



Able Marine Energy Park Environmental Statement

Habitat Compensation Scheme Water Framework Directive Assessment

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Water Framework Directive Assessment



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Acronyms and abbreviations

AWB	Artificial Water Body
BWD	Bathing Waters Directive
EA	Environment Agency
EIA	Environmental Impact Assessment
ES	Environmental Statement
GCS	Good Chemical Status
GEP	Good Ecological Potential
HD	Habitats Directive
HMWB	Heavily Modified Water Body
HRA	Habitats Regulations Assessment
MEP	Marine Energy Park
RBMP	River Basin Management Plan
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SWD	Shellfish Waters Directive
UKTAG	United Kingdom Technical Advisory Group
WFD	Water Framework Directive

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1. *Introduction*

Able UK Ltd. proposes to construct a Marine Energy Park (MEP) near Immingham on the southern bank of the Humber estuary. The Environmental Statement for the project concluded that the development will affect internationally designated intertidal and subtidal habitat within the Humber Estuary, thus if the development is approved, it is likely that Able UK Ltd. will be required to provide compensatory habitat. A separate Environmental Statement (ES) has been prepared for the selected compensation sites Cherry Cobb Sands and Old Little Humber Farm which will provide additional intertidal and wet grassland respectively. Able UK Ltd. has been asked by the Environment Agency (EA) to undertake a Water Framework Directive (WFD) assessment of the habitat compensation scheme to demonstrate compliance with the requirements of this Directive. This assessment is in addition to the WFD assessment previously undertaken for the MEP itself. The requirement for the provision of compensatory habitat is discussed in the ES for the MEP (Able UK Ltd, 2011) and does not form part of this WFD assessment; rather this assessment considers the potential effects of the habitat compensation scheme on the relevant water bodies designated under the WFD.

1.1 CHERRY COBB SANDS

The intertidal compensation site, Cherry Cobb Sands, will be developed in a 115 ha plot, located on the north bank of the Humber Estuary, opposite the MEP, approximately 4 km south-west of Keyingham and north of Stone Creek. The site currently comprises Grade 2 arable fields bounded by drainage ditches and a flood defence embankment.

1.2 LITTLE OLD HUMBER FARM

The managed wet grassland compensation site, Little Old Humber Farm, will be developed on a plot of four existing arable fields, located between Newlands Lane and the South Ends and Thorney Crofts Drain. The existing hedge crossings and ditches bordering the land are not proposed to be disturbed.

1.3 WATER BODIES

Figure 1, taken from the ES, shows the location of the two habitat compensation sites and the proximal water bodies which include the following:

- Humber Lower (transitional water body);
- Little Humber Area (freshwater artificial water body);
- Keyingham Drain (part of Sands/Keyingham/ Roos Drain from Source to Humber artificial water body);
- Otteringham Drain;
- Burstwick Drain;
- Hull and East Riding Chalk (ground water body).

The Humber Lower water body becomes the Humber Middle water body upriver, whilst to seaward it becomes the Yorkshire South/Lincolnshire coastal water body. The distance from Cherry Cobb Sands to the boundary with the Humber Middle water body is approximately 11 km while Cherry Cobb Sands to the coastal water body is approximately 20 km. These water bodies are concluded to be sufficiently distant that they should not form a part of this WFD assessment. Thus the approach taken in the WFD assessment is that should there be no effects on the Humber Lower water body that are considered significant at water body level then there will equally not be any significant effects on these adjacent water bodies. This initial conclusion is reviewed in the overall conclusions (Section 5).

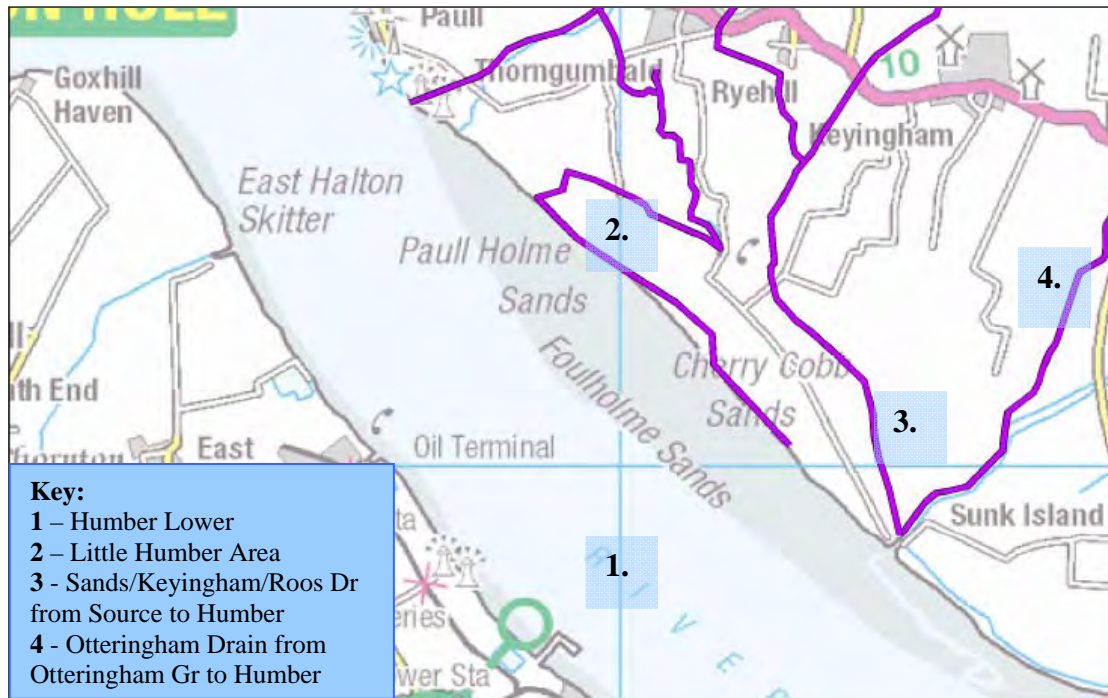


Figure 1 WFD water bodies within and adjacent to the compensation site

This report presents the WFD assessment of the habitat compensation scheme on the water bodies listed in Section 1.3.

2. WFD Assessment Methodology

Presently, there is no specific guidance about the application of the WFD to managed realignment schemes. This WFD assessment is, therefore, based upon the philosophy set out in existing EA guidance (including 'Clearing the waters') and these principles and concepts have been applied to the WFD compliance assessment of the habitat compensation scheme.

The information used to inform the WFD assessment has been informed by the Environmental Statement prepared for the habitat compensation scheme (Able UK Ltd and Black & Veatch 2011) in addition to discussions with the Environment Agency and Defra as well as the expert opinion of the HR Wallingford-led project team.

HR Wallingford has not undertaken a peer review or quality audit of the ES or the associated technical reports. While we have drawn our conclusions making reference to the ES, in cases where the ES conclusions may be unclear or the reasoning behind the impact assessment is not explained we have used our experience to assess the likelihood of an effect on WFD parameters at water body level.

During the assessment it was necessary to make a number of assumptions, as follows:

- The scope of the Environmental Impact Assessment (EIA) had previously been agreed with the appropriate regulators including the EA (and that the EA response highlighted the issues of potential relevance to the WFD).
- The measures that are proposed to change zinc from 'moderate' in 2009 to 'good' in 2015 in the transitional water body will not be affected by the proposed development.

- Where the River Basin Management Plan (RBMP) contains insufficient data for a parameter, for the freshwater water body we have used information from the adjacent water body while for the transitional water body we have assumed the parameter is at good status unless indicated otherwise in Annex B of the RBMP.
- For the transitional water body where data are not available for certain specific pollutants or hazardous priority substances due to their not forming part of routine sediment analysis for dredged material, we have based our assessment on our prediction of the likelihood of them being present at levels above CEFAS Action Level 1.

2.1 POTENTIALLY AFFECTED WATER BODIES

The water bodies in the vicinity of the habitat compensation scheme are listed in Section 1.3 and shown on Figure 1. Of these water bodies a detailed assessment of WFD compliance has been carried out for Humber Lower transitional water body (Section 3), and the Little Humber Area fresh water body (Section 4). The other water bodies were excluded from the detailed assessment for the reasons given below.

2.1.1 *Keyingham Drain, Otteringham Drain, Burstwick Drain*

These water bodies lie outside the boundaries of the habitat compensation site and will not be directly affected by any of the works to create the new habitats (for example the closest water body Keyingham Drain, which is part of the 'Sands/Keyingham/ Roos Drain from Source to Humber' artificial water body, lies 100 m outside Cherry Cobb Sands to the north). However, each drain discharges to the Humber Lower water body. The potential for effect is therefore related to construction activities at the Cherry Cobb Sands site resulting in sediment-laden or contaminated water entering the drains. Keyingham Drain discharges from an outfall via a sluice at Stone Creek and Otteringham Drain discharges via the same outfall and sluice. Burstwick Drain also discharges into the Humber via a sluice that only opens at low tide. As the sluices are closed, except for at low tide, this prevents any estuarine water from entering these water bodies, thus there is no mechanism for potential impacts associated with temporary increased suspended sediment concentrations in the adjacent Humber Lower transitional water.

Notwithstanding the above, the EA is concerned that siltation may occur in front of the sluices that could prevent the water bodies from discharging. This could lead to additional deposition behind the sluice gate which could in time affect the status of the artificial water bodies. This issue is recognised in the ES: Section 36.6.1 refers to 'Construction activities' being 'managed to ensure drainage of surrounding land is not compromised at any time'. It is assumed that this includes ensuring that the current deposition levels in front of the sluice gates are not exacerbated.

2.1.2 *Hull and East Riding Chalk Ground water body*

Section 33 of the ES concludes that there will be no impact from the habitat compensation scheme on the Hull and East Riding Chalk ground water body, in part because of the depth of this primary chalk aquifer which is overlain by around 20 to 25 m of marine and estuarine alluvium and 1 to 5 m of more recent deposits (Black and Veatch, 2012). The ES further concludes that there are no source protection zones within 2 km of the proposed compensation site and it is therefore considered that no source protection zones will be affected by the works at either Cherry Cobb Sands or Old Little Humber Farm. Based on the conclusions of the ES, no further consideration of ground water is included in this WFD assessment.

3. *Lower Humber Water Body*

3.1 CHARACTERISTICS

Reference to the 2009 Humber RBMP confirms that the proposed Cherry Cobb Sands compensation site will, once the sea wall is breached, become part of the Humber Lower transitional water body (ID GB530402609201). This is already designated as a heavily modified water body (HMWB), with both flood protection and navigation cited as the reasons for this designation. The WFD ecological target for the water body is therefore good ecological potential (GEP) and, as with all surface water bodies, the default chemical status objective is good chemical status (GCS). The water body is large, covering an area of 247 km².

3.2 CURRENT STATUS

Annex B of the Humber RBMP confirms that the Humber Lower water body is at moderate ecological potential overall. According to this Annex, the water body is currently failing to meet its WFD objectives in respect of benthic invertebrates, dissolved inorganic nitrogen, zinc and tributyltin. It is also currently at moderate ecological potential because several technically viable mitigation measures are recorded as being 'not in place'. These are all related to the flood protection aspect of the HMWB designation, and comprise measures to preserve and enhance marginal habitats, promote managed realignment, and replace hard defences with soft engineering solutions. Notwithstanding that these measures are related to flood risk management modifications, there may nonetheless be opportunities for other types of development to contribute to improving the ecological potential of the water body.

With the exception of zinc (for which a measure(s) is presumably envisaged although this is not clearly explained in the RBMP), the 2015 WFD target in respect of the other currently failing ecological and chemical parameters is unchanged from the present situation. The reasons cited for this continued failure include disproportionate cost and technical infeasibility – however, it is anticipated that the water body will meet its WFD objectives by 2027.

Insofar as protected areas are concerned, Annex D of the RBMP records the status of protected areas as shown in Table 1.

Table 1 Protected area status

Protected Area	Relevant Legislation	Status
Humber South East Shellfish Water	Shellfish Waters Directive (SWD)	Guideline fail, imperative pass
Cleethorpes Recreational Bathing Water	Bathing Waters Directive (BWD)	Guideline pass; predicted compliance assessment under revised BWD, excellent
Humber Estuary Special Protection Area (SPA) and Special Area of Conservation (SAC)	Birds and Habitats Directives	Humber Estuary SPA not currently meeting water quality objectives; Humber Estuary SAC not meeting abstraction, by-catch, coastal squeeze, diffuse pollution or water quality objectives (however, both are due to meet their Article 4(1c) objectives by 2015)

Annex D of the RBMP does not make clear why protected areas under the Freshwater Fish, Nitrates, and Urban Waste Water Treatment Directives are listed in Annex B for the Humber Lower transitional water body. As there is no obvious mechanism for the managed realignment project at Cherry Cobb Sands to affect the areas that are designated under these Directives, no further assessment of these protected area characteristics was deemed necessary.

3.3 SCOPE OF WFD ASSESSMENT

The potential impacts associated with the habitat creation at the Cherry Cobb Sands site that may affect the Humber Lower water body are considered to be:

- Remobilisation of contaminated sediments within the soil of the compensation site and flushing of pollutants into the estuarine waters after the breach;
- Temporary increases in suspended sediment levels;
- Reduction in levels of dissolved oxygen;
- Removal of aquatic flora which is protected under the SAC, SPA and Ramsar designations;
- Changes to the intertidal zone structure during operation of the Cherry Cobb Sands compensation site;
- Local siltation in front of the sluice affecting adjacent water bodies - discussed in Section 2.1.1.

Using a combination of the thresholds and triggers in 'Clearing the waters' and UKTAG standards, the WFD assessment for the Humber Lower water body has been scoped to include the following WFD parameters:

- Biological quality elements:
 - Aquatic flora (saltmarsh)
 - Benthic invertebrate fauna
 - Transitional fish fauna
- Hydromorphological conditions:
 - Intertidal zone structure
- Physico-chemical conditions:
 - Transparency
 - Oxygenation conditions
 - Nutrient conditions
 - Specific pollutants
- Priority substances:
 - All
- Protected areas:
 - Special Protection Area and Special Area of Conservation.

The following sections consider each of these parameters in turn in order to determine whether there might be deterioration in water body status (defined as a non-temporary effect on status at water body level).

3.4 DETERIORATION IN WFD STATUS

The discussion in this section is based *inter alia* on the information provided in the ES which overall is considered sufficient to identify whether or not there is likely to be a non-temporary effect on status at water body level.

3.4.1 *Biological quality elements*

Aquatic flora (saltmarsh)

There is no mechanism for impact on any of the WFD elements in the Humber Lower water body until the breach is made in the flood defence. This is confirmed in Section 32.6.2 of the ES which states that during the construction phase of the project the habitat creation site will not have an impact on the hydrodynamics and sedimentary regime of the estuary until the final stage when the flood defence is breached. At this point the aquatic flora (saltmarsh) (included in the aquatic flora WFD parameter) will be removed. Construction of the breach in the flood defence requires the removal of 2 ha of saltmarsh which includes both direct removal and any additional loss due to scour

around the mouth of the breach. Although saltmarsh is part of the designated nature conservation sites (SPA, SAC and Ramsar) the area lost equates to 0.1% of the total saltmarsh habitat in the Humber Estuary (627 ha). Section 34.6.1 in the ES states that the loss of saltmarsh will be compensated for and will eventually become part of the Lower Humber water body once new saltmarsh habitat forms. In this instance the consideration of deterioration relates to the effect on the protected area rather than the effect at water body level. It is assumed that this issue is being addressed through the Habitats Regulations Assessment (HRA) which is the appropriate vehicle for assessing the impacts on Natura 2000 sites. Assuming the HRA is accepted by Natural England then the loss of designated saltmarsh habitat will be also considered as acceptable in terms of the WFD.

Benthic invertebrate fauna

Excavation of saltmarsh will result in permanent loss of habitat and its associated benthic communities. Section 34.6.3 in the ES states that this impact has been assessed to be of a local scale restricted to the zone of influence (i.e. the saltmarsh and intertidal habitat within the excavated footprint). All the species recorded are typical of the benthic community within the Humber Estuary, with moderate abundance and diversity of mostly common species with low sensitivity. There are no species of particular conservation importance.

Intertidal habitats will establish quickly once the site is breached which will allow benthic colonies to re-establish and provide additional opportunities for new benthic communities to colonise. This will provide for a net improvement in the status of this currently low scoring biological element.

During construction, the creation of the breach will result in the scouring of a channel immediately in front of the breach location (section 32.6.7 of the ES). Material within this channel is likely to be dispersed into the Humber Lower water body. This process usually takes place over a relatively short period (days to weeks) in response to the discharge of water from the new habitat compensation site. It is assumed that this material will comprise fine muddy sediments that are similar to the large quantity of suspended sediment that is carried in suspension in the Humber. The release of sediment will only occur on the ebb tide as water flows out of the estuary and will therefore be carried seaward, dispersed and deposited in the existing sediment sinks in the Humber. Given the very high volume of dredged material that is disposed of into the Humber as well as the high natural suspended sediment concentration and bedload, this temporary addition of a relatively small quantity of material is not considered to be significant for any of the biological elements at water body level (section 34.6.8 of the ES).

During operation, soils from the agricultural land will enter the water column in the local vicinity of the compensation site, however, the input rate is considered likely to be relatively low as the managed realignment site should be designed to promote deposition rather than erosion. While there is the potential for increases in suspended sediment to result in deposition and smothering of benthic communities outside of the Cherry Cobb Sands site, in practice this is considered unlikely due to the low level of erosion once the site has settled. Further, the sensitivity of the intertidal habitat in the Lower Humber water body is low due to the very high concentrations of suspended sediment already present in the Humber Lower water body.

It is noted that benthic invertebrates are currently the lowest scoring biological element in the Humber Lower water body. The EA has advised that this element was expected to achieve good potential last year (2011) but remain close to the good/moderate status class boundary. This assessment has, therefore, also considered the effect of the habitat creation site at Cherry Cobb Sands on the ability of benthic invertebrates to remain at good status (and, in due course, to move further away from this boundary and more securely into the good status class). The ES reports that there will inevitably be a

delay before the benthic invertebrates in the Cherry Cobb Sands site will be at a level akin to the area that has been lost; however, the area impacted by the breach within the Lower Humber water body is likely to recover more quickly and the combination of this area and the considerably greater additional area of intertidal habitat provided by Cherry Cobb Sands reduces the risk of a temporary reduction in status. It is understood that the EA recognises that the considerable benefits associated with managed realignment are generally associated with a delay.

Fish fauna

Fish fauna in the Humber Lower water body may use intertidal and shallow subtidal areas as spawning or nursery grounds. There is nothing in the ES to suggest that the intertidal area in front of Cherry Cobb Sands is of any greater interest for fish than the many other intertidal areas of the water body. It is not considered likely that there will be either a temporary or permanent impact that is significant at either local or water body level on fish fauna as a result of this project. The seabed in front of the breach will remain available to fish for resting and fish living in the highly turbid Humber Lower water body will be adapted to transient increases in suspended sediments. Given the immediate additional shallow water area that fish may use for sheltering the overall impact will be beneficial.

Conclusion

Subject to confirmation through the HRA that the loss of designated salt marsh is acceptable, the WFD assessment concludes that there will not be a deterioration in status associated with biological quality elements (i.e. a non-temporary effect that is significant at water body level). Further, it is not considered that the habitat compensation scheme will prevent the biological quality elements from reaching or remaining at good potential. It is understood that the EA's internal approach accepts that, whilst the new ecology will take time to adjust, the focus must be on delivering the environmental objectives of the WFD in the longer term.

3.4.2 Hydromorphological conditions

Intertidal zone structure

During the majority of the construction process, the creation of the Cherry Cobb Sands site will not have any impacts on the intertidal zone structure as the new embankments will be built behind the existing flood embankments: the implications of the construction for the Little Humber Area artificial water body are discussed in Section 4. The creation of the breach site will initiate an effect on the hydrodynamic and sediment regime along the frontage of the site as foreshore levels will be lower. A maximum velocity of 2.4 – 2.6 m/s has been predicted in section 32.6.7 of the ES within the first two weeks after the breach. Any saltmarsh remaining near the mouth of the breach will be eroded by the high velocity flows. Local erosion is expected to be 0.5 m over a 5 year period close to the breach (section 32.6.19 of the ES). Over the initial months of operation the north end of Cherry Cobb Sands will encourage deposition of sediments due to lower velocities which will raise bed levels by 0.8 m in 5 years. In itself the processes described above represent a change to the morphology of the intertidal zone and the biological effects of this change have been discussed in Section 3.2.2. It is understood that even after the breach the bed levels at the frontage of the Cherry Cobb Sands site will remain intertidal. There is therefore no permanent loss of intertidal zone and as the biological effects are not considered to be significant at water body level (Section 3.2.2) then the effects on the intertidal zone structure are also not considered to be significant at water body level.

Conclusion

The WFD assessment concludes that there is not likely to be an effect on hydromorphological WFD parameters of the Humber Lower water body that is non-temporary and significant at water body level.

3.4.3 *Physico-chemical conditions and chemical status*

Dissolved oxygen

High levels of suspended sediment in the water column can cause dissolved oxygen levels to decrease and, in extreme cases, this can result in a dissolved oxygen sag. However such effects are generally associated with material containing high levels of organic material for example plant material or sewage. Estuary muds, silts and sands are not usually associated with effects on dissolved oxygen. The ES highlights the presence of a dissolved oxygen sag in the Humber Lower water body and at section 33.16.15 suggests that there may be a small decrease in dissolved oxygen associated with the increases in suspended sediment. However, this decrease is described as being associated with a decrease in primary production caused by a reduction in light attenuation. Such an effect, should it occur, would be highly localised and temporary and therefore it is not considered to be significant at water body level.

Transparency

Increases in suspended sediment concentrations can affect light penetration. However as indicated in section 33.6.4 of the ES, the Humber Lower water body has a low sensitivity to an increase in suspended sediment concentration due to the existing high concentrations of suspended sediment and the size of the water body. The impact would be low given the size of Cherry Cobb Sands and the localised area that would be affected compared to the size of the water body.

Nutrients were scoped into the assessment due to the conversion of previous agricultural land which may contain high levels of nutrients. Nutrients are discussed along with Specific Pollutants and Priority Substances in the following section.

Specific pollutants and priority substances

Bed level changes (erosion/deposition) will begin to occur over the first months of operation. The north end of the site is anticipated to incur deposition of sediments due to low velocities. At the southern end of the site in the vicinity closest to the breach, local erosion of the bed will occur due to high velocities (Section 32.6.19 of the ES). In areas of erosion potential contaminants within the soils of the site could remobilise and enter the water body from this “grade 2 agricultural land” site (Section 31.5.16 of the ES). This could lead to flushing of pollutants into the estuarine waters after the breach and discharge into the Humber during the first few tidal floods. The Ground Investigation Study carried out in August 2011 (Section 33.5.16 of the ES) highlighted that although the 12 samples inside the Cherry Cobb Sands site contained contaminants below the CEFAS guideline Action Level 1 required standard, two nearby (outside the site in the north western fields) samples contained levels of contaminants (zinc, copper, lead and total petroleum hydrocarbons) above the standard level (Section 33.5.16 of the ES). Furthermore, the sampling “did not analyse the presence of pesticides and fertilisers” (Section 33.8.4 of the ES) and “samples taken were limited to a certain extent due to restricted access to land during the survey” (Section 33.5.16 of the ES). In general the site is not thought to have levels of contaminants present higher than the CEFAS Action Level 1 but there is a data gap relating to pesticides and fertilisers.

Conclusion

There is no evidence to suggest that the erosion of soil from the Cherry Cobb Sands site presents a pollution risk to the Humber Lower water body. However it is noted that the soil survey was constrained due to access restrictions and that there is a data gap with respect to pesticides and nutrients. The interim conclusions are that it is unlikely that specific pollutants would have a non-temporary effect on the Humber Lower water body that is significant at water body level and that it is also very unlikely that release of soil-bound pollutants would affect chemical status. However, it is recommended that the WFD assessment is updated once the secondary ground assessment has taken place prior to the commencement of works at the site.

3.4.4 Protected areas

Natura 2000 designated sites

The loss of designated saltmarsh that forms part of the Natura 2000 site is discussed in Section 3.4.1 which concludes that with respect to protected area the consideration of deterioration relates to the effect on the protected area rather than the effect at water body level. It is assumed that the loss of the designated saltmarsh issue is being addressed through the HRA which is the appropriate vehicle for assessing the impacts on Natura 2000 sites. Assuming the HRA is accepted by Natural England then the loss of designated saltmarsh habitat will be also considered as acceptable in terms of the WFD.

Shellfish waters

Protected shellfish waters have been scoped out as commercial fishing operations occur over 13 km south-east at Cleethorpes and Grimsby (Section 33.5.12 of the ES).

Bathing waters

Bathing waters have also been scoped out as the closest beach is 13 km to the south-east of the site at Cleethorpes.

Other protected areas

The Humber Lower water body does not contain any recorded nutrient sensitive areas and thus this protected area has been scoped out.

3.4.5 Contributing to Improvements in WFD status

In addition to determining whether or not there will be an effect on status at water body level, it is also necessary to consider whether it is possible for the proposed compensation site to be established in such a way as to contribute to improving the status of failing WFD parameters in a cost effective and not disproportionately costly manner. The failing parameters for the Humber Lower site are described in section 3.2 and are benthic invertebrates, dissolved inorganic nitrogen, zinc and tributyltin.

The Cherry Cobb Sands reclamation site has been chosen based on the ability to maximise long term creation of a SAC feature by creating a target of 79 ha of sustainable mudflat. This would provide a 2:1 ratio of creation:loss and therefore provide an overall benefit to the Lower Humber water body as it will contribute to some improvements by benefiting marginal aquatic habitats and also help to realise the opportunities associated with managed realignment (albeit that the driver in this case is not flood defence). Therefore the creation of this habitat creation scheme will, once established, contribute to some improvement towards the failing benthic invertebrate parameter. In turn this may contribute to an improvement in ecological value for fish fauna.

3.4.6 Effect on mitigation measures 'not in place'

The Humber RBMP identifies the requirement for mitigation measures related to the flood protection aspect of the HMWB designation. These measures are to preserve and enhance marginal habitats, promote managed realignment, and replace hard defences with soft engineering solutions. It is considered that the Cherry Cobb Sands site (which at 79 hectares is significantly greater than the area of intertidal habitat lost within the water body) will complement and support the achievement of the proposed mitigation measures. Further managed realignment is one of the identified mitigation measures not in place and the breach in the flood defences will provide a frontage of more natural defences which also directly contributes to the mitigation measures that are not in place. The habitat creation site as Cherry Cobb Sands will not, therefore, compromise the

mitigation measures 'not in place' for the Humber Estuary; rather it will make a direct contribution to the achievement of those measures.

4. *Little Humber Area Water Body*

4.1 CHARACTERISTICS

The Little Humber Area water body (ID GB104026066550) is a freshwater surface water body in the Hull and East Riding catchment. It is designated as an artificial water body (AWB) as it is a man-made drainage ditch designed to capture seepage (through the flood embankment) and surface water runoff. As such, in WFD terms, the ecological objective for the water body is to meet good ecological potential (GEP) rather than good ecological status.

It is described in the river basin management plan as being 12 km in length and 9.7 km² in area.

According to Annex B of the Humber RBMP, the only protected area designation associated with this water body is a designation under the Nitrates Directive. However, the ES (Section 33.5.14) states that there are no nitrate (nutrient) sensitive areas (or Nitrate Vulnerable Zones) in the area surrounding the compensation site. This was confirmed in discussion with the Environment Agency (personal communication, 2012) and no further consideration is therefore given to the Nitrates Directive in this report.

4.2 CURRENT STATUS

Annex B of the RBMP records the ecological potential of the Little Humber Area AWB as being moderate with a target of moderate ecological potential by 2015 (because measures are disproportionately expensive and technically infeasible) but reaching good ecological potential (GEP) by 2027. However, the RBMP provides very little information on the ecological characteristics and status of the water body. The current status is moderate potential (uncertain) although it is noted that the quality and dynamics of flow 'supports good'. Chemical status 'does not require assessment': this can be interpreted as meaning that – in the absence of data showing otherwise – the water body is considered to be at relatively low risk of failing to meet good chemical status with regard to contamination by priority or priority hazardous substances.

Section 35.8.28 of the ES describes the pattern of terrestrial habitat and estuarine fringe in the vicinity of the Little Humber Area water body as being 'characteristic of Holderness' and 'of relatively low ecological importance'. In the absence of water body-specific information, the status of the adjacent water body (Keyingham Drain, part of the 'Sands/Keyingham/ Roos Drain from Source to Humber' artificial water body; ID GB104026067230) was therefore reviewed to provide some insight into the likely ecological status of the Little Humber Area AWB. It is acknowledged, however, that adjacent water bodies can be very different in character and it is therefore stressed that this overview is designed to provide an indication only.

The Sands/Keyingham/ Roos Drain from Source to Humber AWB is classified as being at moderate ecological potential overall (very certain). It is listed as being at bad potential due to the status of macroinvertebrates, but no measures are required because the 'bad' status is directly related to the designation of the water body as a AWB (i.e. the nature of its drainage purpose is not compatible with achieving a higher status in this regard). The AWB is also at moderate physico-chemical potential due, *inter alia*, to issues with dissolved oxygen (poor), phosphate (poor), and ammonia (moderate; specific pollutants). According to the RBMP measures to deal with these failures would be disproportionately expensive; no improvement is therefore foreseen in this water body before 2015. However, whereas the Little Humber Area AWB is

described as being 'high' for hydrology, the Sands/Keyingham/ Roos Drain AWB is described as being 'not high'. Two mitigation measures which are currently 'not in place' but which could contribute to improving its status notwithstanding the designation of the Sands/Keyingham/ Roos Drain as an AWB are: structures or mechanisms to enable fish to access the water body; and a sediment management strategy. Finally, as with the Little Humber Area AWB, chemical status in the Keyingham Drain area 'does not require assessment'.

4.3 SCOPE OF WFD ASSESSMENT

Before carrying out the scoping exercise for the WFD compliance assessment for the Little Humber Area water body, it was necessary to establish the basis for the assessment. Specifically, it had to be decided whether the managed realignment of the flood defence and the diversion around 1.5km of the soke dyke AWB to its rear constitutes 'deterioration' in WFD terms and/or whether there is a water body 'type change' insofar as the current location of the soke dyke is concerned. In both cases, water body boundaries will need to be amended accordingly.

The European Commission's recent FAQ paper on the relationship between the WFD and the Birds and Habitats Directives¹ points out that there are certain situations in which changes to the characteristics of a water body represent a change in water body type rather than a deterioration in status. The three examples given are:

- when restoring a WFD water body to make it 'more natural' would lead to the loss of protected habitats or species which have developed in an artificially modified or managed environment (e.g. cut off ox-bows or freshwater marshes in a reclaimed area protected by an artificial flood bank);
- when a compensation requirement under HD Art. 6.4 will lead to a water body type change (e.g. from a freshwater marsh to a tidal lagoon);
- when managed realignment promoted by a shoreline management plan would lead to a change from an impounded (low turbidity freshwater) river to a saline, high turbidity transitional water body.

Taking into account the comments made in the FAQ paper together with relevant aspects of the CIS Guidance Document Exemptions to the (WFD) Environmental Objectives², and following discussions with Defra and the EA, this assessment assumes that the diversion of the Little Humber Area water body does not represent deterioration in status *per se*. The background to this assumption is as follows:

- both the WFD and the Habitats Directive accept and make provision for the physical modification of water bodies subject to certain criteria being met;
- the Cherry Cobb Sands compensation site is being proposed, along with the temporary site at Old Little Humber Farm, to meet the requirements of the Habitats Directive;
- managed realignment is the accepted/preferred approach to the creation of new intertidal habitat;
- most managed realignment projects involve retreat onto low lying land that would originally have been a part of the wider estuarine system;
- managed realignment typically involves modification to or the loss of the drainage ditch (soke dyke) to the rear of the existing flood defence;

1

http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/thematic_documents/biodiversity_water/faq-wfd-bhd_20dec2011/ EN_1.0_&a=d

2

http://circa.europa.eu/Members/irc/env/wfd/library?l=/framework_directive/guidance_documents/documentn20mars09pdf/ EN_1.0_&a=d

- the WFD recognises and makes provision for situations where the requirements of other environmental Directives are different to or more stringent than those of the WFD;
- in a situation where the WFD could compromise the requirements of the Habitats Directive a balance has to be achieved/a pragmatic solution sought;
- in this case, it is impossible to progress the managed realignment and to maintain the relevant length of the Little Humber Area AWB body *in its current position*; the affected stretch of the AWB will necessarily become a part of the adjacent Lower Humber transitional water body (a type change), and a new length of AWB will need to be constructed to fulfil the soke dyke drainage function to the rear of the new flood defence. In both cases, existing water body boundaries will need to be amended in the RBMP.

This approach corresponds to the internal position taken by the EA for their own managed realignment schemes (EA, personal communication, 2012): where realignment is needed under the Habitats Directive, the requirements of the WFD should not prevent or unduly hinder this action from being taken. The EA internal approach further accepts that, whilst the new ecology will take time to adjust, the focus must be on delivering the environmental objectives of the WFD in the longer term. In this case, this will apply to both the Lower Humber (transitional) and the Little Humber Area freshwater water bodies.

The scoping process identified a possible causal link in respect of the following WFD parameters in relation to the Little Humber Area:

- Biological quality elements:
 - Macrophytes and phytobenthos
 - Benthic invertebrate fauna
- Hydromorphological conditions:
 - Hydrological regime (quantity and dynamics of flow; connection to ground water bodies)
 - River continuity
 - Morphological conditions (river depth and width; river bed structure and substrate; riparian zone structure)
- Physico-chemical conditions:
 - Oxygenation conditions
 - Salinity
 - Nutrient conditions.

Further, whilst the RBMP concludes that the chemical status of the Little Humber Area AWB 'does not require assessment' for the purposes of the classification, the potential for contamination as a result of the proposed development (realignment of the flood embankments, diversion of the soke dyke and creation of the temporary compensation area) nonetheless needs to be considered.

The following sections consider each of these parameters in turn in order to determine whether there might be deterioration (defined as a non-temporary effect on status at water body level).

4.4 NO DETERIORATION IN WFD STATUS

Given the lack of data in the RBMP, the ES provided a key source of information in assessing whether the proposed diversion of the Little Humber Area AWB might cause deterioration (i.e. a non-temporary effect on status at water body level).

4.4.1 *Biological quality elements*

Taking into account (i) adjacent and surrounding land uses (ii) the comment in the ES about the area in the vicinity of the Little Humber Area AWB being of low ecological interest and (iii) the documented conditions in nearby water bodies, it seems unlikely that either the macrophytes and phytobenthos or benthic invertebrate fauna will be at good status in the section of the Little Humber Area water body which is to be diverted. In the meantime, Section 33.8.7 of the ES confirms that the intention for the newly diverted soke dyke is to achieve similar or improved conditions compared to those existing (to be based on advice from the EA, during detailed design stage, on measures to maintain or improve water status).

The WFD is particularly concerned with preventing deterioration in the status of water bodies over the medium-long term. In determining what constitutes a 'temporary' effect on status (e.g. due to construction activities) the CIS Environmental Objectives paper (*op.cit*) suggests that reference be made to the frequency of monitoring of (the relevant) WFD quality elements. For macrophytes/phytobenthos and for benthic invertebrate fauna, the monitoring frequency is every three years. Assuming, therefore, that the measures to be taken to ensure the diverted water body achieves similar or improved conditions are effective within three years, it can be concluded that there will be no deterioration in status in the new (diverted) stretch of the AWB.

Section 4.4.2 and 4.4.3 further confirm that there will be no deterioration in the WFD physico-chemical and hydromorphological supporting elements affecting the upstream part of the existing Little Humber Area AWB, not least because of the north-west to south-east direction of flow in the water body. Given also that there will be no deterioration (and possibly an improvement) in the WFD status of the new (diverted) soke dyke, it can be concluded that there will be no overall deterioration in the biological quality elements of the existing AWB.

4.4.2 *Hydromorphological conditions*

Hydrological regime and river continuity

According to Section 36.5.6 of the ES, the existing soke dyke runs behind the entire length of the flood defence embankment. However, it is only identified as a WFD water body over part of its length. In other words, the length of AWB which is to be diverted in fact continues, as a non-WFD ditch, out of the site and past the radar mast before turning northwards and connecting in to Cherry Cobb Sands Drain, just prior to it discharging into Stone Creek. Given that the diverted soke dyke will therefore connect into the existing drainage system at both ends, the flow from the upstream (unaffected) part of the Little Humber Area AWB will pass through the diverted channel and into Stone Creek as it does at present. There will therefore be no deterioration insofar as hydrological regime and river continuity are concerned, and the ES similarly concludes that there will be no implications for ground water.

Morphological conditions

With regard to morphological conditions (river depth and width; river bed structure and substrate; riparian zone structure), the ES identifies an existing problem with siltation affecting the drainage ditches and other water bodies in the study area. The construction process (i.e. the construction of the new embankment, the excavation for the diversion of the soke dyke, and the soil moving works at the terrestrial compensation site at Old Little Humber Farm) all have the potential to exacerbate this problem. Section 36.6.1 of the ES confirms that management measures will be put in place to ensure that the drainage function of the various water bodies is not compromised: this implies that measures will be taken to reduce the sediment load in run-off from the construction site. Assuming that such measures are agreed in advance with the EA and implemented in an effective manner, there is no reason to expect a non-temporary

deterioration in status in either the diverted section of the AWB or the upstream length of the Little Humber Area AWB.

Appropriate measures will also need to be put in place to prevent accumulation of sediment on the estuary side of the sluice affecting the discharge from Stone Creek, so as to ensure that these AWBs are not detrimentally affected by conditions in the adjacent transitional water body. Again, assuming these mitigation measures are included as part of the works, there should be no residual effect on the ability of the AWBs to meet their WFD objectives.

4.4.3 *Physico-chemical conditions and chemical status*

Oxygenation

With regard to oxygenation issues, increased suspended sediment concentrations can affect light penetration and can depress oxygen levels. However, as indicated above, Section 36.6.1 of the ES implies that measures will be taken to reduce sediment in run-off from the construction site – if this is the case, any temporary effects on oxygen levels should be minimised. Further, there should be no effects on the remainder of the Little Humber Area AWB as the flow direction is from NW to SE (i.e. away from the unaffected stretch of water body). In the medium-long term, the ES confirms the intention that the diverted soke dyke will be no worse and ideally improved in status from the current situation. Assuming measures are put in place both to minimise temporary construction-related run-off or resuspension of sediments and to maintain or improve post-construction water body status, deterioration in water body status would not be expected.

Salinity

The ES (Section 33.6.17) reports that any saline influence affecting the diverted AWB will be minimised through careful design of the embankment. However, given that the function of both the existing AWB and the new diversion will be to capture seepage and surface water runoff, some saline influence is likely to be unavoidable. The RBMP already recognises this in the adjacent water body insofar as no measures are proposed (e.g. to improve macroinvertebrates) because these would not be compatible with the function of the water body as a soke dyke. No deterioration from the current status of the Little Humber Area AWB is therefore anticipated.

Nutrients

With regard to nutrients, no water body specific data are available. However, the current 'intensive arable' use of the surrounding area (including the temporary compensation site at Old Little Humber Farm) suggests that there is potential for nutrient enrichment. Whilst there may be some local, temporary reduction in fertiliser inputs, etc. during the period that the Old Little Humber Farm site is being used for compensation, overall the diversion of the soke dyke is unlikely to affect the long-term nutrient status at the level of the water body. Neither significant improvement nor deterioration from the current status is therefore anticipated.

Conclusion

Taking into account all the above, it is not expected that the realignment of the embankment and the associated diversion of the soke dyke will cause deterioration in or otherwise affect the ability of the Little Humber Area artificial water body to reach its ecological status (potential) objectives (i.e. as no measures for this AWB are discussed in the RBMP, there is similarly no likelihood that the proposed works will prevent other planned WFD measures from achieving improvements). Article 4(7) of the WFD does not therefore need to be applied because the diversion will fulfil the same function as the current AWB and the status of the water body will be maintained or improved.

The length of the Little Humber Area water body that will become part of the compensation site will undergo a type change from the freshwater AWB to the adjacent Lower Humber (transitional) heavily modified water body (HMWB). As discussed above, this type change does not represent deterioration: rather the area will in future need to meet the relevant transitional water body objectives discussed and assessed in Section 3.

Specific pollutants and priority substances

The RBMP reports that the chemical status of the Little Humber Area AWB 'does not require assessment'. The potential for the construction of the embankment and the diversion of the soke dyke to cause deterioration nonetheless needs to be assessed.

The ES highlights a number of potential issues with regard to possible deterioration in chemical status. Whilst the effective management of plant and equipment during the construction process described in Section 33.8.2 of the ES should ensure that there is no deterioration due to pollution from these sources, of more concern is the possibility that some of the existing ditches in and around the Cherry Cobb Sands compensation site may previously have been land-filled. Information presented in the ES indicates that:

- elevated levels of copper, lead, zinc and total petrol hydrocarbons are present in the north-western fields just outside the proposed compensation site (Section 33.5.16);
- a geophysical survey (Annex 40.3) indicates magnetic anomalies in areas where old creeks used to exist: some of these channels appear to have been backfilled with highly magnetic material; and
- access restrictions meant that not all parts of the site could be sampled.

The proposed risk management strategy described in the ES is to carry out a secondary ground investigation prior to commencement of the works (section 33.5.18). If evidence of contamination is identified, the material will be removed and will be subject to bio-remediation. Even if no contamination is found in the additional surveys, machine operators will still be instructed to stop work if contamination is encountered subsequently.

The ES also highlights the possibility of contaminated material being encountered during construction of new flood embankments or wet grassland at Old Little Humber Farm (i.e. due to pesticides or fertilisers having been used on agricultural land). However, the site investigation did not analyse the presence of pesticides and fertilisers. These parameters will therefore need to be included in the proposed pre-construction site investigation discussed in Section 33.8.4 of the ES.

Conclusion

The focus of the ES is primarily on the potential effects of any contaminants present in the compensation area on the Lower Humber transitional water body. The fresh water bodies are not fully considered. However, assuming the same approach to potentially contaminated land is adopted for the construction of the realigned embankment and the diverted soke dyke as is proposed for the compensation site (i.e. more site investigations plus mitigation as necessary), it is not expected that there would be any deterioration in the ecological potential or chemical status of the Little Humber Area AWB.

4.4.4 Contributing to improvements in WFD status

In addition to determining whether or not there will be an effect on status at water body level, it is also necessary to consider whether it is possible for a project (in this case the

diversion of part of the AWB) to be carried out in such a way as to contribute to an improvement in the parameters for which the water body is failing.

Whilst there is very little information in the RBMP to indicate exactly which parameters are currently failing to meet their WFD objectives for the water body, the ES does confirm that advice will be sought from the EA on the measures required to maintain or improve the status of the soke dyke. Whilst it is unlikely that the diversion of the AWB would be able to deliver any significant improvement in terms of nutrients, it may be possible to design the embankment so as to reduce the likelihood of saline seepage or to incorporate buffer strips thus reducing the local runoff of sediment. Other opportunities for improvement of physico-chemical or hydromorphological characteristics may be identified which in turn could contribute to improvements in biological elements such as macrophytes and phytobenthos or benthic invertebrate fauna.

5. Conclusion

HR Wallingford has reviewed the relevant ES chapters and associated technical reports prepared for the MEP habitat compensation scheme site and concluded that, for the Cherry Cobb Sands site, the project is not likely to have a non-temporary effect on the status of WFD parameters that is significant at water body level subject to confirmation of the following:

- the acceptability of the HRA;
- confirmation of a lack of contamination from the secondary ground assessment.

The project is not predicted to cause deterioration to the current status of the Humber Lower water body nor should it prevent it achieving its future status objectives. Further, the intertidal habitat creation is likely to contribute to future improvements in WFD status as the site, once established, could improve the ecological value for benthic invertebrate communities.

Insofar as the Little Humber Area artificial water body is concerned, there should similarly not be any deterioration in status or any effect on the ability of the water body to meet its WFD objectives assuming that the following mitigation measures discussed in the ES are effectively implemented:

- the intention, stated in Section 33.8.7 of the ES for the newly diverted soke dyke to achieve similar or improved conditions compared to those existing (to be based on advice from the EA, during detailed design stage, on measures to maintain or improve water status);
- measures to manage sediment run-off and accumulation indicated in Section 36.6.1 of the ES including appropriate measures to prevent the exacerbation of the accumulation of sediment on the estuary side of the sluice affecting the discharge from Stone Creek;
- measures to reduce saline seepage mentioned in Section 33.6.17 of the ES;
- measures to manage plant and equipment to avoid pollution during the construction process described in Section 33.8.2 of the ES.

The WFD assessment also assumes that there will be a satisfactory outcome of the proposed pre-construction site investigation discussed in Sections 33.5.18 and 33.8.4 of the ES and any additional associated mitigation measures.

Finally, with respect to adjacent water bodies, the WFD assessment concludes that there is no mechanism for any effect of the habitat compensation scheme or associated works in the Humber Lower transitional water body, on the status of the adjacent

Humber Middle transitional and Yorkshire South/Lincolnshire coastal water bodies. As previously states measures will, however, need to be put in place to prevent the exacerbation of local accumulation of sediment on the estuary side of the sluice at Stone Creek detrimentally affecting the discharge of the adjacent artificial water bodies.

6. *References*

Clearing the waters: marine dredging and the Water Framework Directive

www.environment-agency.gov.uk

www.wfduk.org

Environmental Impact Assessment chapters and technical reports:

Able UK Ltd and Black & Veatch (December 2011), Environmental Statement Vol 2, Chapter 28: Description of Development (Draft). Provided by Able UK Ltd to HR Wallingford Ltd (March 2012)

Able UK Ltd and Black & Veatch (December 2011), Environmental Statement Vol 2, Chapter 32: Hydrodynamic and Sedimentary Regime (Draft). Provided by Able UK Ltd to HR Wallingford Ltd (March 2012)

Able UK Ltd and Black & Veatch (December 2011), Environmental Statement Vol 2, Chapter 33: Water and Sediment Quality (Draft). Provided by Able UK Ltd to HR Wallingford Ltd (March 2012)

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Able UK Ltd and Black & Veatch (December 2011), Environmental Statement Vol 2, Chapter 36: Drainage and Flood Risk (Draft). Provided by Able UK Ltd to HR Wallingford Ltd (March 2012)

Able UK Ltd and Black & Veatch (December 2011), Environmental Statement Vol 2, Chapter 44: In-Combination (Draft). Provided by Able UK Ltd to HR Wallingford Ltd (March 2012)



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Your ref: IPC-Pro-11
Date: 29 May 2012

Dear Richard

**Water Framework Directive Assessments
Marine Energy Park, Killingholme Marshes, North Lincolnshire**

We have now reviewed the Water Framework Directive (WFD) Assessment for the Marine Energy Park (MEP) Habitat Compensation Scheme at Cherry Cobb Sands.

At the same time we have also revisited the original MEP WFD Assessment and the specific areas of the Environmental Statement (ES), which you directed us to within your signposting report in relation to our previous WFD related comments.

Habitat Compensation Scheme WFD Assessment (ref: TN DHM6835-01 R1)

We have the following comments to make in respect of this document:

3.2 Zinc measure. The reason behind the likely improvement in this element without any noticeable published measures is due to the closure of the point source causing the problem. The predicted improvement is based on the source being removed, rather than a 1st cycle measure.

3.4.1 page 6 – The first paragraph states that 0.1% of the saltmarsh will be lost as a result of the proposal. This appears incorrect as the loss of 2ha from 627ha is 0.3%. This part of the WFD assessment cannot be signed off as acceptable to the Environment Agency until Natural England confirm the Habitats Regulation Assessment (HRA) is acceptable.

Page 6 Benthic invertebrates. The evidence from Managed Realignment sites on the Humber to date is that the benthic invertebrate population is one of the later species to colonise the created sites. In the short-term (1-5 years) they would not contribute significantly to the benthic invertebrate population of the Lower Humber water body. In

the medium-term they would make a contribution, but as the site undergoes succession from mudflat to saltmarsh the benthic invertebrate population would again become a paucity in species and density within the site. In his presentation on 16 May 2012, David Keiller said that his modelling shows the creation of only 43 ha of intertidal mudflat after 5 years (whereas the target for sustainable intertidal mudflat at the ratio of 2:1 is 76 ha) and that this is likely to be significantly less over 10 years. David Keiller's interpretation of the modelling results gave a clear indication that the compensation of intertidal mudflat after 10 years is likely to be less than a ratio of 1:1. The WFD assessment will need amending in the light of this.

Page 6 Benthic Invertebrate fauna, the second paragraph states that there will be a net improvement in the status of this currently low scoring biological element. We would request that more detail on the timing for the net improvement to take place is provided. It is our opinion that it is unlikely to show any improvement in the first WFD monitoring cycle post breach, and possibly not in the second monitoring cycle either.

Page 7 end of first paragraph – the risk in a reduction in status may depend upon when the breach in the compensation site takes place in relation to the reclamation of the intertidal area at AMEP. This is not currently reflected in the assessment, but if the reclamation takes place ahead of the breach, this statement does not necessarily hold true. We would request that this point is addressed.

Page 7 Conclusion – As above, we will not be able to sign the WFD assessment off as acceptable until we have confirmation of HRA acceptance.

Page 8 3.4.3 Specific Pollutants and Priority Substances – We note the need for additional ground samples to confirm CEFAS Action Level 1 and to include pesticides and fertilisers and we look forward to receiving these in due course.

Page 8 Conclusion – we note the interim conclusion drawn and we are likely to request that an updated WFD assessment is secured through a condition in the DCO if this is not received before determination.

Page 9 – It would be helpful if you could provide further clarity in respect of the figures provided in the report. The site area is quoted as being 115 hectares, and the target at Cherry Cobb Sands is to create 79 hectares of sustainable mudflat, whilst removing 2 hectares of saltmarsh in its construction. It is not clear from the report what portion of the 115 hectares will be mudflat and what proportion will be saltmarsh.

Page 10 4.1. We have sent a map to HR Wallingford showing the nitrate vulnerable zones. They may need to update this section following receipt of the map.

Page 16 Paragraph 1 "The ES does confirm that advice will be sought from the EA on the measures required to maintain or improve the status of the soke dyke." We would expect to see the required measures within the Ecological Management and Maintenance Plan.

Page 16 Section 5 Conclusion – we concur with the conclusion that the following two bullet points are critical to the validity of the assessment:

- The acceptability of the HRA;
- Confirmation of a lack of contamination from the secondary ground assessment.

We can therefore confirm that we will not be able to give our full approval of either WFD assessment until the above points have been addressed.

Cont/d..

It appears from the AMEP WFD assessment that the evidence presented is purely based upon guidance for the marine environment. It would seem that in the absence of specific Transitional guidance it would be more appropriate to use a combination of both marine and fluvial guidance. Our fluvial guidance refers to the following additional considerations: critical habitat for the water body; cumulative impacts within the water body, and expert judgement. The application of a trigger is not a reason to ignore expert judgement within the assessment. From the above Technical Note it is unclear how conclusion has been derived as the assessment relies upon the ES. It would be helpful for the regulators if, where the ES is relied upon to form the basis of the WFD Assessment that as a minimum the specific section of the ES is referred to or extracts are cited. At present the assessment appears to be more of a screening exercise as it is difficult to follow the arguments presented and hence to assess the validity of them under the Directive.

In addition, at present there are two WFD assessments. Our advice would be to compile this into one WFD assessment looking at all parts of the project (reclamation, dredging, disposal, compensation site creation) in order that the different parts of the project that are interlinked are adequately assessed in terms of WFD. For example Benthic Invertebrates in both assessments (DER47112-01 and TN DHM6835-01 R1) need to cross-reference each other, but at present do not. If the benthic invertebrate improvement suggested in TN DHM6835-01 R1 is realised, it should have been assessed in terms of the impact of the remainder of the project on the benthic invertebrate community. The evidence for this is not succinctly presented at present. As a minimum the two documents should cross-reference each other, but our preference would be for the points below to be addressed whilst combining a WFD assessment for the total project.

Biological Elements

Benthic invertebrates-

We have concern with regard to the impact on the biological elements. The lowest scoring biological element for the Humber Lower water body is for benthic invertebrates. The only other classification for the biological elements in this water body is for fish, which is currently at Good status. The Benthic Invertebrate Classification for the Humber Lower is Moderate but it is borderline reaching Good status. It is likely that the classification should actually be elevated to Good status as of this year. However, this element will be just inside the Good status boundary with Moderate status. This means with any improvements in sediment quality over the next four years that the biological element could comfortably be in the Good status classification for the benthic invertebrate element. Activities that work against this aim work against the ability to maintain and reach Good status. Our monitoring frequency is yearly and we currently define a non-temporary effect as an impact lasting greater than a year.

By achieving Good status for benthic inverts, the overall monitored biological elements will be reaching Good status. It could be viewed that any major impacts to the benthic invertebrate communities could be considered as detrimental to achieving and maintaining good status for that element and must therefore be considered carefully. With this information in mind, we would request that further consideration be given to the effects of benthic invertebrates for the water body in the WFD deterioration assessment paper - for example, highlighting areas of impact and impact assessment in

the background of a water body that is on a status boundary for that element. Much of this may well be borrowed from the Environmental Statement; however it must be put in the context of the Water Framework Directive.

At present the explanation enclosed within Technical Note DER4712-01 is insufficient for the Environment Agency to accept the argument presented. Table 4.a (Disposal) indicates an impact on benthic invertebrates is unlikely, but in Table 4.b (Disposal) is scoped into the ES. There is no further evidence of the full WFD Assessment we would expect for this activity in the documents present. It appears the argument being made is that the impact on this can be screened out. The evidence to substantiate this view point is not presented. In addition Technical Note TN DHM6835-01-R1 indicates that the creation of a compensation site will ensure there is no impact on benthic invertebrates and that this risk is being mitigated. The sub-tidal element of the impact from AMEP is being compensated at a ratio of 1:1. The impact on benthic invertebrates from both non-erodible and erodible deposition is likely to extend to 18 months (based on Appendix 2 in Annex 7.6). The compensation site will not commence construction until either the DCO is granted or planning permission is sought by an alternative means. The compensation site is not going to have a rich benthic invertebrate community in the early years (years 1-5 as a minimum). This means that there is a potential impact on benthic invertebrates that would span a period from the onset of marine works in the short-term. As we stated in our letter of 25 July 2011, our monitoring frequency is yearly and we currently define a non-temporary effect as an impact lasting greater than a year.

We expect to see a detailed assessment of the impact of the entire project (reclamation, dredging, and the compensation site) on benthic invertebrates within the Lower Humber water body, explaining the reasoning behind the argument presented. It is our understanding that there are potential impacts on benthic invertebrates in the short and longer-term (as the effectiveness of the compensation site reduces), with a potential improvement in the medium term as the colonisation of the compensation site takes place.

Other Aquatic Flora (e.g. Saltmarsh and seaweed)

At present it is not possible to understand the argument made with regard to this biological element within the WFD assessment. The assessment is summarised in the table, but with no evidence presented, and no reference to where in the ES this can be found. It is difficult, at present, to link the argument between the mitigation presented within TN DHM6835-01 R1 and DER4712-01. This needs to be improved.

Fish

At present it is not possible to understand the argument made with regard to this biological element within the WFD assessment. The assessment is summarised in the table, but with no evidence presented, and no reference to where in the ES this can be found.

Hydromorphological elements supporting biological elements

Morphological Conditions

Depth Variation

No screening or assessment of this appears to have taken place. Evidence needs to be presented as to how the disposal of both erodible and non-erodible material will affect the depth variation as a consequence of the development. There are numerous dredge

specific mitigation measures within the Humber Lower water body. How are these being applied to this development? How will the footprint of the reclamation affect the depth variation in the Humber Lower water body as a consequence of changes in flow dynamics?

Bed

No screening or assessment of this appears to have taken place. Evidence needs to be presented as to how the disposal erodible and non-erodible material will affect the bed of the estuary as a consequence of the development. There are numerous dredge specific mitigation measures within the Humber Lower water body. How are these being applied to this development? How will the footprint of the reclamation affect the bed of the estuary in the Humber Lower water body as a consequence of the development?

Intertidal Zone Structure

Screening has been undertaken for this element, but concluded that the likelihood of a non-temporary effect is unlikely. At present it is not possible to understand the argument made with regard to this hydromorphological supporting biological element within the WFD assessment. The assessment is summarised in the table, but with no evidence presented, and no reference to where in the ES this can be found. It is difficult at present to link the argument between the mitigation presented within TN DHM6835-01 R1 and DER4712-01. This needs to be improved.

Tidal Regime

Wave exposure

Reference is made within the ES of the potential impact on tidal regime within Annex 8.1 specifically at the AMEP site. Is not clear within the ES of the impact on the wider estuary, and specifically the Humber Lower water body. From Tables 4.a and 4.b within the assessment it is not possible to understand the evidence being presented to conclude that it is unlikely for a non-temporary effect. If the tidal regime is permanently affected, we would expect to see the argument presented within the assessment as to why this is not significant at the water body level.

Water Dependent Features

We agree that this can be based on the outcome of the HRA, but you need to consider the Humber Lower water body in this assessment, and whether there is anything unique to the Humber Lower water body. It is worth noting that the Humber Lower water body does not coincide with the Outer part of the estuary as far as the Habitat Regulations are considered, but overlaps with the Humber Middle part of the estuary. The loss of mudflat in the Humber Lower water body does need to be considered in terms of the biological quality elements.

Not affect delivery of mitigation measures as outlined in the Humber Lower water body in Annex B.

As indicated in our response on 25 July 2011, the assessment also needs to ensure that the scheme will not compromise the mitigation measures 'not in place' for the Humber estuary. Even though, as HR Wallingford point out, the mitigation measures for this water body relate to flood protection, it is important that the impacts of this scheme will not invalidate the mitigation measures we need to put in place to achieve good ecological potential. Despite the inclusion of a section on contributing to WFD improvements, the document should ideally address whether the scheme will impact on the ability to deliver the required measures. At present we do not think that the Technical Notes sufficiently addresses the points raised above.

If your consultants would like to discuss the technical aspects of this response with us, they are advised to contact Sue Manson from our Humber Strategy Team, on 01709 312925.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me on the number below.

Yours sincerely

Annette Hewitson
Principal Planning Officer

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