This monitoring will continue for an initial period of ten years.
117. For each survey one double-ended fyke net will be deployed at each of two sites, with each deployment covering two full tidal cycles.
118. As far as is practicable survey locations will be based on those used for the baseline study (i.e. sites FK1 and FK4 of the 2010 baseline survey).
119. Each double fyke net assembly will be deployed parallel to the shore, the nets being secured with canes and/or anchors. It will be important to ensure that the possibility of entrapment of waterbirds and mammals is minimised (e.g. by fitting otter guards and by following associated Environment Agency regulations).
120. Deployment will be at the low tide point and the nets left in place for 24 h (two tidal cycles). Catch will be collected after 12 h and 24 h to prevent the catch from drying out. Following retrieval of the nets, the catch will be collected and returned (frozen in insulated containers) to the laboratory for identification, enumeration and measurement.
121. Monitoring will be undertaken during the spring and autumn, but with consideration to key periods of waterbird sensitivity (i.e. avoiding the main winter period and the autumn passage as a minimum).

3.6.2.3 Subtidal

122. Subtidal fish monitoring will be undertaken by means of a 2m-wide research beam trawl fitted with a 5mm cod end sleeve.
123. Sampling locations will utilise those used in the baseline study, but will be extended to also cover WFD sampling locations in the Middle and Lower Humber water body identified as being potentially effected by the dredging operation.

124. Each trawl will be deemed to commence from the point at which the gear reaches the seabed after the warp length is paid out and the winch is locked. Trawling will be conducted with a warp length of three times the depth at constant speed (2 knots) following a straight path (towards or away from the station fix) to a predetermined finish point.
125. All relevant details (including, for each tow: station and tow number; start & end times and positions; shooting & hauling times and positions; any significant changes in tow direction; depth; length of warp; speed over ground; tidal state; weather and sea conditions; and shipping activity, together with date and gear type) will be recorded. Positions to be recorded using DGPS.
126. After the completion of the sampling run, the trawl will be quickly hauled to the vessel's deck and the sample will be recovered into a container. The net will then be checked for any remaining epifauna and fish, before the cod end is refastened, prior to redeployment at the next station.
127. After completion of the sampling run and hauling up to survey vessel's deck, samples will be cleared of large debris and the total catch shall be photographed. Fish species will be sorted from epifaunal invertebrates, divided into species groups, counted and measured (total length) to the closest millimetre.
128. Any species not identified on board will be coded and preserved in 10% buffered formaldehyde solution in seawater or frozen and identified on return to the laboratory.

3.7 Marine Mammals

3.7.1 RATIONALE & OBJECTIVES

129. Although no baseline data were collected, potential impacts to marine mammals from piling activity on the AMEP were identified, although with no adverse effect with mitigation measures applied.
130. Legal Requirement: Piling conditions are identified within the DML, with a requirement to undertake noise monitoring to ensure agreed piling restrictions are met. There are also requirements for water and air temperature as well as dissolved oxygen to be monitored and piling restrictions prescribed around a series of thresholds. Furthermore, there is a requirement for a qualified Marine Mammal Observer to be present.
131. Objectives(s): Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors.

3.7.2 MONITORING

132. As per the piling conditions detailed within the DML, a Marine Mammal Observer (MMO) will be present (within 100 metres of the pile being driven) during marine piling works.

133. The MMO will operate standard protocols to ensure that piling work is not undertaken when a marine mammal is in the vicinity of the works.
134. Additional monitoring of parameters relating to the conditions of the DML will be undertaken with automatic monitoring equipment installed on a specialised 1250mm diameter buoy. The buoy will be anchored to the river bed and connected via a chain of approximately 15m in length (to allow for tidal movement and wave height).
135. The location of the monitoring buoy in relation to the intake and outfall locations and the AMEP development is provided in Figure 9.

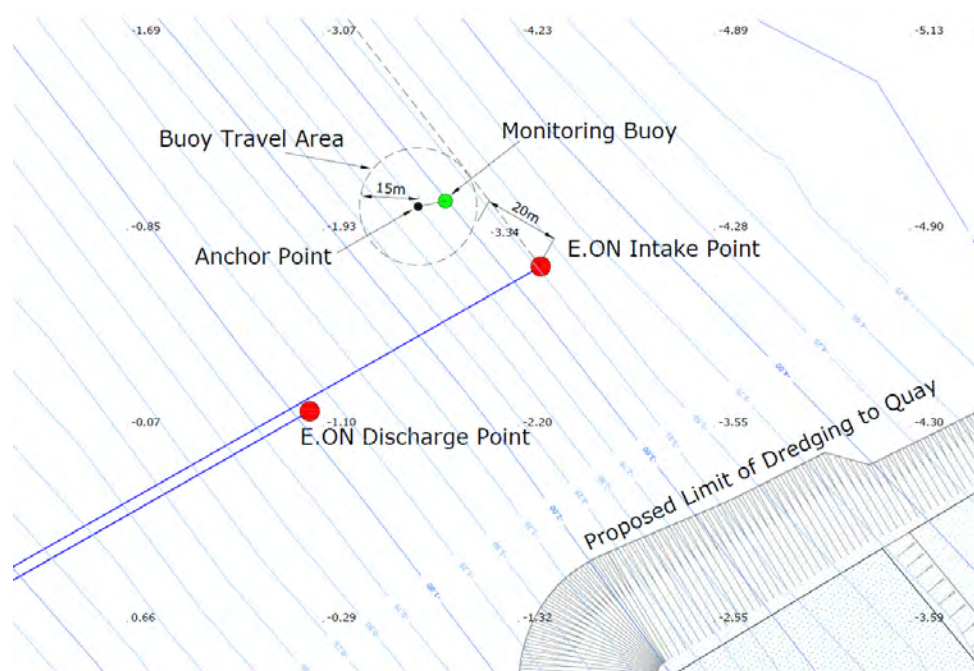


Figure 9: Proposed Monitoring Buoy Location

3.7.2.1 Temperature Monitoring

136. Temperature monitoring will be carried out using a YSI 6600 multi sonde installed onto the buoy.
137. The sensor within the sonde can monitor temperatures within a range from -5 °C to +50 °C with an accuracy of ± 0.15 °C.
138. Temperature monitoring will be carried out by default when the suspended solids are monitored.

3.7.2.2 Dissolved Oxygen Monitoring

139. Dissolved oxygen monitoring will be carried out by installation of an additional sensor onto the YSI 6600 multi sonde which is used to monitor temperature and suspended solids.

140. The sensor within the sonde can monitor dissolved oxygen within a range from -0 to 50mg/L with an accuracy of. $\pm 0.2\text{mg/L}$ or 2% of reading whichever is greater for 0 to 20mg/L range and $\pm 6\%$ of reading for 20 to 50 mg/L range.
141. Able propose to carry out dissolved oxygen monitoring approximately two weeks prior to commencement of the piling and dredging works and throughout the duration of the works.

3.7.2.3 Underwater Noise

142. Underwater noise levels will be monitored by an automatic monitoring buoy to demonstrate that restrictions on piling laid out with the DML are complied with.
143. Noise monitoring will carried out using a separate sensor fitted to the same buoy described in Section 3.1. The sensor is an Ic-Listen-LF smart hydrophone with a bandwidth of 0.1 to 1600 Hz.
144. Able will carry out noise monitoring approximately two weeks prior to commencement of the piling and dredging works and throughout the duration of the works.
145. As per the piling conditions detailed within the DML, a Marine Mammal Observer (MMO) will be present (within 100 metres of the pile being driven) during marine piling works.
146. The MMO will operate standard protocols to ensure that piling work is not undertaken when a marine mammal is in the vicinity of the works.

3.7.2.4 Air Temperature

147. In addition to the monitoring of water-related parameters, air temperature will be monitored. Piling will not be permitted during extended periods of cold weather.
148. However, the details of the thresholds and agreement have yet to be finalised.

4. TARGET SETTING AND TRIGGERS

149. As noted above, objectives and targets have been derived with reference to a number of information sources, including the SoCG, the DCO/DML and dialogue with the Regulatory Authorities and tables to action these are presented in the following text.
150. However, where objectives, targets and/or remedial actions have yet to be agreed in full, then these are identified in the following tables with an asterisk (*) and will be developed through subsequent dialogue with the appropriate Regulatory Authorities.
151. Whilst the agreement on many of these can be formed through bilateral discussion, the cross cutting nature of some of these may require multi-lateral discussion, perhaps at a meeting. A suggested timetable for the completion of this process is 21st December 2012, however this timetable can be revised depending on the requirements of the appropriate Regulatory Authorities.

5. TABULATED ACTION PLANS

152. For the broad Objectives identified in the preceding text, the following Action Plans summarise Targets, Actions (or Monitoring) to achieve those Targets and the Responsible Body to undertake the Actions (or Monitoring). Timing for the Action (or Monitoring) is provided, as well as Limits of Acceptable Change (LACs) against which any change from baseline conditions can be identified. Finally, potential types of Intervention are identified where LACs have been exceeded.
153. Importantly given the status of this plan, items within the plan that have yet to be agreed and thus require further consultation with regulators are marked with an asterisk (*) at the initial Objective headline.
154. As described within Section 1.3, the findings from the monitoring programmes will be submitted to the Steering Group, and required actions will be identified where necessary, based on baseline data and compliance with agreed targets and triggers.

TOPIC: SEDIMENT PARAMETERS

Objective: During dredging ensure sediment levels remain within limits agreed under the DML in relation to C.RO and E.ON intake/outfall operation *

Target	Ensure sediment levels remain within ranges identified and agreed through pre-construction monitoring at automatic monitoring buoy. NB existing baseline data suggest typical range of 100-1600 mg/l within the Humber Estuary
Management	n/a
Monitoring	Automatic monitoring buoy equipped with YSI 6600 multi Sonde
Who	AHPL
When	Continuous monitoring: initial pre-construction monitoring will be used to develop new baseline; monitoring will continue up to, and including, the first maintenance dredging
Limits of Acceptable Change	As set out in the DML, to be agreed following collection of baseline data and included within the monitoring scheme submitted to, and approved by, the MMO, in consultation with the EA, C.RO and E.ON
Remedial Action	As set out in the DML, to be agreed and included within the monitoring scheme submitted to, and approved by, the MMO, in consultation with the EA, C.RO and E.ON
Notes	Details of scheme to be developed and agreed prior to development

Objective: To corroborate predictions on intertidal accretion/erosion from EX8.10 and ES

Target	No target – impact verification Any changes in intertidal mudflat elevation to be within ranges modelled and described in EX8.10.
Management	n/a
Monitoring	LiDAR
Who	AHPL appointed consultant/contractor
When	Detail of monitoring dates laid out in Appendix 1; to include pre- and post-construction for a period of at least ten years
Limits of Acceptable Change	As outlined in EX8.10
Remedial Action	Dredging if required
Notes	

**TOPIC: INTERTIDAL ESTUARINE HABITAT (SALTMARSH) - WFD / HUMBER ESTUARY
EMS MONITORING**

Objective: To record changes in extent and composition of saltmarsh

Target	No target; ongoing monitoring to address WFD and Humber Estuary EMS Conservation Objectives issues
Management	n/a
Monitoring	<ul style="list-style-type: none"> • LiDAR survey of intertidal between the flood defence wall and MLWN or -2m ODN (whichever is the greater) and between HST and HIT to determine saltmarsh extent and elevation, and change over time; • NVC surveys of identified areas of saltmarsh to determine species composition, and change over time
Who	AHPL appointed consultant/contractor
When	<ul style="list-style-type: none"> • LiDAR as per EA monitoring requirements presented as Appendix 1 (biannual, for a minimum of ten years post-construction); • NVC annually during summer; pre-construction and post-construction for at least ten years
Limits of Acceptable Change	n/a
Remedial Action	n/a
Notes	

TOPIC - INTERTIDAL ESTUARINE HABITAT (BENTHOS)**Objective: To identify deleterious change to intertidal benthic invertebrate fauna ***

Target	<p>No impact on WFD status (status currently assessed as Moderate for Lower Humber, and predicted as being Moderate in 2015 for Lower Humber; no assessments for Middle Humber) – WFD assessments include number of taxa; AZTI* Marine Biotic Index (AMBI); and Simpson's Evenness</p> <p>Quantitative targets to be defined and agreed following completion of full baseline (pre-construction) surveys.</p> <p>Possible metrics to include:</p> <ul style="list-style-type: none"> Abundance and biomass dominance (key species such as <i>Hediste diversicolor</i>, <i>Macoma balthica</i> and <i>Corophium volutator</i>); Provisional biomass target (wet weights as g/m²) based on spring (May) characterisation (in line with NE suggestions, a nominal increase of 20% is included within the figures below as this is considered to provide for the autumn peak); <table border="1"> <thead> <tr> <th>Species</th> <th>Upper shore</th> <th>Mid shore</th> <th>Lower shore</th> </tr> </thead> <tbody> <tr> <td><i>Hediste diversicolor</i></td> <td>28.60</td> <td>n/a</td> <td>0.7</td> </tr> <tr> <td><i>Macoma balthica</i></td> <td>2.70</td> <td>15.50</td> <td>2.10</td> </tr> <tr> <td><i>Corophium volutator</i></td> <td>4.20</td> <td>4.50</td> <td>1.3</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Overall benthic invertebrate biomass (wet weight / m²) to exceed agreed thresholds; Abundance of specific size classes of key species (e.g. <i>Macoma</i> > 2 mm, <i>Hediste</i>) to exceed agreed thresholds; Biotope composition and extent to remain unaffected. 	Species	Upper shore	Mid shore	Lower shore	<i>Hediste diversicolor</i>	28.60	n/a	0.7	<i>Macoma balthica</i>	2.70	15.50	2.10	<i>Corophium volutator</i>	4.20	4.50	1.3
Species	Upper shore	Mid shore	Lower shore														
<i>Hediste diversicolor</i>	28.60	n/a	0.7														
<i>Macoma balthica</i>	2.70	15.50	2.10														
<i>Corophium volutator</i>	4.20	4.50	1.3														
Management	n/a																
Monitoring	Intertidal survey using hand-held corers (standard methods – including species and community analysis, particle size analysis, organic content)																
Who	AHPL appointed consultant/contractor																
When	Biannual (spring & autumn) surveys beginning with establishing new baseline pre-construction and continuing for ten years post-construction																
Limits of Acceptable Change	To be based on uni- and multi-variate statistical analysis of temporal and spatial community variability and change																
Remedial Action	n/a																
Notes	Full targets to be defined and agreed following completion of full baseline (pre-construction) surveys																

Objective: To record and identify potential changes in intertidal topography

Target	To meet EA monitoring requirements and to validate model predictions of changes in bathymetry to the south-east of the AMEP quay as described in EX 8.10
Management	n/a
Monitoring	LiDAR survey of intertidal between the flood defence wall and MLWN or -2m ODN (whichever is the greater) and between HST and HIT (area shown in Figure 7)
Who	AHPL appointed consultant/contractor
When	<ul style="list-style-type: none"> • Once during month prior to commencement of construction works; • biannual surveys for ten years post-construction
Limits of Acceptable Change	
Remedial Action	n/a
Notes	Further details as per Environment Agency monitoring requirements attached as Appendix 1

TOPIC - SUBTIDAL ESTUARINE HABITAT (BENTHOS)

Objective: To identify deleterious change to subtidal benthic invertebrate fauna due to dredging and dredge disposal e.g. including WFD Compliance*

Target	<p>To identify potential impact on WFD status (status currently assessed as Moderate for Lower Humber, and predicted as being Moderate in 2015 for Lower Humber; no assessments for Middle Humber) – WFD assessments includes number of taxa; AZTI* Marine Biotic Index (AMBI); and Simpson’s Evenness</p> <p>Quantitative targets to be defined and agreed following completion of full baseline (pre-construction) surveys.</p> <p>Possible metrics to include:</p> <ul style="list-style-type: none"> • Abundance and biomass dominance; • Overall benthic invertebrate biomass (wet weight / m2) to exceed agreed thresholds; • Biotope composition and extent to remain unaffected.
Management	n/a
Monitoring	<p>Subtidal benthic invertebrate survey of (maintenance) dredge areas using Hamon grab (standard methods – including species and community analysis, particle size analysis, organic content);</p> <p>Subtidal benthic invertebrate survey of areas within, and immediately surrounding, dredge disposal sites;</p> <p>Additional monitoring at agreed WFD locations.</p>
Who	AHPL appointed consultant/contractor
When	<p>Dredge sites: annual (spring) surveys beginning with establishing new baseline pre-construction and continuing for ten years post-construction</p> <p>Disposal sites: scheme for monitoring and management of disposal activities to be submitted to, and agreed with, the EA; the scheme shall include:</p> <ul style="list-style-type: none"> • timetable for when monitoring shall be undertaken; • detailed monitoring methodology; • evaluation of the contribution the disposal activities make to the overall ecological potential of the Humber Lower water body
Limits of Acceptable Change	To be based on uni- and multi-variate statistical analysis of temporal and spatial community variability and change
Remedial Action	n/a
Notes	<p>Full targets to be defined and agreed following completion of full baseline (pre-construction) surveys.</p> <p>Further details regarding disposal site monitoring as per Environment Agency monitoring requirements attached as Appendix 1</p>

Objective – to derive baselines for dredging and disposal impacts and to validate boundaries of disposal grounds

Target	Derive baselines for dredging/disposal impacts and to validate assumptions on boundaries of disposal grounds
Management	n/a
Monitoring	Bathymetric survey of dredge areas and disposal sites and of intertidal between HST and HIT
Who	AHPL appointed consultant/contractor
When	Once during month prior to commencement of construction works; Fortnightly during capital dredging and the month following; Annual surveys for ten years post-construction
Limits of Acceptable Change	Sedimentation patterns indicating greater levels of erosion in comparison to those defined in Chapter 8 of ES or subsequent revision
Remedial Action	As noted below, the annual surveys will provide the information needed to either validate the boundaries of the deposit grounds, or trigger the need for them to be amended, and will also allow ongoing management of the dredge and disposal.
Notes	<ul style="list-style-type: none"> • The first surveys shall provide the baseline for determining the impacts of dredge and disposal works, and should allow natural variability to be accounted for in any assessment. • The subsequent surveys shall provide the information needed to either validate the boundaries of the deposit grounds, or trigger the need for them to be amended. It shall also allow ongoing management of the dredge and disposal. • Surveys will be undertaken on similar tidal ranges and state of tide wherever possible. This will allow volumetric differences to be roughly compared, meaning the approximate portion of sediment retained and dispersed may be deducted. <p>Further details as per Environment Agency monitoring requirements attached as Appendix 1</p>

TOPIC - FISH COMMUNITIES

Objective: To identify deleterious change to intertidal fish populations *

Target	To identify potential impact on WFD status (status currently assessed as Good for Middle and Lower Humber, and predicted as being Good in 2015 for Middle and Lower Humber) and Humber Estuary EMS Conservation Objectives
Management	n/a
Monitoring	Intertidal fyke net surveys
Who	AHPL appointed consultant/contractor
When	Annual beginning with establishing new baseline pre-construction and continuing for ten years post-construction
Limits of Acceptable Change	No change to WFD status
Remedial Action	n/a
Notes	

Objective: To identify deleterious change to subtidal fish populations *

Target	To identify potential impact on WFD status (status currently assessed as Good for Middle and Lower Humber, and predicted as being Good in 2015 for Middle and Lower Humber) and Humber Estuary EMS Conservation Objectives
Management	n/a
Monitoring	Subtidal beam trawl surveys
Who	AHPL appointed consultant/contractor
When	Annual beginning with establishing new baseline pre-construction and continuing for ten years post-construction
Limits of Acceptable Change	No change to WFD status
Remedial Action	n/a
Notes	

TOPIC: MARINE MAMMALS

Objective: Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors

Target	Piling only to take place when dissolved oxygen levels are above defined threshold value as specified within the DCO
Management	n/a
Monitoring	Automatic monitoring buoy equipped with YSI 6600 multi Sonde
Who	AHPL
When	Continuous monitoring: to include pre-construction monitoring and subsequent monitoring throughout construction phase
Limits of Acceptable Change	Dissolved oxygen to be at, or in excess of, 5 mg/l
Remedial Action	No percussive piling to take place whilst dissolved oxygen is below 5 mg/l
Notes	All details as per DML

Objective: Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors

Target	Piling only to take place when water temperature is above defined threshold value as specified within the DCO
Management	n/a
Monitoring	Automatic monitoring buoy equipped with YSI 6600 multi Sonde
Who	AHPL
When	Continuous monitoring: to include pre-construction monitoring and subsequent monitoring throughout construction phase
Limits of Acceptable Change	Water temperature to be at, or below, 21.5 °C
Remedial Action	No percussive piling to take place whilst water temperature exceeds 21.5 °C
Notes	All details as per DML

Objective: Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors

Target	Piling only to take place at times specified within the DCO
Management	n/a
Monitoring	Automatic monitoring buoy equipped with Ic-Listen-LF smart hydrophone
Who	AHPL
When	Continuous monitoring: to include pre-construction monitoring and subsequent monitoring throughout construction phase
Limits of Acceptable Change	<p>No percussive piling shall take place between 7 April and 1 June inclusive in any calendar year.</p> <p>No percussive piling shall take place before 0600 hours or after 2200 hours on any day.</p> <p>Percussive piling shall be restricted at other times as follows:</p> <ul style="list-style-type: none"> • from 2 June to 22 July inclusive in any year, the maximum amount of percussive piling permitted within any four-week period shall not exceed: <ul style="list-style-type: none"> ○ 101 hours where a single piling rig is in operation, or ○ a total of 168 hours where two or more rigs are in operation; • from 23 July to 10 September inclusive in any year, the maximum amount of percussive piling permitted within any week-long period shall not exceed: <ul style="list-style-type: none"> ○ 25 hours where a single piling rig is in operation, or ○ a total of 42 hours where two or more rigs are in operation; • from 11 September to 31 October inclusive in any year, the maximum amount of percussive piling permitted within any four-week period shall not exceed: <ul style="list-style-type: none"> ○ 134 hours where a single piling rig is in operation, or • a total of 224 hours where two or more rigs are in operation. • from 1 November in any year to 6 April in the following year inclusive, the maximum amount of percussive piling permitted within any eight-week period shall not exceed: <ul style="list-style-type: none"> ○ 336 hours where a single piling rig is in operation, or ○ a total of 560 hours where two or more rigs are in operation. ○ The measurement of time during each work-block shall begin at the start of each timeframe, roll throughout it, then cease at the end, where measurement will begin again at the start of the next timeframe, such process to be repeated until the end of piling works.
Remedial Action	Piling to cease outside of permitted times.
Notes	All details as per DML

Objective: Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors

Target	To ensure no marine mammal presence in vicinity of piling activity
Management	n/a
Monitoring	Direct observation by Marine Mammal Observer using standard protocols (e.g. JNCC guidance, 2009)
Who	AHPL appointed consultant/contractor
When	Whenever piling is being undertaken
Limits of Acceptable Change	No marine mammal within 100 metres of the pile being driven
Remedial Action	Cessation of piling while any marine mammals are within 100 metres of the pile being driven
Notes	All details as per DML

Objective: Ensure compliance with piling restrictions to restrict or remove potential impacts on sensitive marine mammal receptors

Target	To ensure no piling activity during extended periods of cold weather
Management	n/a
Monitoring	Temperature monitoring at sites to be agreed
Who	AHPL appointed consultant/contractor
When	Whenever piling is being undertaken
Limits of Acceptable Change	Range of temperature-based restrictions set out in DCO (still to be fully defined – see notes)
Remedial Action	Cessation of piling when cold-weather thresholds are breached
Notes	No operations consisting of piling shall commence until a cold weather piling restriction strategy is submitted and agreed with the MMO, following consultation with Natural England. A finalised strategy has yet to be produced.

SUBTIDAL – FLOOD RISK ASSESSMENT

Objective - To assess longer-term impacts of AMEP within the wider estuary on standard of protection of EA defences

Target	Validation of predicted changes in sedimentation patterns, as defined in Chapter 8 of ES or subsequent revision
Management	n/a
Monitoring	Bathymetric and LiDAR surveys within the area shown in Figure 8
Who	AHPL appointed consultant/contractor
When	Once during month prior to commencement of construction works; Annual surveys post-construction to 2033 (Humber Strategy Period)
Limits of Acceptable Change	Sedimentation patterns indicating greater levels of erosion in comparison to those defined in Chapter 8 of ES or subsequent revision
Remedial Action	Monitoring frequency increased to biannual until either: <ul style="list-style-type: none"> • there are two confirmed surveys indicating erosion - which will trigger a Standard of Protection (SoP) Review to be undertaken for affected locations; or • there is no further evidence of erosion and a pattern of stabilisation can be detected; at which point the monitoring may return to annual frequency
Notes	Understood to be addressed within a separate Flood Risk Management Plan; Further details as per Environment Agency monitoring requirements attached as Appendix 1

6. REFERENCES

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APPENDIX 1

Agreed monitoring for Able Marine Energy Park (AMEP) Capital Dredging and Disposal Activities

APPENDIX ONE

Monitoring for Able Marine Energy Park (AMEP) Capital Dredging and Disposal Activities

A. Bathymetric Monitoring

Able shall undertake bathymetric surveys (as defined in Section E) at the following locations and for at least 500 metres up and down the estuary, at not greater than 50 metre line spacing:-

- 1) AMEP berth pocket dredge (bounded by co-ordinates (53°39.506N, 00°13.416W), (53°39.496N, 00°13.448W), (53°39.515N, 00°13.463W), (53°39.537N, 00°13.376W), (53°38.972N, 00°12.631W) and (53°38.946N, 00°12.678W));
- 2) AMEP approach channel dredge (bounded by co-ordinates (53°39.537N, 00°13.376W), (53°39.579N, 00°13.230W), (53°39.094N, 00°12.296W), (53°38.956N, 00°12.570W) and (53°38.972N, 00°12.631W));
- 3) AMEP turning area dredge (bounded by co-ordinates (53°39.406'N, 00°12.893'W), (53°39.414'N, 00°12.524'W), (53°39.112'N, 00°12.261'W) and (53°39.094'N, 00°12.296'W));
- 4) HU080 Disposal site down estuary (bounded by co-ordinates (53°36.95'N, 00°03.47'W), (53°36.55'N, 00°00.42'E), (53°36.30'N, 00°00.62'W) and (53°36.47'N, 00°02.32'W)) ;
- 5) HU082 Disposal down estuary (bounded by co-ordinates (53°37.47'N, 00°02.27'W), (53°37.25'N, 00°00.80'W), (53°36.97'N, 00°00.81'W) and (53°37.12'N, 00°02.29'W));

The first surveys shall be undertaken and completed within the month prior to the commencement of any marine construction, dredge or disposal works. Surveys shall thereafter be repeated no less than once a fortnight, or suitable timescale to be agreed, during the capital dredge programme (as defined in the dredge and disposal strategy, clause 32 (1) Schedule 8 of the Development Consent Order). Upon completion of the capital dredge programme, surveying shall continue at the agreed frequency for one month.

Within 2 weeks of the completion of each survey, Able shall:-

- Supply the results of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Able shall produce a report collating and analysing the monitoring undertaken to date:-

- Every 6 months from the commencement of monitoring; and
- Supply a copy of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Note:

- The first surveys shall provide the baseline for determining the impacts of dredge and disposal works, and should allow natural variability to be accounted for in any assessment.
- The subsequent surveys shall provide the information needed to either validate the boundaries of the deposit grounds, or trigger the need for them to be amended. It shall also allow ongoing management of the dredge and disposal.
- Surveys shall be undertaken on similar tidal ranges and state of tide wherever possible. This shall allow volumetric differences to be roughly compared, meaning the approximate portion of sediment retained and dispersed may be deducted.

B. Bathymetric and LiDAR Monitoring Upstream and Downstream of AMEP

Able shall undertake LiDAR surveys (as defined in Section E) at the following locations, at not greater than 50 metre line spacing:-

- 6) Between the flood defence wall and MLWN or -2m ODN (whichever is the greater) upstream of AMEP, from quay wall to HST (as defined in Plan 6);
- 7) Between the flood defence wall and MLWN or -2m ODN (whichever is the greater) downstream of AMEP, from quay wall to HIT (as defined in Plan 6);

Able shall survey locations 6 and 7 in the month prior to the commencement of any marine construction, dredge or disposal works and thereafter following completion of the quay construction. These surveys shall be repeated at six month intervals, or suitable timescale to be agreed, for 10 years in order to record the level of sedimentation taking place upstream and downstream of the quay.

Within 2 weeks of the completion of each survey, Able shall:-

- Supply the results of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Able shall produce a report collating and analysing the monitoring undertaken to date:-

- Every 12 months from the commencement of monitoring; and
- Within 6 weeks of the each annual survey; and
- Compare the results to the modelling results presented in Chapter 8 of the ES and all technical appendices submitted with the application; and
- Supply a copy of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

If the rate of sedimentation is significantly different to that predicted in the ES, or there is any indication of significant erosion of sediment in either location (6 or 7) and there is a risk of flood defences being undermined, Able shall:

Increase the frequency of monitoring to every 12 weeks until such time that either:

- there is no further evidence of erosion and a pattern of stabilisation can be detected; at which point the monitoring may return to the 6 monthly frequency identified above; OR
- there are two confirmed surveys indicating erosion. This shall trigger a Standard of Protection (SoP) Review, at Able's cost, for all defences identified in the monitoring results showing a change in sedimentation patterns. The standard of protection that is provided by the current defence line against flooding from the sea shall be reviewed at Able's expense using those parameters in use by the EA and which have been notified to Able in writing by the EA. If the results show a reduction in SoP Able shall, at its own expense, undertake improvement works to restore the affected lengths of defence to the original SoP. The original SoP, shall be agreed by both parties prior to the Commencement. This SoP review shall extend from Humber Sea Terminal (HST) to Humber International Terminal (HIT). Prior to any improvement works being undertaken by Able, the methodology shall be agreed in writing with the EA.

C. Longer term Monitoring of Impacts of AMEP within the Wider Estuary on Standard of Protection of EA Defences

Able shall undertake bathymetric surveys (as defined in Section E) at the following locations at not greater than 500 metre line spacing:-

- within AMEP monitoring polygon no.1 as shown on Plan 6, across the width of the estuary up to MLWN
- within AMEP monitoring polygon no.2 as shown on Plan 6, across the width of the estuary up to MLWN

These surveys shall be undertaken on a 12 monthly basis for 10 years, commencing on the completion of the marine and capital dredging works. At the end of the 10 year period the EA shall review the results; which may include a SoP review (as defined Section B) at Able's expense if there is a significant change in the surveyed levels which demonstrate that erosion is occurring, which will impact upon the flood defences. The EA may require monitoring to be undertaken for a further 10 years if it considers this to be reasonably necessary and justifiable following the SoP review.

Within 2 weeks of the completion of each survey, Able shall:-

- Supply the results of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Able shall produce a report collating and analysing the monitoring undertaken so far:-

- Every 12 months from the commencement of monitoring; and
- Within 6 weeks of the each annual survey; and
- Compare the results to the modelling results presented in Chapter 8 of the ES and all technical appendices submitted with the application; and
- Supply a copy of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

If at any point during the monitoring period there is a significant change in the sedimentation patterns defined in the baseline assessment (based on Chapter 8 or the ES subject to suitable revisions of this chapter by Able) Able shall:

Increase the frequency of monitoring to every 6 months until such time that either:

- there is no further evidence of erosion and a pattern of stabilisation can be detected; at which point the monitoring may return to the 12 monthly frequency identified above ;
OR
- there are two confirmed surveys indicating erosion. This shall trigger a Standard of Protection (SoP) Review to be undertaken by Able for those locations identified which appear to be affected (following methodology defined in Section B). If the results show a reduction in SoP Able shall, at its own expense, undertake improvement works to restore the affected lengths of defence to the original SoP. The original SoP, shall be agreed by both parties prior to the Commencement. The methodology for improvement works shall be agreed, in advance of work being undertaken, in writing with the EA.

D. Benthic Invertebrates

Prior to the commencement of any marine disposal activities, a Scheme for the protection and enhancement of benthic invertebrates through the monitoring and management of disposal activities within, and immediately surrounding, the disposal sites of the Lower Humber water body, shall be submitted to and agreed in writing with the EA. The Scheme shall include the following:-

- i. A timetable for when monitoring shall be undertaken, including monitoring before, during and after disposal activities are undertaken;
- ii. A detailed methodology for the monitoring;
- iii. An evaluation of the contribution the disposal activities make to the overall ecological potential of the Humber Lower water body as assessed by the biological elements, supporting elements, supporting conditions and ecological potential assessment as set out in Annex B of the Humber River Basin Management Plan;

If the evaluation of i)-iii) shows that marine disposal works contribute to, or are likely to contribute to, a failure of the water body in achieving its WFD objectives, a Remedial Action Plan shall be submitted to the EA that detail measures to ensure disposal activities are amended such that, as far as is reasonably practicable, they do not contribute towards a deterioration of the Humber Lower water body status (including deterioration within existing status class), should such arise. The Remedial Action Plan may include variations to disposal activities to reduce their impact and/or specific measures to protect and enhance benthic invertebrates.

Within 2 weeks of the completion of each piece of monitoring, Able shall:-

- Supply the results of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Able shall produce a report collating and analysing the monitoring undertaken so far:-

- Every 6 months from the commencement of monitoring; and
- Within 6 weeks of the each annual survey; and
- Supply a copy of each report to the EA via email to humber.strategy@environment-agency.gov.uk, unless otherwise advised in writing by the EA.

Should a Remedial Action Plan be deemed necessary as a result of the Scheme, Able shall:-

- As soon as reasonably practicable, submit a Remedial Action Plan to the EA for their approval,
- As soon as reasonably practicable following the approval of the Remedial Action Plan, implement any actions agreed in the plan

E. Definitions

MHWS- Mean High Water Springs

MHWN- Mean High Water Neaps

MLWS- Mean Low Water Springs

MLWN – Mean Low Water Neaps

Bathymetric Survey

All survey work shall be undertaken in accordance with the EA survey specification v3.1, relating directly to Section VII (Hydrographic Surveys of River channels and other Water Areas using Swathe Bathymetry), or shall be provided in accordance with an agreed alternative method.

A multibeam echo sounder should be used. The system measures water depths across a wide swathe perpendicular to the vessel track, thus giving greater coverage of bed features along the line than traditional single beam. The additional horizontal coverage shall vary depending upon the water depths, but should approximate between 3 to 8 times the water depth, and produce wide channels of data capture, and ultimately complete coverage of the river channel.

The results need to include the methodology used to collect the data; the equipment deployed, including but not limited to Echo Sounder, Motion Sensor, Sound Velocimeter; position fixing equipment and processing. The software used to collect and process the data and the software used to produce charts and digital x,y,z outputs.

All surveys are to be referenced to UK National Grid, and any vertical datum shall be referenced to Ordnance Datum Newlyn.

The following data shall be supplied.

- i) ASCII raster format *.asc 1m gridded data set supplied per OS Grid Square
- ii) XYZ data *.txt 1m gridded data set per study reach
- iii) Survey report.

Following the initial baseline survey, all subsequent data shall be compared to the baseline for the identification of river bed and bank movement.

LiDAR Survey

A LIDAR Digital Surface Model (DSM) and Digital Terrain Model (DTM) in ArcView ASCII Grid file in 0.25m x 0.25m and 0.5m x 0.5m file sizes for each polygon defined. Also supplied shall be last return XYZI point cloud data in LAS format and DSM XYZ ASCII TXT.

Data shall be collected during tidal windows in the order of 1 hour either side of Low Water, or suitable agreed time period.

The error specification for LIDAR surveys shall be an RMSE of +/- 15cm.

Ground truth surveys for the checking of LIDAR height accuracy shall be carried out within each polygon.

A full quality control report shall be supplied to the EA on completion of each survey. This shall include at least the following:

- A plot of all data indicating polygon coverage and aircraft navigation lines.
- A copy of the flight log for all polygons.
- Data processing procedures.
- A report on the comparison of these data with available ground truth data.

ANNEX H

FREEDOM OF INFORMATION REQUESTS FOR ABP COMPENSATION DETAILS

Schedule of Correspondence Regarding Release of ABP Legal Agreements in Relation to Compensation Sites on the Humber Estuary

Date	Time	Email/Letter/ Telecon/Doc (E/L/T/D)	From	To	Reason
19.7.11	12:59	E	Natural England (S Hall)	Able	NE responded to Able's request for Internal Review re Alkborough Flats – letter attached.
		L	Natural England	Able	NE's Internal Review of decision re Able's Alkborough Flats request concluded that information was not correctly withheld. Redacted version of legal agreement issued.
		D			Tripartite Land Agreement and map.
18.7.11	16:25	E	Natural England (D Green)	Able	NE's response to Able's request re copies of NE/ABP correspondence – letter attached.
		L	Natural England	Able	NE refuse Able's request for copies of NE/ABP correspondence, citing regulation 12(5)(f) of EIR Regulations 2004 - ABP declined to give consent to issue.
13.6.11	13:38	E	Natural England (D Green)	Able (RC)	NE note extra time required – letter attached.
		L	Natural England	Able	NE advise that extra time is required to consider Able's request copies of NE/ABP correspondence.
23.5.11	13:52	E	Natural England (B Marling)	Able	NE (B Marling) responded that Internal Review (Alkborough Flats) had been initiated.
20.5.11	16:28	E	Able (RC)	Natural England (SH)	Able forward requests for NE Internal Review (Alkborough Flats) and for copies of correspondence to B Marling.
20.5.11	15:38	E	Able (RC)	NE (SH)	Able requested NE Internal Review of NE's decision re Alkborough Flats refusal. Able also request copies of all correspondence between NE and ABP relating to request dated 21 st March.
20.5.11	14:05	E	Natural England (DG)	Able (RC)	Final part of NE's response re Able's request dated 21 st March – letter attached.

Date	Time	Email/Letter/ Telecon/Doc (E/L/T/D)	From	To	Reason
		L	Natural England	Able	NE refused Able's Access to Information Request for the Compensation legal agreement for Alkborough Flats, citing Reg 12(5)(e) of the EIR Regulations 2004, i.e. commercial confidentiality.
18.5.11	12:01	E	Natural England	Able	NE responded to Able's Access to Information Request dated 21 st March with a partial release.
		L	Natural England	Able	NE provided Able with a copy of the ABP Compensation legal agreement for Welwick/Chowder Ness.
		D			Compensation Agreement for Immingham Outer Harbour & Hull Quay 2005 (Welwick/Chowder Ness LA)
21.3.11	17:57	E	Able (RC)	Natural England (PD)	Able requested copy of legal agreements between ABP and NE re: <ul style="list-style-type: none"> • Alkborough Flats • Welwick/Chowder Ness

Leslie Hutchings

From: Hall, Simon (NE) <Simon.Hall@naturalengland.org.uk>
Sent: 19 July 2011 12:59
To: Richard Cram
Subject: Natural England Internal Review of request for information from Able UK
Attachments: 1077 - Internal Review Response Final.pdf; Agreement Maps REDACTED.pdf; Tripartite Land Compensation Agreement 2006 REDACTED.pdf

Dear Mr Cram

Thank you for your email that you sent to me on 18th May appealing against the decision to withhold information regarding the Alkborough flood alleviation scheme agreement. Please see my response attached below, and the information that you requested as far as we are able to provide below that.

<<1077 - Internal Review Response Final.pdf>>

<<Agreement Maps REDACTED.pdf>> <<Tripartite Land Compensation Agreement 2006 REDACTED.pdf>>

If I can be of further assistance to you, please do contact me using the details below.

Regards

Simon Hall
Head of Customer Service Excellence
Customers Team
Natural England
Home Based - Taunton

Telephone – 01823 681322

Mobile - 07768 552835
simon.hall@naturalengland.org.uk

www.naturalengland.org.uk

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

This email and any attachments is intended for the named recipient only.
If you have received it in error you have no authority to use, disclose, store or copy any of its contents and you should destroy it and inform the sender.

Nothing in the email amounts to a legal commitment on our part unless confirmed by a signed communication. Whilst this email and associated attachments will have been checked for known viruses whilst within the Natural England systems, we can accept no responsibility once it has

. left

our systems. Communications on Natural England systems may be monitored and/or recorded to secure the effective operation of the system and for other lawful purposes.

Date: 19 July 2011



Mr Richard Cram
Able UK Ltd
Able House
Billingham Reach Industrial Estate
BILLINGHAM
Teeside
TS23 1PX

Customer Services
Natural England
c/o Block B, Government Buildings
Whittington Road
Worcester
WR5 2LQ

Dear Mr Cram

Access to Information Request – Internal Review – RFI 1077

Thank you for your email of 18 May appealing against the decision to withhold information regarding the Alkborough flood alleviation scheme agreement you requested under the Environmental Information Regulations 2004 (the regulations). I apologise for the not meeting the deadline for an internal review, which expired yesterday.

In accordance with Natural England's internal review procedures, your case has been reviewed by the more Senior Officer in discussion with colleagues who handled your original request. We have considered your appeal, including your arguments in favour of disclosure of and reviewed the public interest arguments for and against disclosure.

We have concluded that the information you requested was not correctly withheld under the Regulations. As you suggested Natural England should have considered redacting the information that was indeed sensitive. However, following this careful consideration, I regret to inform you that we are still withholding through redaction of some clauses. This letter acts as a Partial Refusal Notice.

Chronology

On 21 March 2011 you emailed a request for information to Natural England.
On 14 April 2011 we emailed you informing you of our intention of ending the deadline.
On 20 May 2011 Darren Green emailed you a response to your original request.
On 20 May 2011 you send me a request for Internal Review.
On 23 May 2011 my colleague Barbara Marling emailed an acknowledgement of your request for Internal Review.

Regulatory Regime

We have concluded that the Regulations are the applicable information access regime. This is because any such information held by Natural England would meet the definition of environmental information in the Regulations, being information on measures affecting or likely to affect the state of the elements of the environment and natural sites and an environmental agreement affecting or likely to affect the above. This therefore falls within the definition of environmental information in the Regulations.

Timeliness (Regulation 5)

We have considered whether Natural England complied with the requirement in the Regulations to respond to a requester within legal deadlines after the date of receipt of the request. Natural England did not respond within 20 working days, but did respond within 40 working days after taking an extension to the deadline under Regulation 7. Natural England's

response to RFI 1077 was emailed to you on 18 May 2010, 40 working days after the date of receipt, and therefore complied with the Regulations.

Exception in Regulation 12(5)(e)

This exception is engaged where disclosure of the information would adversely affect the confidentiality of commercial or industrial information where such confidentiality is provided by law to protect a legitimate economic interest.

Natural England has again consulted with ABP on the disclosure of this information. From this consultation it is Natural England's view that releasing some clauses in the agreement would prejudice the commercial interests of ABP. I regret that I cannot give any further information on this prejudice without revealing the information itself.

Public interest test

In applying this exception, we have had to balance the public interest in withholding the information against the public interest in disclosure. Generally speaking there is a public interest in the disclosure of commercial information for example in circumstances where it would show the transparency in the accountability of public funds; or proper scrutiny of regulatory activities. However, this must be balanced against private organisations being about to compete effectively in a highly competitive market and being less likely to provide commercially sensitive information in future and consequently undermine the ability of a public authority to fulfil its role. It is also not in the public interest to release information that which would harm their ability to compete and cause a distortion to the marketplace. Also the access to information legislation it not there to help commercial organisations glean sensitive internal information concerning a potential competitor organisation, in order to enable them to reach a more dominant position in their business sector. Whilst Natural England strives to be an open and transparent organisation, in this case we believe that public interest test supports the withholding of this information.

Conclusion

In all the circumstances of the case, having reviewed the exception that is engaged and considering the public interest arguments, we consider that the public interest in maintaining the exception outweighs the public interest in disclosure. Please find attached a redacted version of the Alkborough flood alleviation scheme agreement.

I hope that the above answers your email satisfactorily. However, if you remain dissatisfied, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. Telephone: 01625 545 700, www.ico.gov.uk.

Yours sincerely

Simon Hall
Head of Customer Service Excellence
Telephone – 01823 681322
Mobile - 07768 552835
simon.hall@naturalengland.org.uk

Enc

ENGLISH NATURE
and
THE ENVIRONMENT AGENCY
and
ASSOCIATED BRITISH PORTS

AGREEMENT
ALKBOROUGH LAND COMPENSATION

TAYLOR WESSING
Carmelite
50 Victoria Embankment
Blackfriars
London EC4Y 0DX

+44 (0)20 7300 7000
+44 (0)20 7300 7100
DX 41 London

Ref: BJJ/ASS19.1



TaylorWessing

ENGLISH NATURE
and
THE ENVIRONMENT AGENCY
and
ASSOCIATED BRITISH PORTS

AGREEMENT
ALKBOROUGH LAND COMPENSATION

TAYLOR WESSING
Carmelite
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Blackfriars
London EC4Y 0DX

+44 (0)20 7300 7000
+44 (0)20 7300 7100
DX 41 London

Ref: BJK/ASS19.1



TaylorWessing

1 This AGREEMENT is made the 31st day of August 2006 between:

(1) ENGLISH NATURE of Northminster House, Peterborough, Cambridgeshire, PE1 1UA ("English Nature");

(2) ENVIRONMENT AGENCY of Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32 4UD ("The Agency"); and

(3) ASSOCIATED BRITISH PORTS of 150 Holborn, London, EC1N 2LR ("ABP").

2 Recitals

2.1 [REDACTED]

2.2 Planning permission for the Scheme was granted by North Lincolnshire District Council on 7th July 2005.

2.3 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

2.4 [REDACTED]

2.5 [REDACTED]

[REDACTED]

[REDACTED]

2.6 [REDACTED]

3 Definitions

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4 English Nature and ABP hereby agree -

4.1 [REDACTED]

- [REDACTED]
- [REDACTED]

[REDACTED]

4.2 [REDACTED]

- [REDACTED]
- [REDACTED]

5 ABP hereby agree:-

- 5.1 To support the promotion and implementation of the Scheme in any such manner as may be considered reasonable by ABP bearing in mind its position as Harbour Authority for the Humber.
- 5.2 To enter into such legal agreements as may be necessary to secure the necessary consents for the Scheme provided that such legal agreements do not fetter ABP's powers or duties or obligations as statutory Harbour Authority for the Humber.

6 The Agency hereby agrees:-

- 6.1 To establish the ASG, membership of which will comprise the Agency, English Nature and ABP as soon as may be practicable after execution of this Agreement, the terms of reference of which shall include:-
- (a) the review and approval of the monitoring requirements for the Scheme;
 - (b) the review of any environmental or related information obtained by the parties to this Agreement during the life of the management of the Scheme; and
 - (c) the review and approval as appropriate of any changes required in the environmental management of the Scheme.
- 6.2 To arrange, as far as practicable, that the ASG meets at least twice a year.

7 Generally

- 7.1 Nothing in this Agreement shall be construed as prejudicing or affecting the exercise of any statutory power or duties of the Agency.
- 7.2 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.
- 7.3 Nothing in this Agreement shall be construed as prejudicing or affecting the exercise of any statutory power or duties of ABP.

8 Contracts (Rights of Third Parties) Act 1999

This agreement is intended to be for the sole benefit of the parties to it and a person who is not a party to this Agreement shall not have any rights under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Agreement. This clause does not affect any right or remedy of any person that exists or is available otherwise than pursuant to that Act.

9 Enforcement

- 9.1 Any dispute, controversy or claim arising out of or relating to this Agreement including (without limitation) any question as to the breach, termination, existence or invalidity hereof (hereinafter "Disputes") shall be referred to the courts of England.
- 9.2 Each of the parties hereto irrevocably agrees that this Agreement shall be governed and construed in accordance with English Law and the courts of England shall have non-exclusive jurisdiction to hear and determine any suit, action or proceeding, and to settle any disputes, which may arise out of or in connection with this Agreement and, for such purposes, irrevocably submits to the jurisdiction of such courts.

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

SIGNED as a DEED and DELIVERED on behalf of the ENVIRONMENT AGENCY by Sarah Ward Principal Solicitor acting pursuant to a Power of Attorney dated 1 April 2006 in the presence of



R. J. Sezcil

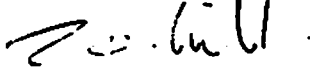
Kingfisher House

Peterborough



Environment Agency by its Attorney

EXECUTED as a DEED on behalf of ENGLISH NATURE by



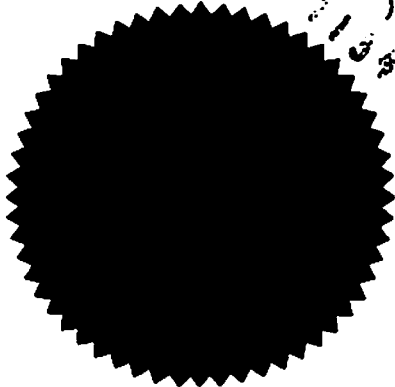
T. HILL

NORTHMINSTER HOUSE

PETERBOROUGH

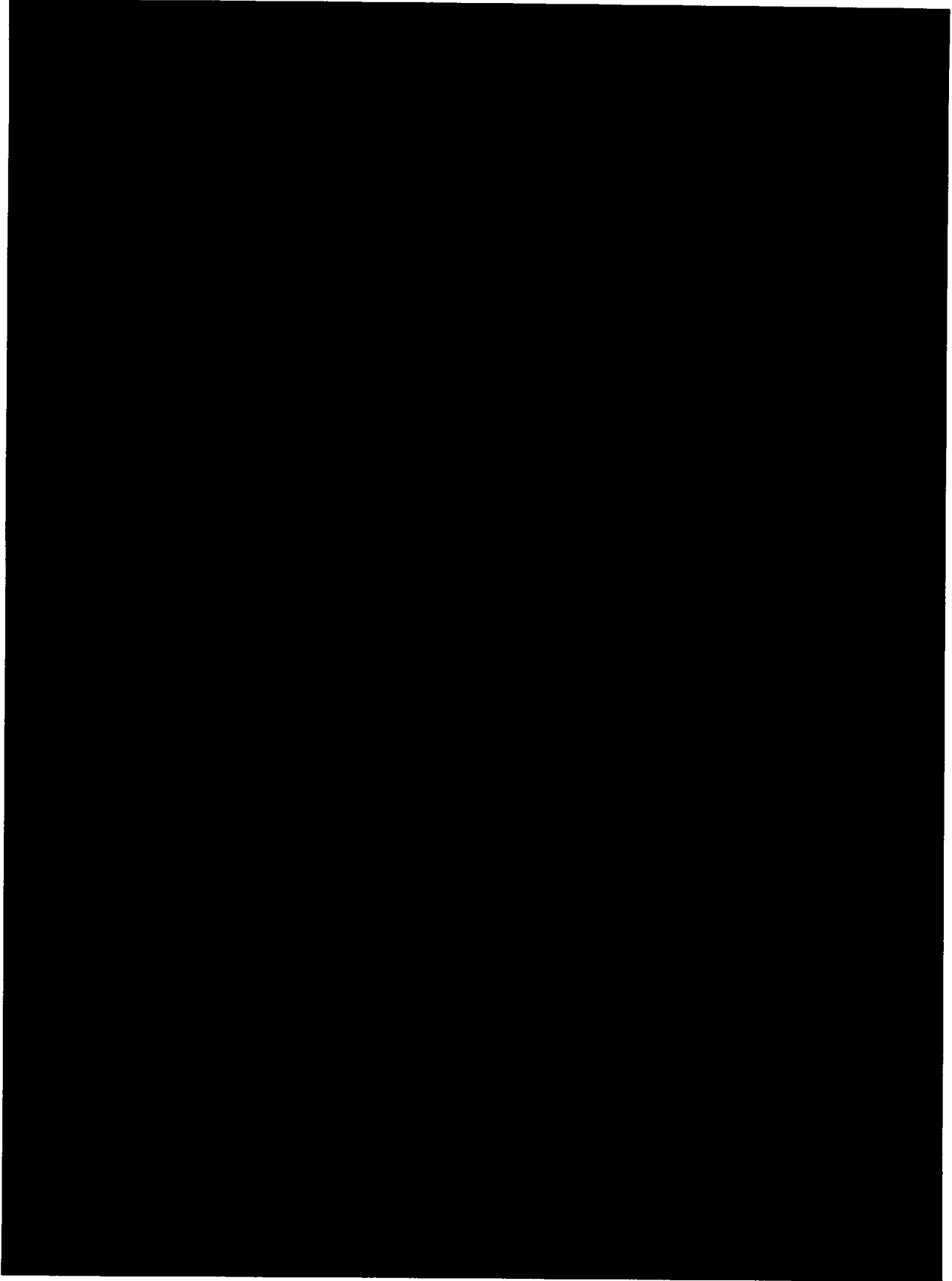


EXECUTED as a DEED on behalf of ASSOCIATED BRITISH PORTS by

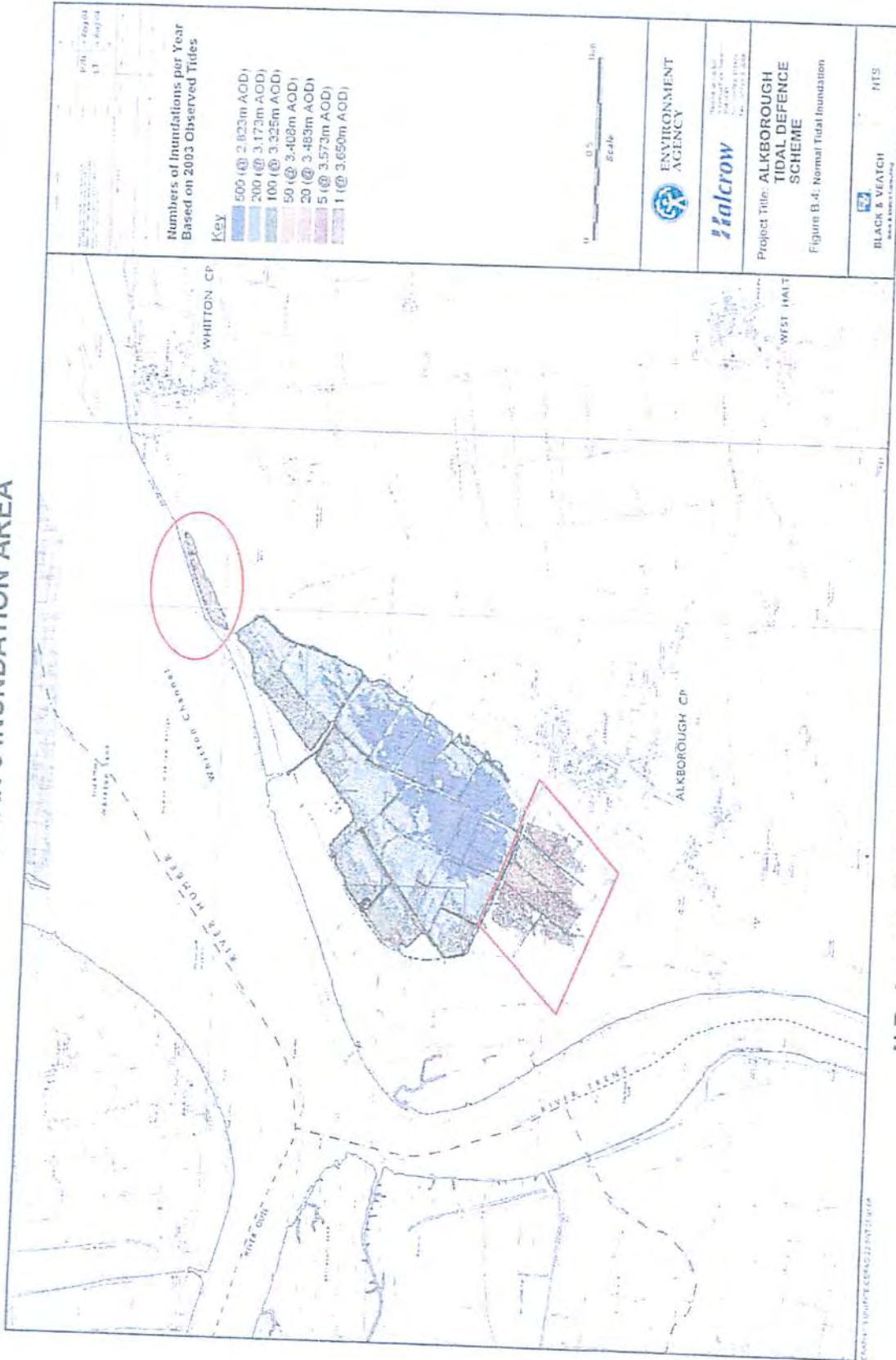


ASSISTANT SECRETARY

PLAN 2 – LAND OWNERSHIP





PLAN 3 INUNDATION AREA




N.B. Areas outlined in red are not within the Inundation Area

PLAN 4 – Access route through Walcot Farm to Site



Drawing Title: PLAN 4: ACCESS ROUTE THROUGH WALCOT FARM			
OS Grid Ref. SE87382211	Drawn by: AM	Scale: Not to Scale	Date: 07/07/2010
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	<p> The Council of North Lincolnshire is a public body established under the Local Government Act 1972. It is a body corporate and has legal personality. It is not a government department or a government office. It is not a public authority for the purposes of the Freedom of Information Act 2000. It is not a public body for the purposes of the Access to Information Act 1983. It is not a public body for the purposes of the Freedom of Information Act 2000. It is not a public body for the purposes of the Access to Information Act 1983. It is not a public body for the purposes of the Freedom of Information Act 2000. It is not a public body for the purposes of the Access to Information Act 1983. </p>		

Access route: 

Site Boundary: 

Leslie Hutchings

From: Green, Darren (NE) <Darren.Green@naturalengland.org.uk>
Sent: 18 July 2011 16:25
To: Richard Cram
Subject: request for information - RFI 1138
Attachments: 1138 - Response Final.pdf

Dear Mr Cram

Please find attached our response to your request for information.

<<1138 - Response Final.pdf>>

Thanks

Darren

Darren Green, Senior Adviser - Information Access

Natural England, Block B, Government Buildings,

Whitlington Road, Worcester, WR5 2LQ

T: 0300 060 1616 M: 078101 56750

darren.green@naturalengland.org.uk

www.naturalengland.org.uk/foi/default.htm

If I have invited you to a phone-conference,

call 0800 528 5260 (0207 979 0009 if calling from a mobile)

and enter access code 9132321# to join

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Natural England systems, we can accept no responsibility once it has
left

our systems. Communications on Natural England systems may be monitored
and/or recorded to secure the effective operation of the system and for
other lawful purposes.

Date: 18 July 2011



Mr Richard Cram
Able UK Ltd
Able House
Billingham Reach Industrial Estate
BILLINGHAM
Teaside
TS23 1PX

Customer Services
Natural England
Block B, Government Buildings
Whittington Road
Worcester
WR5 2LQ

Dear Mr Cram

Access to Information Request – Refusal – RFI 1138

Thank you for your request for a copy of all correspondence between ourselves and ABP in respect of requests RFIs 1077 and 1138 which we received on 20 May 2011. Your request has been carefully considered under the Environmental Information Regulations 2004.

Following careful consideration, I regret to inform you that we have decided not to disclose this information. This letter acts as a Refusal Notice.

Regulation 12(5)(f)

The information you requested is being withheld as it falls under the exception in Regulation 12(5)(f). This exception states that a public authority may refuse to disclose information if its disclosure would adversely affect the interests of the person who provided the information where that person-

- (i) was not under, and could not have been put under, any legal obligation to supply it to that or any other public authority;
- (ii) did not supply it in circumstances such that that or any other public authority is entitled apart from these Regulations to disclose it; and
- (iii) has not consented to its disclosure.

Section 7.5.7.2 of the DEFRA Guidance states the intention behind this exception:

“The purpose of this exception is to ensure the free flow of volunteered information to government,... It could include information provided by organisations and individuals who are not public authorities for EIR purposes.”

Section 7.5.7.3 goes on to say, “...It [the exception] recognises that making such information available to the public could inhibit open and constructive discussions between public authorities and third parties. It is recognised therefore that the supply of volunteered information could diminish if information is later published in response to EIR requests.”

- Safeguarding the free flow of information to the public authority, which it relies on in order to carry out its statutory functions.
- Ensuring that people are not deterred from volunteering information if they are concerned
- Avoiding undesirable impact to relationships.

We believe that when ABP volunteered the information they expected that that information should remain confidential. They were under no obligation to supply it and Natural England has no statutory power to make them do so. In this case we consulted with but they have refused to give consent.

Although all three of the exception conditions have been met, there still has to be an adverse affect (harm) to the interests of the owner/occupiers for the exception to be engaged.

In this case, we believe that the release of the information would have an adverse affect on the commercial interests of ABP. I regret that I cannot give any further information on this adverse affect without revealing the information itself.

We are satisfied that this exception is therefore engaged.

In applying this exception, we have had to balance the public interest in withholding the information against the public interest in disclosure. Generally speaking there is a public interest in the disclosure of commercial information for example in circumstances where it would show the transparency in the accountability of public funds; or proper scrutiny of regulatory activities however, this must be balanced against companies being less likely to provide commercially sensitive information in future and consequently undermine the ability of a public authority to fulfil its role. It is also not in the public interest to release information that could damage the competitiveness of a company. Whilst Natural England strives to be an open and transparent organisation, in this case we believe that public interest test supports the withholding of this information.

If you have any queries about this letter, please contact me. As you may be aware, under the legislation should you have any concerns with the service you have received in relation to your request and wish to make a complaint or request a review of our decision, please contact:

Simon Hall, Head of Customer Service Excellence Team.
Email: simon.Hall@naturalengland.org.uk.

Under Regulation 11(2) this needs to be done no later than 40 working days after the date of this letter.

If you are not content with the outcome of your complaint, you may apply directly to the Information Commissioner for a decision. Generally, the Commissioner cannot make a decision unless you have exhausted the complaints procedure provided by Natural England. The Information Commissioner can be contacted at: The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. Telephone: 01625 545 700, www.ico.gov.uk.

Yours sincerely

Darren Green
Senior Adviser – Information Access
0300 060 1616

Leslie Hutchings

From: Green, Darren (NE) <Darren.Green@naturalengland.org.uk>
Sent: 13 June 2011 13:38
To: rcram@ableuk.com
Subject: Request for Information - RFI 1138
Attachments: 1138 - extension.pdf

Dear Mr Cram

Please see the attached regarding your request for information.

<<1138 - extension.pdf>>

Yours sincerely

Darren Green

Darren Green, Senior Adviser - Information Access

Natural England, Block B, Government Buildings,

Whittington Road, Worcester, WR5 2LQ

T: 0300 060 1616 M: 078101 56750

darren.green@naturalengland.org.uk

www.naturalengland.org.uk/foi/default.htm

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our systems. Communications on Natural England systems may be monitored and/or recorded to secure the effective operation of the system and for other lawful purposes.

Date: 13 June 2011



Mr Richard Cram
Able UK Ltd
Able House
Billingham Reach Industrial Estate
BILLINGHAM
Teeside
TS23 1PX

Customer Service Excellence
Natural England
Block B, Government Buildings
Whittington Road
Worcester
WR5 2LQ

T: 0300 060 1616

Dear Mr Cram

Environmental Information Regulations 2004 – Extension of time – Request No. 1138

I am writing to advise you that the time limit for responding to your request for information under the Environmental Information Regulations 2004, which we received on 20 May 2011, needs to be extended.

The Regulations allow us 20 working days to respond to your request from the date of its receipt. However, it is occasionally necessary to extend the 20 working day time limit for issuing a response. In this case I regret that we must extend the time limit for responding, because of the complexity of the request requiring us to consult with a third party on the release of this information.

If you have any queries about this letter, please contact me. As you may be aware, under the legislation should you have any concerns with the service you have received in relation to your request and wish to make a complaint or request a review of our decision, please contact:

Simon Hall, Head of Customer Service Improvement Team.
Email: simon.hall@naturalengland.org.uk.

Under Regulation 11(2) this needs to be done no later than 40 working days after the date of this letter.

If you are not content with the outcome of your complaint, you may apply directly to the Information Commissioner for a decision. Generally, the Commissioner cannot make a decision unless you have exhausted the complaints procedure provided by Natural England. The Information Commissioner can be contacted at: The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. Telephone: 01625 545 700, www.ico.gov.uk.

Yours sincerely

Darren Green
Senior Adviser – Information Access

Leslie Hutchings

From: Marling, Barbara (NE) <Barbara.Marling@naturalengland.org.uk>
Sent: 23 May 2011 13:52
To: rcram@ableuk.com
Subject: RE: NE/ABP Agreements

Dear Mr Cram

Request for internal review - acknowledgement – Request No. 1077

Thank you for your request for an internal review of our response to your request for information. I would like to confirm that during Simon Hall's absence I will be dealing with your review under the Environmental Information Regulations 2004.

I have initiated the review. Your request is being considered and you will receive our response within the legal deadline of 40 working days. If, for any reason, we are unable to meet the deadline we will keep you fully informed of the reasons for this.

I also acknowledge your new request for information, reference (RFI 1138) with a deadline of 20 June 2011.

Yours sincerely

Barbara Marling

Barbara Marling
Senior Adviser
Customer Service Excellence Team
Organisation Development
Natural England
3rd floor, Touthill Close,
City Road,
Peterborough Cambs PE1 1XN
Tel: 0300 060 0596
Mob: 07500 814 957

<http://www.naturalengland.org.uk/>

We are here to secure a healthy natural environment for people to enjoy , where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

From: Richard Cram [<mailto:rcram@ableuk.com>]
Sent: 20 May 2011 16:28
To: Marling, Barbara (NE)
Subject: NE/ABP Agreements

Barbara,

Please see attached e-mail to Simon Hall who appears to be out of the office until 1 June. Hopefully you can action in his absence.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
Fax: 01642-655655
Email: rcram@ableuk.com
Web: www.ableuk.com & www.ableshiprecycling.com

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sender.

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our systems. Communications on Natural England systems may be monitored
and/or recorded to secure the effective operation of the system and for
other lawful purposes.

Leslie Hutchings

From: Richard Cram <rcram@ableuk.com>
Sent: 20 May 2011 15:38
To: 'simon.Hall@naturalengland.org.uk'
Cc: 'Green, Darren (NE)'
Subject: RE: ABP/NE AGREEMENTS
Attachments: 1077 - Response Final.pdf; msc report.pdf

Importance: High

Simon

I have received the attached letter. The letter states that a review of the decision can be requested from yourself; we request a review on the following grounds.

1. The argument presented regarding the PUBLIC interest is highly generic.
2. It is not clear how the PUBLIC interest of **releasing** the information has been assessed and weighted. What criteria have been used?
3. The specific PUBLIC benefit of withholding, in full, the information is not clear. How would the public interest be harmed by its publication?
4. It is not explained how the commercial interests of ABP are affected by the release of the information.
5. It is not clear whether you have considered the release of a redacted version to best balance the PUBLIC interest and the alleged commercial interest of ABP. Reference to the existence of a legal agreement and some of the details of it are already contained in publicly available documents (see page 79 of the attached report), yet you have refused to even release any information at all. As you will see from the report, ABP is acknowledged and we can only therefore conclude that they have knowingly put this information into the public domain themselves.

In addition to the above we would request, under the same legislation as before, a copy of all correspondence between yourselves and ABP in respect of both this request and our request for a copy of the Agreement relating to Quay 2005 which you have released.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
Fax: 01642-655655
Email: rcram@ableuk.com
Web: www.ableuk.com & www.ableshiprecycling.com

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unauthorised amendment, and we do not accept liability for any such corruption, interception or amendment or the consequences thereof.

From: Green, Darren (NE) [mailto:Darren.Green@naturalengland.org.uk]
Sent: 20 May 2011 14:05
To: rcram@ableuk.com
Subject: RE: ABP/NE AGREEMENTS

Dear Mr Cram

Please find attached the final part of our response to your request for information.

Thanks
Darren

Darren Green, Senior Adviser - Information Access
Natural England, Block B, Government Buildings,
Whittington Road, Worcester, WR5 2LQ

T: 0300 060 1616 M: 078101 56750

darren.green@naturalengland.org.uk
www.naturalengland.org.uk/foi/default.htm

If I have invited you to a phone-conference,
call 0800 528 5280 (0207 979 0003 if calling from a mobile)
and enter access code 9132321# to join

From: Richard Cram [mailto:rcram@ableuk.com]
Sent: 21 March 2011 17:57
To: Duncan, Paul (NE) (VLA)
Cc: Hawthorne, Emma (NE) (VLA); jmonk@ableuk.com
Subject: ABP/NE AGREEMENTS
Importance: High

Paul,

I would like to request, under the Freedom of Information Act 2000 and Environmental Information Regulations 2004, a copy of the agreement between ABP and Natural England [among other parties] regarding compensation land for the Natura 2000 sites affected by The Associated British Ports (Hull) Harbour Revision Order 2006 and in relation to the Alkborough flood alleviation scheme.

In accordance with the Act and Regulations, I should like to receive this as soon as practicable, and in any event within 20 working days. I would prefer to have the information sent to me as pdf attachment to an email.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
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Leslie Hutchings

From: Green, Darren (NE) <Darren.Green@naturalengland.org.uk>
Sent: 20 May 2011 15:05
To: rcram@ableuk.com
Subject: RE: ABP/NE AGREEMENTS
Attachments: 1077 - Response Final.pdf

Dear Mr Cram

Please find attached the final part of our response to your request for information.

Thanks
Darren

Darren Green, Senior Adviser - Information Access
Natural England, Block B, Government Buildings,
Whittington Road, Worcester, WR5 2LQ

T: 0300 060 1616 M: 078101 56750

darren.green@naturalengland.org.uk
www.naturalengland.org.uk/foi/default.htm

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To: Duncan, Paul (NE) (VLA)
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Subject: ABP/NE AGREEMENTS
Importance: High

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In accordance with the Act and Regulations, I should like to receive this as soon as practicable, and in any event within 20 working days. I would prefer to have the information sent to me as pdf attachment to an email.

Kind regards

RICHARD CRAM
Design Manager

Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Tel: 01642-806080
Fax: 01642-655655

Email: rcram@ableuk.com

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Date: 20 May 2011



Mr Richard Cram
Able UK Ltd
Able House
Billingham Reach Industrial Estate
BILLINGHAM
Teeside
TS23 1PX

Customer Services
Natural England
Block B, Government Buildings
Whittington Road
Worcester
WR5 2LQ

Dear Mr Cram

Access to Information Request – Refusal – RFI 1077

Thank you for your request for the Alkborough flood alleviation scheme agreement which we received on 21 March 2010. Your request has been carefully considered under the Environmental Information Regulations 2004.

Following careful consideration, I regret to inform you that we have decided not to disclose this information. This letter acts as a Refusal Notice.

The information you requested is being withheld as it falls under the exception in Regulation 12(5)(e) of the Environmental Information Regulations 2004 which relates to the confidentiality of commercial or industrial information where such confidentiality is provided by law to protect a legitimate economic interest.

Natural England has consulted with ABP on the disclosure of this information. From this consultation it is Natural England's view that releasing this information would prejudice the commercial interests of ABP.

In applying this exception, we have had to balance the public interest in withholding the information against the public interest in disclosure. Generally speaking there is a public interest in the disclosure of commercial information for example in circumstances where it would show the transparency in the accountability of public funds; or proper scrutiny of regulatory activities however, this must be balanced against companies being less likely to provide commercially sensitive information in future and consequently undermine the ability of a public authority to fulfill its role. It is also not in the public interest to release information that could damage the competitiveness of a company. Whilst Natural England strives to be an open and transparent organisation, in this case we believe that public interest test supports the withholding of this information.

If you have any queries about this letter, please contact me. As you may be aware, under the legislation should you have any concerns with the service you have received in relation to your request and wish to make a complaint or request a review of our decision, please contact:

Simon Hall, Head of Customer Service Improvement Team.
Email: simon.hall@naturalengland.org.uk.

Under Regulation 11(2) this needs to be done no later than 40 working days after the date of this letter.

If you are not content with the outcome of your complaint, you may apply directly to the Information Commissioner for a decision. Generally, the Commissioner cannot make a decision unless you have exhausted the complaints procedure provided by Natural England. The Information Commissioner can be contacted at: The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. Telephone: 01625 545 700, www.ico.gov.uk.

Yours sincerely

Darren Green
Senior Adviser – Information Access

Leslie Hutchings

From: Page, Tim (NE) <Tim.Page@naturalengland.org.uk>
Sent: 18 May 2011 12:01
To: rcram@ableuk.com
Subject: ABP/NE AGREEMENTS - FOI/EIR request
Attachments: Quay 2005 IOH agreement - no redactions.pdf; TP 11-05-18 Release of Quay 2005 document.doc

Mr Cram,

See attached.

<<Quay 2005 IOH agreement - no redactions.pdf>> <<TP 11-05-18 Release of Quay 2005 document.doc>>

Tim Page
Conservation Adviser (Humber Estuary)
Natural England

Northern North Sea Team, Marine Function
Direct dial - 0300 0601850

Work mobile - 07773 345317

Natural England, 25 Queen Street, Leeds, LS1 2UN

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our systems. Communications on Natural England systems may be monitored
and/or recorded to secure the effective operation of the system and for
other lawful purposes.

Date: 18th May 2011
Our ref: RFI No: 1077
Your ref:

By e-mail



Natural England
25 Queen Street
Leeds LS1 2UN

RICHARD CRAM
Design Manager
Able UK Ltd
Able House
Billingham Reach Industrial Estate
Billingham
Teesside TS23 1PX

Dear Mr Cram,

Access to Information request – Partial release – Request No 1077

Thank you for your request for a copy of the agreement between ABP and Natural England [among other parties] regarding compensation land for the Natura 2000 sites affected by The Associated British Ports (Hull) Harbour Revision Order 2006 and in relation to the Alkborough flood alleviation scheme which we received on 21 March 2011. Your request has been carefully considered under the Environmental Information Regulations 2004.

A copy of The Associated British Ports (Hull) Harbour Revision Order 2006 is enclosed.

However, we are still deciding whether to release the agreement related to the Alkborough Flood Alleviation Scheme.

Please note that the information we have supplied to you is subject to copyright protection under the Copyright Designs and Patents Act 1988. You may re-use this information (not including logos) free of charge in any format or medium, for the purposes of research for non-commercial purposes, private study, criticism, review and news reporting. You must re-use it accurately and not in a misleading context. The material must be acknowledged as Natural England copyright and you must give the title of the source document/publication. However, if you wish to re-use all or part of this information for commercial purposes, including publishing you will need to apply for a licence. Applications can be sent to Enquiry Service, Natural England, Block B, Government Buildings, Whittington Road, Worcester, WR5 2LQ.

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If you have any queries about this letter, please contact me. As you may be aware, under the legislation should you have any concerns with the service you have received in relation to your request and wish to make a complaint or request a review of our decision, please contact:

Frances Randerson
Team Leader, Northern North Sea Team
Natural England, Marine Function
The Quadrant
Newburn Riverside, Kingfisher Boulevard
Newcastle NE15 8NZ

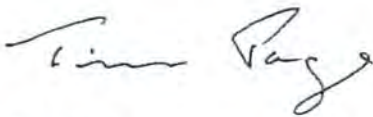
Tel: 0300 0600813

frances.randerson@naturalengland.org.uk

Under Regulation 11(2) this needs to be done no later than 40 working days after the date of this letter.

If you are not content with the outcome of your complaint, you may apply directly to the Information Commissioner for a decision. Generally, the Commissioner cannot make a decision unless you have exhausted the complaints procedure provided by Natural England. The Information Commissioner can be contacted at: The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. Telephone: 01625 545 700, www.ico.gov.uk.

Yours sincerely,

A handwritten signature in black ink that reads "Tim Page". The signature is written in a cursive style with a large, sweeping "P" and "g".

Tim Page
Conservation Adviser (Humber Estuary)
Natural England
Northern North Sea Team, Marine Function

Direct dial: 0300 0601850

tim.page@naturalengland.org.uk

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)

Compensation Agreement for
Immingham Outer Harbour and Hull Quay
2005

1 THIS AGREEMENT is made the 30th 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 94,000m³ 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 48,000m³ 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.

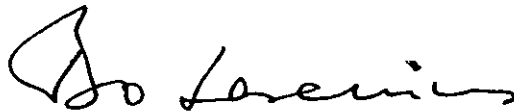
Doig's Creek Habitat Enhancement Scheme

- 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.

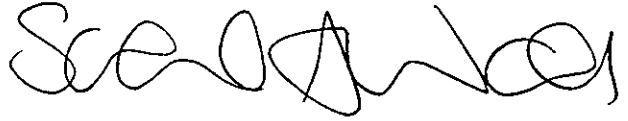
Executed as a Deed on behalf of
Associated British Ports by



Executed as a Deed on behalf of
English Nature by



Executed as a Deed on behalf of the
Environment Agency by



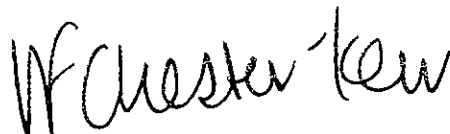
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Royal Society for the Protection of Birds by

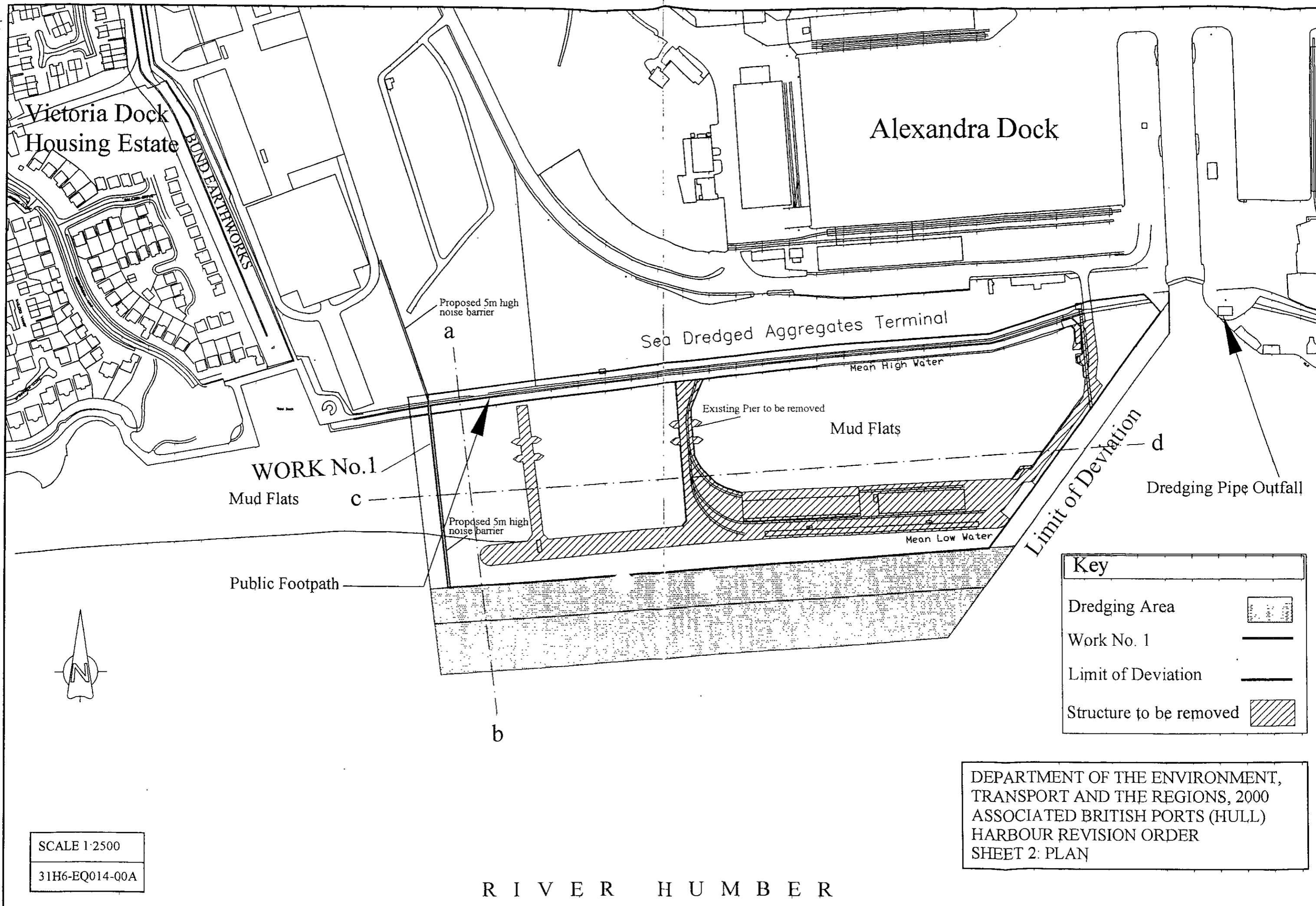






Executed as a Deed on behalf of the
Lincolnshire Wildlife Trust by



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



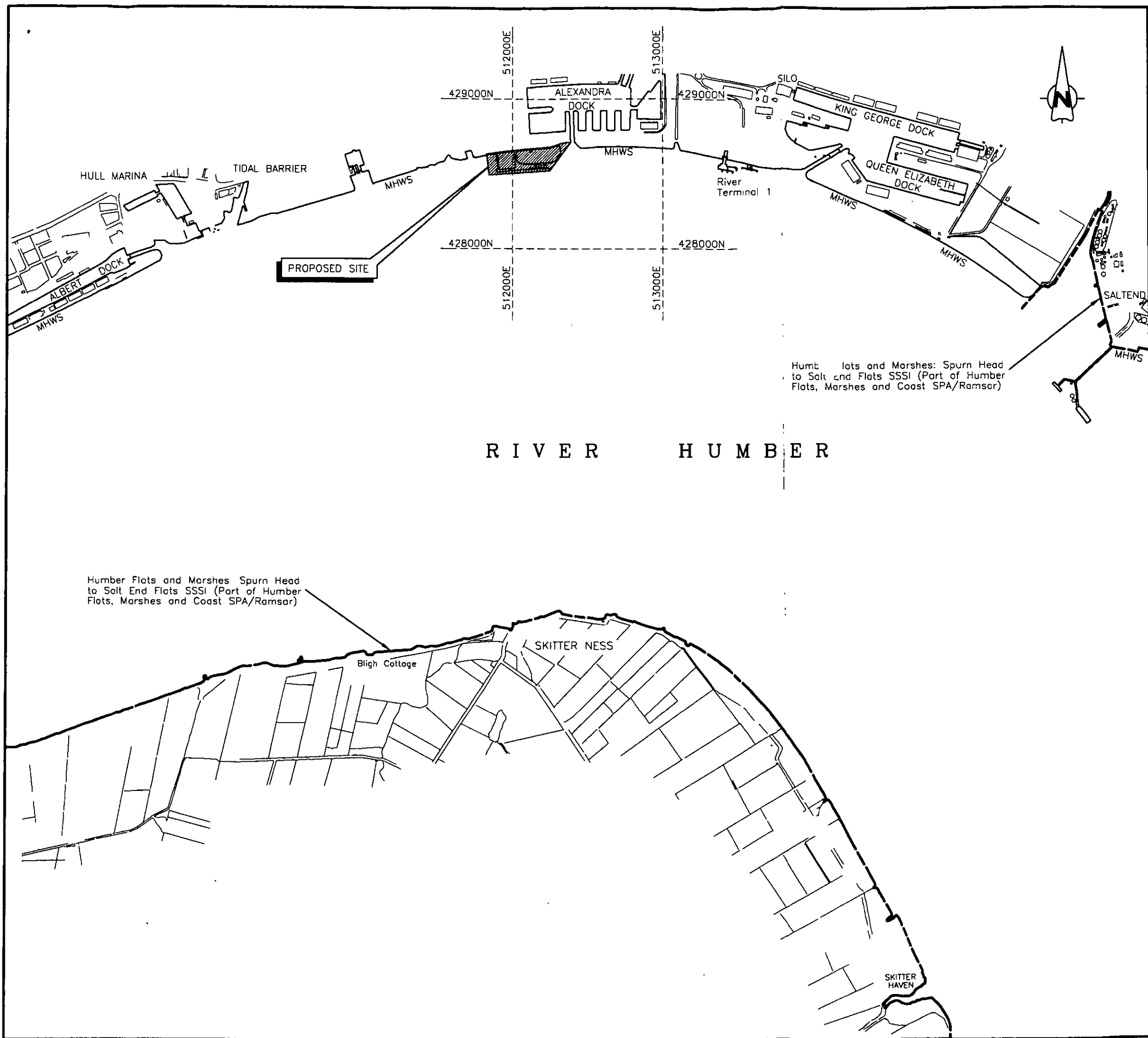


Key	
Dredging Area	
Work No. 1	
Limit of Deviation	
Structure to be removed	

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

SCALE 1:2500
 31H6-EQ014-Q0A

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

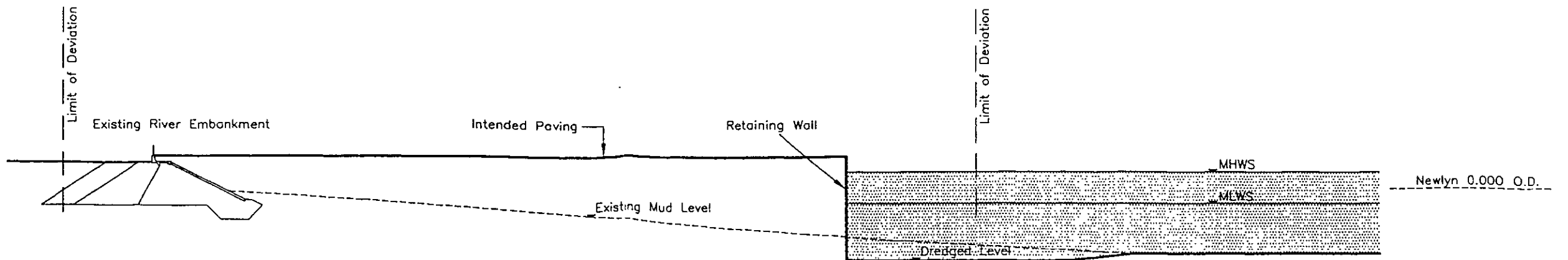
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Checked	Scales
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Approved Projects Manager	1:25000
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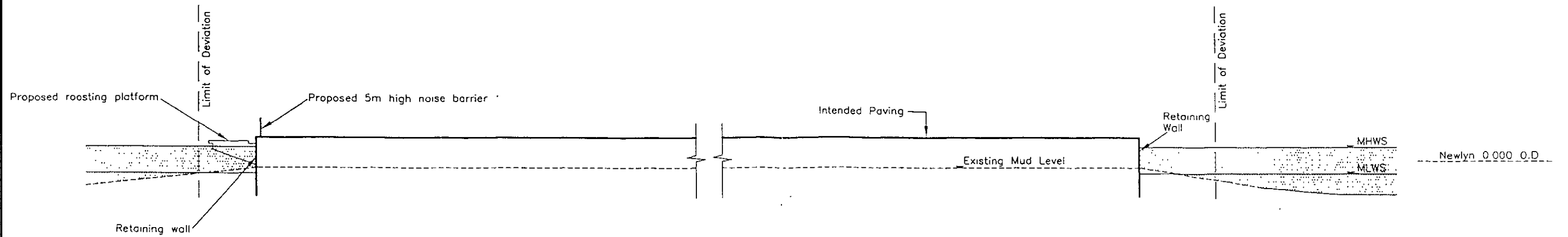
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Contract Drawing No	Drawing No. 02/DEC/17	Revision A
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Section a:b

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

ANNEX I

SUMMARY OF MarLIN BENCHMARKS AND RATIONALE

1.1. Summary of MarLIN benchmarks and rationale.

- 1.1.1. The following text outlines the process by which tolerance and recoverability are assigned and the subsequent assessment of sensitivity for species and habitats. The methodology used is based on the Marine Life Information Network (MarLIN sensitivity assessment).
- 1.1.2. The MarLIN Sensitivity assessment is recommended both for the process of identifying impact pathways and subsequently the assessment of sensitivity and recoverability by the Institute of Ecology and Environmental Management's "Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal".

1.2. Definitions

- 1.2.1. Tolerance is defined as the susceptibility of a habitat, community or species (i.e. the components of a biotope) to damage, or death, from an external factor. Tolerance is therefore assessed relative to change in a specific factor.
- 1.2.2. Recoverability is the ability of a habitat, community, or species (i.e. the components of a biotope) to return to a state close to that which existed before the activity or event caused change.
- 1.2.3. Sensitivity is dependent on the tolerance of a species or habitat to damage from an external factor and the time taken for its subsequent recovery. For example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'low' tolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low'; recoverability). Tolerance and hence sensitivity must be assessed relative to change in a specific factor.

1.3. Rationale

- 1.3.1. The rationale used to prepare a review of the biology and key sensitivity information for a species is given in the following text.

Stage 1

- 1.3.2. Collate key information on the species. The best available scientific information through primary literature, grey literature and other sources is acquired in order to describe the biology and likely sensitivity of the species. This is collated using the resources of the National Marine Biological Library (NMBL), the scientific literature databases such as Scencedirect, and the expertise of marine biologists based at the Marine Biological Association of the UK (MBA), Plymouth.

Stage 2

- 1.3.3. Indicate quality of available data. The MarLIN programme operates an internal quality assurance procedure, to ensure that only the most accurate available information is provided on-line. The quality of the available evidence and our confidence in our assessments (based on availability of information) is clearly stated and ranked against a standard scale.

Stage 3

- 1.3.4. Assess the tolerance of the species to change in environmental factors. The likely tolerance of the species is assessed with respect to a specified magnitude and duration of change (benchmarks) for 24 separate environmental factors.
- 1.3.5. Precedence is given to direct evidence of effect or impact. For example, information from targeted studies / experiments that looked at the effect of the specific factor on the species, or targeted work / experiments on the effects of similar factors on similar species or studies of the likely effects of a factor. The assessment of tolerance is then made by reference to the reported change in environmental factors and their impact, relative to the magnitude and duration of the standard benchmarks and other relevant key information.
- 1.3.6. In the absence of direct evidence, the MarLIN rationale includes simple decision trees to aid intolerance and recoverability assessment based on the available key information for the species. The decision trees provide a systematic and transparent approach to assessment. The decision trees are described in full by Tyler-Walters et al. (2001).

Stage 4

- 1.3.7. Assess the recoverability of the species. The likely recoverability of a species from disturbance or damage is dependent on its ability to regenerate, regrow, recruit or recolonize, depending on the extent of damage incurred and hence its intolerance. The recoverability of a species is assessed against the recoverability scale by reference to direct evidence of recruitment, recolonization or recovery (e.g. after environmental impact or experimental manipulation in the field) and/or key information on the reproductive biology, habitat preferences and distribution of the species.
- 1.3.8. Precedence is given to direct evidence of the effects of changes in environmental factors on a habitat, its community and associated species (i.e. the components of a biotope), and its subsequent recovery. The intolerance of a biotope to change in each environmental factor is assessed against a standard 'benchmark' level of effect, which allows the user to compare the recorded sensitivity to the level of effect predicted to be caused by a proposed development or activity. The evidence and key information used to assess sensitivity and any judgements made are explained in the on-line rationale for each assessment. The source of all information used is clearly referenced on-line.

Stage 5

- 1.3.9. Assess the sensitivity of the species. The overall sensitivity rank is derived from the combination of intolerance and recoverability using the rationale shown in Table1 and Table 2.
- 1.3.10. The sensitivity assessment rationale uses the question 'does it matter if?', together with the definitions of sensitive habitats and species proposed in the Review of Marine Nature Conservation (Laffoley et al., 2000) as touch-stones throughout. Due to the importance of recoverability in assessing the continued survival of a habitat or species population, the scale is intuitively weighted

towards recoverability. However, where recovery is likely to occur in a short period of time, tolerance has been given a greater weight rather than underestimate the potential sensitivity of marine habitats and species. The sensitivity scales and definitions are designed to be meaningful in marine environmental management, protection, and conservation.

- 1.3.11. For instance, if a habitat or species is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'low' tolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low'; recoverability) then it would be considered to be highly sensitive. Similarly, if a habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, 'intermediate' tolerance) but is expected to recover in a short period of time, i.e. within 1 year or up to 5 years ('very high' or 'high' recoverability) then it would be considered to be of low sensitivity.

Decision matrix

- 1.3.12. The decision matrix shown in Table 1 is not symmetrical because the scale represents scenarios in which the potential damage to the species or habitat matters. The scale is intuitively weighted towards recoverability, although in a few cases tolerances have been given a greater weight rather than underestimate the potential sensitivity of marine habitats and species.

Table 1 Decision Matrix for Sensitivity

		Recoverability						
		None	Very low (>25 yr.)	Low (>10/25 yr.)	Moderate (>5 -10 yr.)	High (1 -5 yr.)	Very high (<1 yr.)	Immediate (< 1 week)
Tolerance	Low	Very high	Very high	High	Moderate	Moderate	Low	Very low
	Intermediate	Very high	High	High	Moderate	Low	Low	Very Low
	High	High	Moderate	Moderate	Low	Low	Very Low	NS
	Tolerant	NS	NS	NS	NS	NS	NS	NS
	Not relevant	NR	NR	NR	NR	NR	NR	NR

The following

- 1.3.13. Table 2 defines 'sensitivity' *sensu lato* for habitats and species. 'Reduced viability' includes physiological stress, reduced fecundity, reduced growth, and partial death of a colonial animal or plant.

Table 2 Definition of Sensitivity

Rank	Definition
Very High	<p>"Very high" sensitivity is indicated by the following scenario:</p> <ul style="list-style-type: none"> • The habitat or species is very adversely affected by an external factor arising from human activities or natural events (either killed/destroyed, "low" tolerance) and is expected to recover only over a prolonged period of time, i.e. >25 years or not at all (recoverability is "very low" or "none"). • The habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, "intermediate" tolerance) but is not expected to recover at all (recoverability is "none").
High	<p>"High" sensitivity is indicated by the following scenarios:</p> <ul style="list-style-type: none"> • The habitat or species is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, "low" tolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ("low" recoverability). • The habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, "intermediate" tolerance) and is expected to recover over a very long period of time, i.e. >10 years (recoverability is "low", or "very low"). • The habitat or species is affected by an external factor arising from human activities or natural events (reduced viability **, "high" tolerance) but is not expected to recover at all (recoverability is "none"), so that the habitat or species may be vulnerable to subsequent damage.
Moderate	<p>"Moderate" sensitivity is indicated by the following scenarios:</p> <ul style="list-style-type: none"> • The habitat or species is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, "low" tolerance) but is expected to take more than 1 year or up to 10 years to recover ("moderate" or "high" recoverability). • The habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, "intermediate" tolerance) and is expected to recover over a long period of time, i.e. >5 or up to 10 years ("moderate" recoverability). • The habitat or species is affected by an external factor arising from human activities or natural events (reduced viability, "high" tolerance) but is expected to recover over a very long period of time, i.e. >10 years (recoverability is "low", "very low"), during which time the habitat or species may be vulnerable to subsequent damage.

Low	<p>"Low" sensitivity is indicated by the following scenarios:</p> <ul style="list-style-type: none"> • The habitat or species is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, "low" tolerance) but is expected to recover rapidly, i.e. within 1 year ("very high" recoverability). • The habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, "intermediate" tolerance) but is expected to recover in a short period of time, i.e. within 1 year or up to 5 years ("very high" or "high" recoverability). • The habitat or species is affected by an external factor arising from human activities or natural events (reduced viability, "high" tolerance) but is expected to take more than 1 year or up to 10 years to recover ("moderate" or "high" recoverability).
Very low	<p>"Very low" is indicated by the following scenarios:</p> <ul style="list-style-type: none"> • The habitat or species is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, "low" tolerance) but is expected to recover rapidly i.e. within a week ("immediate" recoverability). • The habitat or species is adversely affected by an external factor arising from human activities or natural events (damaged, "intermediate" tolerance) but is expected to recover rapidly, i.e. within a week ("immediate" recoverability). • The habitat or species is affected by an external factor arising from human activities or natural events (reduced viability **, "high" tolerance) but is expected to recover within a year ("very high" recoverability).
Not sensitive	<p>"Not sensitive" is indicated by the following scenarios:</p> <ul style="list-style-type: none"> • The habitat or species is affected by an external factor arising from human activities or natural events (reduced viability **, "high" tolerance) but is expected to recover rapidly, i.e. within a week ("immediate" recoverability). • The habitat or species is tolerant of changes in the external factor.
Not sensitive	<p>The habitat or species may benefit from the change in an external factor (tolerance has been assessed as "tolerant").</p>
Not relevant	<p>The habitat or species is protected from changes in an external factor (i.e. through a burrowing habit or depth), or is able to avoid the external factor.</p>
Insufficient information	