

**Written Representations on EX28.3
for the
Royal Society for the Protection of Birds**

9 November 2012

Planning Act 2008

In the matter of:

**Planning Application for construction of the Able Marine Energy Park on the
South Bank of the River Humber at Immingham, North Lincolnshire**

**Planning Inspectorate Ref: TR030001
Registration Identification Ref: 10015550**



THE RSPB WRITTEN REPRESENTATIONS ON EX28(3)

This document has been contributed to by various members of the RSPB team, the key members of which will be at the issue specific hearing on Monday and Tuesday to answer questions on it. There has not been time to produce detailed individual proofs.

Overview

1. Much common ground was established at the last hearing as to the ecological function lost at North Killingholme Marshes (**NKM**) (and the Haven Pits - **NKHP**) particularly in respect of black-tailed godwits which has to be replaced through the package of compensation proposals.
2. Annex A to this document considers the contribution which will be made to replacing that lost ecological function through the wet grassland proposals at Cherry Cobb Sands (**CCS**) (and the possible additional land based compensation).
3. This document considers whether there can be the requisite or any confidence that the current, “final” managed realignment/regulated tidal exchange (**RTE**) proposals at CCS will replace the ecological function lost at NKM in terms of the intertidal mudflat on which black-tailed godwits depend during the moulting period.
4. The new, third and “final” proposals for the managed realignment/RTE at CCS are seriously flawed in a number of highly material respects such that there can rationally be no confidence on the information provided that the managed realignment/RTE will meet the basic requirements re: the ecological function lost. These concerns are addressed under four heads:
 - a. quality of the intertidal mudflat;
 - b. quantum of the intertidal mudflat;
 - c. timing of delivery;
 - d. monitoring, management and enforcement including legal agreements.
5. **Quality of the intertidal mudflat:** On quality of the intertidal mudflat, the minimum requirement of 44ha presupposes that there can be confidence that the RTE will deliver long term sustainable mudflat of an equivalent quality ha:ha as that lost. That will turn on two principal issues: the food resource and the quality of the environment.
6. In terms of food resource, it is common ground that the intertidal mudflat at NKM supports very large numbers of black-tailed godwits at exceptional densities and comprises “excellent feeding grounds” (especially at low tides)¹. The apparent attempt to rely on Annex 10.1 of the ES to seek to undermine this basic common ground is misconceived because that Annex looks at food resource in May (the trough of the annual cycle) rather than autumn (the peak and relevant part of the cycle) and is inconsistent with Able’s own Habitats Regulation Assessment Report and with observation.
7. Ex28.3 sets a requirement for density of *Hediste* and *Macoma* (the two key prey species for black-tailed godwits) of only 4g/m² afdw (ash free dry weight) for the RTE in reliance on the Stillman et al (2005) (EX28.3(2) para 1.13.2) paper which has been misunderstood and misapplied. In any event, Able’s very limited data demonstrates that NKM has a density of

¹ See RSPB Written Representations submitted on 29th June 2012 at paras 2.11 - 2.14 which was accepted as common ground at the last issue specific hearing.

relevant biomass 3.45 times that figure (even in May) so the Applicant's target for the RTE is many times lower than what is actually delivered at NKM.

8. Further, Able relies on experience from the managed realignment at Paull Holme Strays (PHS). Dr Tony Prater, the RSPB, has carried out detailed work previously on the comparative densities of feeding black-tailed godwits at PHS and at NKM. The figures are exceptionally stark (please see the RSPB Written Representations, Annex B2 Dr Prater's proof, para 5.8). PHS does not support anything like the density of black-tailed godwits as NKM and its performance over the years has declined. There is no evidence from PHS that equivalent quality of food resource to that at NKM can be delivered through an managed realignment. Therefore proceeding on the basis that replicating the food resource at PHS is sufficient is wrong.
9. Even if PHS did demonstrate equivalence to NKM which it plainly does not, it is not possible to rationally read across from the managed realignment at PHS to the RTE at CCS. Biomass density/recovery is at least in large part a function of the larvae and or spat in the water coming into a site. The RTE works by significantly limiting the water volume compared to that at an managed realignment. That will necessarily mean that an RTE is less able to replenish/colonise than an managed realignment.
10. In any event, NKM is almost totally undisturbed year by year. At CCS, there will be regular dredging and levelling. Depending on which figures from Ex28.3(3) one relies on, it appears that about a ¼ of each field (4ha) will be dredged every year and other areas will be levelled to 150mm regularly. On the scientific material provided by Able, the recovery period for relevant invertebrate populations from such disturbance is between 1 and 10 years². The RTE will by reason of the necessary dredging regime deliver a disturbed environment for the food resource.
11. Therefore, on a correct understanding of Able's own case, before we get into criticisms of the assumptions made, there can be no rational basis for considering that the food resource will be equivalent to that lost ha:ha. It necessarily follows that the minimum requirement of 44ha is wrong.
12. In any event, the assumptions as to colonisation and densities of invertebrate resource are optimistic not precautionary. The assumptions made re: the vulnerability of invertebrate to temperature and lack of oxygen especially are not accepted.
13. In terms of physical characteristics, the RSPB is pleased that Able is at last starting to try to address some of the ecological requirements of black-tailed godwits in terms of e.g. sloppy mud. The extent to which these efforts have been successful in the documents provided is assessed below. However, there are a number of major remaining issues with the RTE in terms of its physical character:
 - a. NKM is a very large open uninterrupted expanse of intertidal mudflat attractive to black-tailed godwits at least in part because of the all round surveillance that is possible and the lack of any obstructions to that view. The RTE has several kilometres of bunds (between 2 and 4m above the base level) which means that there is no very large open uninterrupted expanse of intertidal mudflat and, importantly for the quantum calculation, there will be areas of the fields which will be too close to the high bunds to be attractive to black-tailed godwits and which will therefore be of significantly lesser value ha:ha than that available at NKM;

² Although Able claim without any evidence (Para 8.2.5 Ex28.3(5)) that recovery will occur within several months.

- b. NKM is gently sloping with the result that the tide gently and slowly rises and falls with black-tailed godwits generally³ feeding right on the water's edge as the tide advances/recedes. Each field of the RTE now proposed is flat. There will be no slow advance of the tide but almost immediate inundation of the whole gradually increasing in depth. This approach is not consistent with the feeding habits of black-tailed godwits on the foreshore;
 - c. Able appear to count as available intertidal mudflat, during the neap tide sequence, the impounded fields where the water depth will be 100mm. Whilst it may be possible for black-tailed godwits to feed at such depths if forced to do so, this is not their normal foraging environment⁴.
14. It follows that: (1) there is no possible basis for confidence that 1:1 ratio will be adequate. All the evidence shows the contrary; (2) the proposal needs to be redesigned to overcome or mitigate the problems with the physical characteristics set out above. However, after now three attempts to come up with a workable scheme at CCS, the RSPB is very dubious as to whether a suitable scheme can be delivered here.
 15. **Quantum of the intertidal mudflat:** the headline target intertidal mudflat area is 88ha. There is no suggestion in any of Ex28.3(3) that the proposals can come close to delivering that quantum of operational intertidal mudflat⁵ in even the medium term.
 16. There is no claim (nor could there be) that the managed realignment area will contribute useable intertidal mudflat for black-tailed godwits in the medium or long term. It will be rapidly accreting to saltmarsh and the only mudflats will be on relatively steep slopes which will not be usable by black-tailed godwits. It is therefore necessary to find an adequate quantum of intertidal mudflat within the fields. It is impossible to do so.
 17. First, there are substantial areas which will either be unusable or seriously limited in their quality. The culvert channels into each field (will be concrete lined and will not deliver intertidal mudflat) and the areas around the margins (see above) take up a considerable area. We are not told how large an area. No allowance appears to have been made in respect of the areas close to the bunds which black-tailed godwits are unlikely to use. In addition there will be pools in each field - which will further reduce the useable area. No information is provided as to the size of such pools.
 18. Second, on our understanding of Ex28.3(3) – see below for difficulties experienced in understanding that document – up to 4ha per field will be dredged per annum after an initial period. The scientific evidence demonstrates that consequential disturbance will take between 1 and 10 years to recover from for the relevant prey species. It necessarily follows that each area of each field will be sub-optimal condition (compared to NKM) for very substantial periods or potentially all the time.
 19. On Able's analysis (which we do not accept) the two factors in the preceding two paragraphs equate to 3ha per field or 12ha overall.

³ Although some birds choose to stop on other good feeding areas as the tide recedes.

⁴ Please note that most of the Humber Estuary SPA assemblage species will be unable to feed at this depth.

⁵ At the outset of the breach occurring there will be an area of 88ha but it will not be functioning intertidal mudflat of the requisite quality at that time and by the time the quality is achieved in the fields on Able's case, the shape and nature of the managed realignment will be rapidly changing to a channel and saltmarsh such that 88 ha will no longer be available.

20. Third, Able assume that the interface between intertidal mudflat and saltmarsh is 2.5mAOD. This is wrong. The Able assumption is based on experience at PHS but the reason saltmarsh did not grow at a lower level there was because the accretion/siltation was so fast that seedlings were rapidly buried and could not grow. It was only when accretion rate fell below or close to 50mm pa (i.e. at approaching 2.5m AOD) that saltmarsh species could become established. The science is clear. Saltmarsh starts to develop rapidly above MHWN here 1.9mAOD. There will be a constant battle to prevent accretion to saltmarsh here. Saltmarsh is not usable by black-tailed godwits.
21. Fourth, on the neap tide cycle - a substantial part of the whole tidal cycle – one field (15ha) will be impounded at significant depth from the last spring tide for the duration of the neap. It will be unusable. Further two fields will be impounded to 100mm for much of that cycle. Whilst black-tailed godwits may use them if there is no alternative, this is not their normal foraging environment on the foreshore.
22. Fifth, Able recognise that there may be issues even with delivery of the 44ha and in EX28.3(3), section 8 suggest a possible extension northwards. It is unclear whether that is in the red line and/or on the contaminated land. Yet in order to show 44ha this extension is relied on.
23. There are a number of further detailed points but it is unnecessary to develop them at length because the above conclusively demonstrates that there will not be adequate areas of long term sustainable intertidal mudflat (never mind of the requisite quality).
24. **Timing of delivery:** There is a very substantial timelag between the harm to NKM and the delivery of an operational RTE. The RTE works (which we understand will take about 15 months) will commence at the same time as the works to construct the quay at NKM. The harm to NKM and the loss of the ecological function will happen at that point. Contrary to Able's understanding of EU Guidance and the *Humber Ports* case the compensation is required at that time. There is no evidence of any carrying capacity elsewhere in the Humber which can be used as a stop gap and references to possible use of areas A and B at NKM and of CCS itself are rightly not pursued because there is no evidence to justify so doing. Once the RTE works are complete, the seawall will be breached and 100mm of mud established over 1 – 3 years. Colonisation by invertebrate will take at least 2 years (although it is accepted that there will be some colonisation as the mud is becoming established). There will therefore be a timelag of several years between the loss and the delivery of the compensation. For reasons considered in detail in the attached note the wet grassland (which is in any event no substitute for intertidal mudflat and only a supplementary resource) will not be of adequate quality at the time of the harm.
25. The result is that we will be losing an intertidal mudflat of exceptional quality with no replacement at all for several years. That is simply not possible under EU law.
26. The suggestion of later over-compensation to remedy the delay is not justified on the facts, the guidance or the law. The interim wet grassland will not be ready to meet the immediate need and in any event there is no suggestion that it will replicate the ecological function lost.
27. **Monitoring, management and enforcement:** A comprehensive CEMMP enforceable under a proper legal agreement is fundamental to the delivery of appropriate compensation for reasons which the RSPB has previously addressed.
28. The CEMMP is not fit for purpose. The level of detail is nowhere near sufficient to have a workable document which will secure the ecological objectives over the long term. It is long on

generalities and lacking in any of the sort of enforceable detail which was the basis of the agreed CEMMP's at Shellhaven, Bathside Bay, Immingham, Bristol etc.

29. It is understood that it is currently the subject of further work and the RSPB will comment on it when a further, meaningful draft with targets, requirements, and feedback loops is provided.
30. Of particular concern is that there are no actual measurable requirements which the RTE is required to meet and no feedback loops in the event of the proposals not delivering that proposed. Annex B sets out some detailed issues.
31. The legal agreement is similarly flawed. As currently drafted no requirement for any compensation is triggered until all Consents are obtained. This means that if permission is refused for the wet grassland, there will be no obligation under it to deliver the RTE. The dispute resolution clauses (secrecy) are unacceptable because it will be through e.g. the RSPB that issues arise and will then have to be grappled with. The "aims" are just that and have no enforceable feed back loops or sanctions. The result is that the Examining Authority and the Secretary of State is being told – as long as Able do what their current proposals show, whether or not they work in practice, that will be sufficient.
32. On each of these four headings, there are fundamental issues which cannot be overcome through this process on the information or plans currently available. There can be no reasonable scientific confidence that the compensation will adequately compensate. Consent cannot therefore lawfully be granted.
33. Able will no doubt claim that the details can be worked out later. That is wrong for reasons already addressed at length. In any event the facts are strongly against such a claim. We have now had the original proposals (which were worked up supposedly through the pre-application stages) and dropped only in July 2012 because they did not work (for reasons the RSPB had been stating for considerable time); the first RTE proposals were flawed basically because they had (incredibly) failed to grapple with the ecological requirements of black-tailed godwits; and the current third and final set of proposals are so seriously flawed that there can be no confidence in them.
34. The fact the RSPB still has fundamental concerns about the compensation package at this stage of the process is exceptional. For the Bathside Bay and Shellhaven port proposals and elsewhere concerns on adequacy of compensation have been properly grappled with well before this stage of the equivalent process in technical, physical and legal terms. The way those matters were ultimately resolved – in very large part meeting the requirements of the RSPB (in other words developers came round to the RSPB's way of thinking) was through detailed design work, detailed analysis of the ecological resource lost and the quality of the replacement, robust testing and ultimately agreement on a suitably precautionary approach. The only case where this was not achieved was Dibden – and there it was because, as here, the compensation proposals simply would not work.

Procedure

35. This document is presented without prejudice to the RSPB's basic case that this procedure is unlawful and unfair. All previous points on this are incorporated by reference and are not repeated.

36. In terms of ability to pursue different applications from that accepted by the Secretary of State, it is to be noted that even now Able is suggesting that further changes including to the size of the RTE may be pursued.
37. In terms of timing and rigorous examination of proposals, with the original proposals the Panel correctly required a multi-stage approach (even after all the pre-application stages had been gone through) of: (1) proposals with ES; (2) written representations on them; (3) response to written representations and a further round; (3) questions from the Examining Authority and answers in two stages. That process necessarily took several months after the fully worked up proposals had been submitted and all the opportunities for input and changes in the pre-application stages. We now have new and very different proposals from the original and from the first attempt at an RTE. The process for examining those new proposals has been truncated into just one month.
38. Further, that one month timetable was imposed on the RSPB and others without regard to the availability of their experts in that month, the amount of work involved or the seriousness of the issue. Even then, Able was late in providing the documentation. As shown below that highly detailed and complex documentation is seriously deficient in significant respects. Initial requests for clarification were made as quickly as possible and were answered on 30th October 2012. Partly in order to allow the RSPB to understand the proposals in response to that request for clarification, a without prejudice meeting was held on 2nd November 2012. There has been just 5 working days since then to work up these written representations.
39. Further, these written representations on a highly technical topic are to be provided the working day before the issue specific hearing. The RSPB will not have had any opportunity to assess what any other party has said nor have seen any response by Able to its points. There is no time for a further round of representations. The result is that the RSPB will have no ability to respond to any written response of Able to this (first but also final stage) document.
40. The timeline has placed impossible pressures on the team. The team would have wished to develop a large number of points about the inconsistency in the data provided and what it did/did not demonstrate. The timeline has made it impossible to set out these points in writing.
41. The RSPB is playing, and will continue to play, a major role in DCO cases up and down the country. It is essential to it that developers comply with the process which is, at its heart, premised on complete and fully worked up proposals with full EIA being presented at the outset and tested in a shortened process. The RSPB does not have the ability to jump whenever a developer decides, at the last minute, to change essential parts of its proposals. The RSPB regards the issue here of substantial very late amendments to proposals in a way which prejudices its ability to properly test them as of great importance to the integrity of the DCO process and requests that this issue is specifically addressed in the Examining Authority report.

The Documentation

42. Mark Dixon and Dr Tony Prater are acknowledged experts in managed realignment/RTE and the ecological requirements of birds species using intertidal mudflat respectively. They have spent several days trying to understand Ex28.3(3), have sought clarification and have attended a “without prejudice” meeting with Able. They still do not understand key parts of it. There are numerous inconsistencies in the data, the figures used and the assumptions. Several points do not make sense to them or are internally contradictory.

43. Annex C contains some examples of the contradictions and inconsistencies which have made understanding the documentation so difficult.
44. Unless and until one can understand clearly what has been done it is impossible to properly test it. Yet this document has had to be drafted at a time when the experts do not fully understand what is being proposed or what is the correct data to rely on on individual issues.

Detailed Case

45. In this section, we move on to address the 4 headings above in more detail. These submissions focus on black-tailed godwits but the points made apply to all species and the assemblage.

The Correct Approach

46. There are two essential starting points here: (1) NKM (and NKHP) are of exceptional value to black-tailed godwits. No other part of the Humber comes close to their importance in the moulting period; and (2) delivering managed realignment/RTE in a very high sediment estuary on an accreting shore is exceptionally difficult, largely experimental and prone to very considerable uncertainty. The combination of these two points makes it legally, scientifically and factually necessary to be sure that *each stage* of the analysis is robust – leading to the ultimate conclusion that there is no reasonable scientific doubt that the compensation will replace the ecological function lost.
47. This RTE in this environment is highly experimental in nature, untried and untested. A significant margin for error and to cater for unknowns is necessarily required and a precautionary basis has to be applied. This makes 1:1 replacement necessarily inappropriate as a matter of principle before any assessment of the extent to which the RTE will work.
48. This is not a case where the scientists are agreed that the RTE will work subject to detailed design. This is a case where acknowledged experts in the field have serious concerns that the proposals to date do not give any confidence that the RTE will work here or that it is of an appropriate size/quality. It is therefore not possible to rely on later “iterations” or “detailed design” to justify a grant. Able has to now give the requisite scientific confidence. It has failed to do so.
49. There are a number of hints in Ex28(3) that the black-tailed godwits may be able to secure their ecological requirements elsewhere than on the RTE. However, in respect of areas A and B of NKM there is no basis for that claim because Area A has never held birds in any numbers and Area B is mostly to be lost under the footprint or disturbed. In respect of wider opportunities elsewhere there is (by Able’s own admission) no evidence of any spare carrying capacity (even if spare existing carrying capacity was legally relevant which is not accepted). It necessarily follows that the compensation package has to replace all that lost. There is no claim that the wet grassland will be able to meet a substantial proportion of the black-tailed godwits’ food needs. It is correctly regarded as a supplementary to, and not an alternative to, adequate intertidal mudflat. Dr Prater will be able to explain this in detail if required. It is assumed to be non-controversial. It is notable that Dr Percival’s analysis on this (which RSPB completely rejects) is not being pursued.

Quality of intertidal mudflat

50. The quality of NKM as set out in RSPB Written Representations is common ground (answers in cross examination at last issue specific hearings). Paragraphs 2.11 - 2.14 of the Written

Representations are incorporated here by reference. The data to back up paras 2.11 – 2.14 of that document given by Dr Prater is overwhelming. The densities of black-tailed godwits here are orders of magnitude greater than those achieved elsewhere including PHS which appears to be being used as a benchmark for the RTE.

51. The RTE objectives include a minimum requirement of 44ha⁶ of sustainable intertidal mudflat (Ex28.3(3) para 1.2.1 third bullet). That means 1:1 with that lost.
52. In order for that objective to have any scientific validity it must be premised on the basic assumption that each hectare of the RTE is of equivalent quality to NKM. The first question therefore is whether this has been demonstrated. This is addressed in two stages: (1) the food resource; and (2) the environmental quality.

Food Resource

53. The key prey species are *Macoma* and *Hediste*.
54. The way Able has been sought to demonstrate equivalence is by setting out the requirements for the intertidal mudflat and then assessing whether those requirements can be met. The assessment is flawed at both stages. The requirements do not reflect the qualities of that lost; and the assessment as to whether those requirements can be met is based on optimistic assumptions derived from inapplicable comparators.
55. Ex28.3(1) para 1.3.2 tells us what the features that that intertidal mudflat will have to deliver – including “mud capable of supporting [principal prey species]” and “prey items in sufficient densities”. What this means is explained at para 1.13.2 Ex28.3(2) – namely a biomass of *Macoma* and *Hediste* of at least 4g/m² derived from Stillman’s work.
56. The Stillman et al (2005) work (EX28.3(2), para 1.13.2) does not:
 - a. demonstrate that densities of 4g/m² is what is present at NKM. In fact, Annex 10.1 of the ES demonstrates that a biomass of 14.67gm² afdw is present at NKM even in May;
 - b. demonstrate that 4mg density would sustain the very large numbers of black-tailed godwits at exceptional densities with which we are concerned.
57. In any event, the 4g/m² figure is estuary wide figure above which less than 10% mortality would occur. It tells us nothing about the density required at black-tailed godwits favoured feeding sites. It is entirely inappropriate as a measure of equivalence particularly when we have direct observations on which to base actual data and therefore targets.
58. In any event, achievement of the 4g/m² (or elsewhere 6g/m²) requirement or replicating what is achieved at PHS (even if possible) would not replace 1:1 that lost:
 - a. we still do not have data on the density of food resource at NKM in the autumn – except we can say it is well above the figure in Annex 10.1 - even though that is (at the very least) a key driver of its ecological function for black-tailed godwits. What we do know is that the black-tailed godwits leave NKM when the resource is depleted by them below

⁶ When we come to the quantum, it is clear that even the achievement of this figure is highly doubtful at all never mind long term.

what they could obtain elsewhere⁷ - so they get their food resource here for substantial periods in the critical moulting period before moving elsewhere;

- b. the only site specific data is for May 2010 - Annex 10.1. The invertebrate resource in May will be low (after the winter and breeding season) before recovering over the summer to peaks in the autumn. However, Annex 10.1 shows that the relevant biomass at NKM even in May is 14.67 - well in excess of the 4g figure⁸. So Annex 10.1 shows that even in May, the density at NKM is far higher than the Stillman density required in the autumn;
- c. the significance of the May – autumn distinction can be seen by the data. Ex 28.3(2) para 1.7.14 shows that in May the lower shore feeding resource is relatively impoverished. Yet we know from Able's HRA (Document Ref TR030001/APP/15) observation and from the common ground that the black-tailed godwits use the lower shore in very high numbers and at exceptional densities for feeding. The food resource in Autumn is self evidently not relatively impoverished – quite the reverse;
- d. HS is used as a comparator – it being assumed that if X density can be achieved there, then it should also be capable of being achieved at RTE. PHS appears to have densities of relevant invertebrates above the Stillman figure. Yet Dr Prater has demonstrated in stark statistics the difference in density of black-tailed godwits using PHS and NKM. There may be a number of reasons for this but the lack of appropriate density of food resource in the managed realignment compared to NKM⁹ is necessarily key. If PHS cannot sustain significant populations and densities of feeding black-tailed godwits where does the confidence come that an RTE will have the necessary food resource to be able to do so (especially on a 1:1 basis)?
- e. PHS is a managed realignment site which is inundated to significant depth at each spring tide. In an RTE the quantum of water entering the site is deliberately and substantially limited. Able rely on data from PHS and infer that a similar density of food resource could be achieved at the RTE. However, biomass density (and especially recovery) is at least in large part a function of the larvae and or spat being swept in in the water column volume. All other things being equal, the smaller the water volume the less biomass which will be achieved. There is no recognition of this in Able's case. It follows that simply pointing to PHS as an example of what could be achieved is not justified (this has implications for the recovery issue below);

⁷ Able try (Ex28.3(5) para 1.4.10) to claim CCS is better quality inter tidal mudflat than NKM. This is not comparing like with like. The study on which reliance is based in fact shows that NKM is the best site on the southern shore and relatively similar in characteristics to CCS.

⁸ See summary of Annex 10.1 in EX28.3(2) table 1-3 (26g) and table 1-5 (12g).

⁹ The data from Stillman indicates that 4.0gm² afdw is the sort of area where below which up to 90% (still 10% mortality) survival would be predicted. EX28.3 (pt 2) p 1.13.2 then identifies 4gm²afdw as the target for the RTE.

The data for PHS (Franco and Mazik 2011 (please see the RSPB's Written Representations, Annex B2 Appendix VI.5.) shows that it held in September 2010 3.37gm² afdw of Hediste and 0.88 gm² afdw Macoma – together 4.25gm²afdw. This figure is just above the Stillman 'limit'.

Annex 10.1 for NKM data shows that for the 6 transects covered by the development in May 2010, that the biomass is 9.0gm²afdw for Hediste and 5.67gm²afdw for Macoma – together 14.67gm²afdw.

This shows that NKM is 3.45x better than PHS, even though the NKM data are around the annual minimum while PHS is at autumn maximum.

The key point is that the target in 1.13.2 should be 14.67gm²afdw of the two principal species not 4gm²afdw from Stillman. Note that Stillman is a theoretical model with effectively no data to verify it is correct and in any case has confidence limits around estimates which also can't be verified.

- f. at NKM and PHS there is not regular flushing, levelling and/or dredging – compared with what is proposed here. The invertebrate population is undisturbed. The relevant prey species are moderately sensitive to removal of sediment: table 1–9 Ex28.3(2). That equates to a recovery timescale of 1 – 10 years. Of course, steps will be taken to mitigate the disturbance from removal of sediment (Ex28.3(3) para 7.5.16) but at least a quarter (4ha) of each field will be dredged each year (para 7.5.16); there is no assessment we have been able to find as to how long that area would take to recover in the 1- 10 year time frame; and therefore even on a best case scenario (the opposite of what the precautionary approach required) a ¼ of each field will be subject to activity to which it has “low” tolerance each year and takes x years to recover. On a less optimistic basis, the impact will be longer and over more of each field with unassessed implications for the density of the resource.
59. In the material we have seen there does not appear to be any attempt to grapple with these issues.
60. Therefore, on a correct understanding of Able’s own case, before we get into criticisms of the assumptions made, there can be no rational basis for considering that the food resource will be equivalent to that lost ha:ha. It necessarily follows that the minimum requirement of 44 ha is wrong.
61. In any event, the assumptions as to colonisation and densities of invertebrate resource are optimistic not precautionary in this highly difficult, experimental situation which is materially different from the position at PHS. The data from PHS does not demonstrate that even an RTE can deliver density of relevant invertebrate resource equivalent to that on natural intertidal mudflat.
62. Further, Able’s approach does not seek to account for any implications which will arise by reason of the novel impounding regime. For example the impact of very cold weather on invertebrates in a few cms of water.
63. The only conclusions open on the evidence currently available is that there is no scientific material to support the assumption that ha:ha the RTE intertidal mudflat will be of remotely the same quality in terms of food resource as that at NKM.
64. Even if these fundamental points were potentially wrong, the CEEMP would have to make detailed provision as to what would happen if the food resource did not reach i.e. PHS standards. It does not do so – see below.

Physical Characteristics

65. Ex28.3(3) shows that the managed realignment area will rapidly accrete to saltmarsh and a deep channel. Dr Prater gave evidence at the last issue specific hearing that black-tailed godwits would not use that area. Nobody has (so far as we can tell) produced any evidence to the contrary. The managed realignment area will not therefore compensate black-tailed godwits for the intertidal mudflat lost at NKM.
66. The areas of the fields proposed are set out at Ex28.3(3) para 4.5.8 – broadly 15ha each. Elsewhere (before section 8) references are made to 18 ha and 16ha. We will work on the 15ha figure.

67. The concrete channels proposed in each field are shown at Ex28.3(3) page 56 and page 48 and described in para 7.2.1 (page 48). The area does not appear to be defined. These channels will not be intertidal mudflat and needs to be deducted from the 15ha.
68. The bunds are shown at Figure 4-4 (page 13). The inner bunds are 2m above ground level stretching in total for several kilometres. The bund separating the RTE from the managed realignment is 4m above the ground level. These are major physical obstructions obscuring site lines for black-tailed godwits over a significant area and having the effect of making that area less attractive to them. Whilst there is a flood defence wall at NKM, at almost all stages of almost all tides, the black-tailed godwits will not be feeding anywhere near that wall. In the RTE a very substantial proportion of each field will be within relatively short distances of the walls. No account has been taken of this in the calculations of usable area. A significant deduction is required from the 15 ha figure.
69. The way the RTE will work here because each field has to be flat (a requirement necessitated by the level at which the RTE will be created – approx 1.9mAOD) is that once the tide rises above the invert of the inlet structures, water will rapidly flood the whole area and then rise gradually. This is very different from what happens in the natural environment on NKM. In the natural environment, black-tailed godwits feed on the water's edge moving up with the tide over time extracting food as they go. That natural way of feeding will not be possible here. There does not appear to have been any assessment as to the time period when the very wet mud will be accessible to black-tailed godwits in any particular tide. Given that the inundation will be up to about 300mm, and that even Able appear to accept beyond 100mm depth, black-tailed godwits do not access the food resource, it appears that by reason of the flat design there will be limited feeding windows on each rising tide in contrast to the natural position.
70. The neap tide cycle analysis (which is very difficult to follow in the papers and there appears to be some inconsistency between the text and the tables which we have not been able to follow) is summarised at p62 (Ex28.3(3)). That appears to show that one field will be fully impounded to significant depth for up to 18 tides of the 36¹⁰. That will not be available intertidal mudflat for that significant part of the tidal cycle. One other field will be impounded for about 12 tides to 100mm. Able assume that this is equally good quality intertidal mudflat for black-tailed godwits as natural mudflat. But generally black-tailed godwits choose to feed right on the edge of the water and not in 100mm of water. The RSPB does not consider that this impounded field to 100mm is properly considered to be available intertidal mudflat for the period it is impounded. Even for the other two fields they are each impounded for 24 hours; so the same problem arises. The result is that on p62 in the neap cycle for certain tides – see e.g. tide no 15 – 24, there will be no rising and fall tide on each tide but only on every other tide; and there will only ever be 15ha (at most) which is not covered in at least 100mm of water. No account appears to have been taken of this in the availability calculations.
71. Without taking into account these points, the total quantum of intertidal mudflat is shown to fall to just 46.2ha (Ex28.3(3) para 8.2.4) in the neap. Just above 1:1.
72. There is no suggestion in any of Ex28.3(3) that the proposals can come close to delivering anything like 88ha of operational intertidal mudflat¹¹ in even the medium term.

¹⁰ The source of the 36 is not clear and is not understood.

¹¹ At the outset of the breach occurring there will be an area of 88ha but it will not be functioning inter tidal mudflat of the requisite quality at that time and by the time the quality is achieved in the fields on Able's case, the shape and nature of the managed realignment will be rapidly changing to a channel and SM.

The managed realignment – nil contribution

73. There is no claim (nor could there be) that the managed realignment area will contribute useable intertidal mudflat for black-tailed godwit in the medium or long term. It will be rapidly accreting to saltmarsh and the only mudflats will be on relatively steep slopes which will not be usable by black-tailed godwit. It is therefore necessary to find an adequate quantum of intertidal mudflat within the “fields”. As shown below, it is impossible to do so.

The Fields

74. The total physical footprint of the cells (excluding bunds) is just over 60 ha. If only 16 ha of this is not fully functioning intertidal mudflat, even the inappropriately low 1:1 will not be achieved. 16ha equates to about 3.75ha per cell.

Physically unusable

75. The concrete lined channels into each cell and round the margins will not deliver intertidal mudflat. We are unable to identify precisely how many hectares these areas take up.
76. Ex28.3(3) also explains that there will be pools around the margins. No information is given on their size, location or depth. Any pools which are not regularly drained will not function as intertidal mudflat.

Dredged areas

77. On our understanding of Ex28.3(3), a predicted 4ha per cell will be dredged per annum after an initial period. That figure would increase if the siltation rates are higher than modelled¹². The scientific evidence demonstrates that consequential disturbance will take between 1 and 10 years to recover from for the relevant prey species (Ex28.3(2) table 1-9 –*Hediste* and *Macoma* sensitivity to removal of sediment - moderate – 1 - 10 years). Able contend (para 8.2.5) that the harm will take “several months to recover”. There does not appear to be any analysis to back this up which is un-evidenced, inconsistent with Able’s own documents and highly optimistic.
78. Applying table 1-9 and para 7.5.16 of Ex28.3(3) it appears that on Able’s case and with Able’s assumed level of dredging, it is necessarily the case that the invertebrate resource each area of each cell will be in sub-optimal condition (compared to NKM) for very substantial periods or potentially all the time (if dredging is on a 4 year cycle).
79. We have been unable to make para 7.5.16 work. The 3 ha at the end of it appears to exclude the areas of so called lesser intensity levelling (2.6ha per cell). There is no scientific basis for that area to be excluded.
80. Further that paragraph is concerned with the levelling in combination with suction dredging - see heading above para 7.5.11. To that must be added the levelling in 7.5.6 (assessed at 0.4ha per cell).

¹² Which, given the scientific uncertainty, is necessarily a real risk. The very limited information we have on the model does not claim that the model is conservative or that there is not room for error - there obviously is. The RSPB does not accept that the inputs into the model are conservative overall but it has not had time to analyse this fully.

biomass. This has not been factored into the assessment because the wrong threshold (2.5mAOD) is used.

90. This problem highlights the basic error in the proposals – the ground level is simply and substantially too high.
91. Able may contend that by holding back water for longer, they will be able to “trick” the environment into acting as if it were lower than 2.5mAOD. This will not work on the facts. The depth of water coverage is limited and sometimes very limited. Light will penetrate to the seedlings. Saltmarsh will develop.

Neap tide cycle

92. RSPB’s experts have found it impossible to understand at a detailed level, the analysis of the neap tide cycle and how the RTE will operate in Ex28.3(3). Superficially, the text is just capable of being followed but it does not appear consistent with the tables and various data is different in different places without an explanation for the difference. It would take far longer than we have to explain in writing the difficulties we have encountered.
93. Here, the detail is vital. It is fundamental to know how the mud will be kept sufficiently wet throughout the tidal cycle.
94. On our understanding¹⁴ of e.g. the table at page 62 (Ex28.3(3)) RTE field 2 will be unusable for 17 of the 36 tides, RTE field 4 will be impounded at 100mm for 12 of the 36 tides¹⁵.
95. RTE field 1 and RTE field 3 will be “wet” interchangeably over a 4 tide cycle. That means there will only be only one cell operating as a natural tidal area (albeit with a prolonged period of entrapment to make one tide last two cycles). That equates to 15ha (even before one takes into account all the other factors referred to above).
96. The true conclusion from Ex28.3(3) is therefore that even on the assumptions in it, for significant parts of the tidal cycle, there will be only (at most 15ha) of intertidal mudflat operating in remotely the same way as that lost.

Possible extension

97. Able recognise that there may be issues even with delivery of the 44ha and in EX28.3(3), section 8 suggest a possible extension northwards. It is unclear whether that is in the red line and/or on the contaminated land. Yet in order to show 44ha this extension is relied on (see para 7.5.16 – last sentence which presupposes that each cell is in fact 18ha rather than 15 and that assumption is then carried forward in the tables at p68). No proposal for that extension is even now on the table.
98. There are a number of further detailed points but it is unnecessary to develop them at length because the above conclusively demonstrates that there will not be adequate areas of long term sustainable intertidal mudflat (never mind of the requisite quality).

¹⁴ And without setting out our concerns about the adequacy of the reservoir of water to deliver the neap cycle in the schedules (how is water moved from one level site to another site at the same level).

¹⁵ Whilst black tailed godwit may use them if there is no alternative, this is not their normal foraging environment on the foreshore.

Timing of delivery

99. There is a very substantial timelag between the harm to NKM and the delivery of an operational RTE: see Ex28.3(5) page 6 table 5.1. It is understood that the DCO would allow the NKM works to start at the same time as the works to the RTE. The harm to NKM and the loss of the ecological function will happen at that point. We think that is 2013 but are not clear about the date. The RTE will, even on Able's case, not be fully functioning until 2018/19 - para 1.4.6 Ex28.3(5) (a 5 – 6 year timelag).
100. Even the wet grassland which is supposed to cover the interim period pending the delivery of the RTE (and even on Able's assumptions as to the rate of colonisation which are wrong – see the attached Annex A) will not be fully functioning until the end of 2015 – a two year time lag.
101. The reliance on Humber Ports case is misconceived. The RSPB is here presenting a case that a very large population of black-tailed godwit will be dislodged from the best intertidal mudflat "package" in the Humber Estuary for it and that that loss has to be compensated immediately for the requirements of the Habitats Directive (and its implementing UK regulations) to be met. In *Humber Ports* no such case was put by any party and there was no evidence on it [59]. It was principally on that basis that the claim failed – that case was really about an opportunist attempt to rely on this point by a competing port operator who had presented no evidence at the Inquiry. The Examining Authority is respectfully invited to read paras 56 – 68 of the judgment in full. Of course here there is no question that the Secretary of State will secure the coherence of the SPA himself by his own actions. In granting a DCO he will be relying on Able to secure it for him. RSPB's case here is that unless one requires provision of the compensation in a fully operational way before the harm is caused permission cannot be granted because the requisite coherence will not be secured.
102. Able's interpretation of the EU guidance (Ex28.3(5) para 1.7.4) ignores the import of the key operating words and is directly contrary to the purposes of that guidance: (1) a site must not be irreversibly affect before compensation is in place; (2) compensation should be "effective at the time the damage occurs". It is only if this cannot be "fully achieved" that over-compensation can be relied on to partly fill the gap. But here compensation will not start to be achieved.
103. Ex28.3(5) Para 1.7.5 first bullet is not understood. The ecological resource at NKM will be destroyed. The relevance of the fifth bullet (if meant to impact on the intertidal mudflat requirement) is not understood.
104. The draft DEFRA Article 6(4) guidance directly supports the RSPB's position (Ex28.3(5) para 1.7.8). It concerns uncertainty about whether compensation will be available on time. Here there is no uncertainty – there is certainty that it will not be available on time.
105. The RSPB considers that the development should not be allowed to start until the RTE is functioning. In any event, if this is not accepted, over-compensation is required. That means over the (say) 88ha referred to already.
106. The result is that we will be losing an intertidal mudflat of exceptional quality with no replacement at all for several years. That is simply not possible under EU (or UK) law.
107. The suggestion of latter over-compensation to remedy the delay is not justified on the facts, the guidance or the law. The interim wet grassland will not be ready to meet the immediate need and in any event there is no suggestion that it will replicate the ecological function lost.

Monitoring, management and enforcement

108. A comprehensive CEMMP enforceable under a proper legal agreement is fundamental to the delivery of appropriate compensation for reasons which the RSPB has previously addressed.
109. The CEMMP is not fit for purpose. The level of detail is nowhere near sufficient to have a workable document which will secure the ecological objectives over the long term. It is long on generalities and lacking in any of the sort of enforceable detail which was the basis of the CEMMP's at Shellhaven, Bathside Bay, Immingham, Bristol etc.
110. It is understood that it is currently the subject of further work and the RSPB will comment on it when a further draft is provided.
111. Of particular concern is that there are no actual measurable requirements which the RTE is required to meet and no feedback loops in the event of the proposals not delivering that proposed. Annex B sets out some detailed issues.
112. The draft legal agreement is similarly flawed and is basically meaningless in terms of securing that which is promised. In any event,
 - a. As currently drafted no requirement for any compensation is triggered until all Consents are obtained. This means that if permission is refused for the wet grassland, there will be no obligation under it to deliver the RTE.
 - b. The dispute resolution clauses (secrecy) are unacceptable because it will be through e.g. the RSPB that issues arise and will then have to be grappled with. The clauses exclude the RSPB from the process.
 - c. The "aims" are just that and have no enforceable feed back loops or sanctions. The result is that the Examining Authority and the Secretary of State is being told – as long as Able do what their current proposals show, whether or not they work in practice, that will be sufficient.
113. On each of these four headings, there are fundamental issues which cannot be overcome through this process on the information or plans currently available. There can no reasonable scientific confidence that the compensation will adequately compensate. Consent cannot therefore lawfully be granted.

ANNEX A

Comments on the document 'EX28.3 – Final Compensation Proposals. Part 4: Wet Grassland and Roosting Site'

1. EX28.3 Part 4 provides details of the proposed new wet grassland site at Cherry Cobb Sands (CCSWGGS). The site replaces the original wet grassland site, which was to be at Old Little Humber Farm (OLHF). Supplementary information is provided in the Applicant's response to the RSPB's request for clarification dated 30 October 2012.
2. In broad terms the new location is an improvement on OLHF; the site is closer to the proposed new intertidal habitat at Cherry Cobb Sands and is close to potential sources of fresh water (subject to the grant of Abstraction Licences).
3. Further, overall the key points in EX28.3 Part 4, page 5, para 1.1.2 and the 6 Objectives set out in EX28.3 Part 4, page 8, para 3.1.1 are suitable and the Indicative Layout (Figure 3) shows an appropriate scheme.
4. However, the RSPB has no confidence that the scheme as proposed can meet its objectives for the following reasons (the most significant of which appears, on current information to be the first):
 - a. The site will not provide sufficient food for black-tailed godwits in the timeframe prior to the establishment of the MR/RTE;
 - b. Outstanding questions on the proposed drainage scheme.
 - c. Gaps in knowledge of existing site conditions.
 - d. Uncertainty over design and future management regime.

Food resource

5. The fundamental flaw is that the site will not have enough food for godwits during the period when it is supposed to be providing compensatory habitat for NKM.
6. The Applicant's consultants (Thomson Ecology) have tried to address this in EX28.3 Part 4, page 20, para 6.4.1.

The required biomass density

7. Based on the original calculation pertaining to the OLHF, the wet grassland at the CCSWGS would have to support a mean biomass of soil macroinvertebrates of $38.5/26 \times 40.35$ g per m² = **59.75 g per m²**. We currently do not have information on the current biomass. Based on evidence from other sites, the RSPB previously said that it would be extremely unlikely that the target for soil macroinvertebrate biomass would be reached within two to four years (Dr Prater's Proof of Evidence, Annex B2, page 15, para 5.24.6).
8. In EX28.3 Part 4, the CCSWGS proposal, three pieces of evidence (EX28.3 Part 4, page 20, para 6.4.1) are used to support their argument '*that there is a very good prospect of having functional wet grassland (i.e. capable of providing foraging habitat for waders) in two to four years*' (EX28.3 Part 4, page 20, para 6.4.2)
9. The Applicant's response to the RSPB's Question 4 on EX28.3, Part 4, dated 30 October 2012, confirms that the three papers cited in EX28.3, Part 4, para 6.4.1 form the core evidence base.

- (a) The use of the first piece of evidence (Eglington, 2008) as a basis for Able's claims is completely flawed. Eglington did not measure soil macroinvertebrate biomass at all, but only sampled surface-living beetles and spiders using pitfall traps and flies using sticky traps, and found that there were 'good' densities of beetles and spiders two years after conversion of arable to wet grassland.
 - (b) the Postma-Blaauw paper which has just been published says that it takes four years for earthworm abundance to reach the levels found in permanent grassland, which is far too long here given the timing of the loss of NKM and the coming on stream of CCS Wet Grassland.
 - (c) The Van Eekeren et al paper (2008), says that it takes a minimum of three years for grassland created on arable to attain biomass levels found in permanent pasture. The paper shows that in their experiments, earthworm biomass increased from 8 g per m² when the land was arable, to 51 g per m² two years after conversion to grassland (i.e. in their experiment, earthworm biomass did attain the target biomass for the compensatory wet grassland after 2 years). The authors point out that their results were unusual, and differ from those of other studies. They suggest that the reason why earthworm biomass increased so rapidly in their experiment was probably because they had sown a mixture of rye-grass and white clover (rather than just grass). EX28.3 Part 4, page 20, para 6.3.5 identifies a seed mixture which differs fundamentally from this Dutch mixture.
10. So, even being most optimistic, these references *do not* support the argument that there is a high likelihood of achieving the required soil macroinvertebrate biomass during the period of time that the site needs to provide compensatory feeding habitat. Thus it has not been demonstrated that a key part of the package to overcome the timing problems overall will work.

Worm biomass

11. These are the worm species which form the majority of the soil macroinvert biomass in unflooded high water level grasslands. All occur in clayey soils, so would be suitable for this site. Ausden, M., Sutherland, W.J. & 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. (RSPB Response, 3 August 2012, Annex IV.A)
12. *Allolobophora* and *Lumbricus rubellus* are both more tolerant of very saturated soil than the two *Aporrectodea* species, so it would be good to include them in any mix. The *Allolobophora chlorotica* which are found in wet conditions are pretty much all of the green (rather than unpigmented) morph. We assume that companies would only have stocks of the unpigmented morph.

Species	Mean weight (g per m ²)	Mean % of total soil macroinvertebrate weight
<i>Aporrectodea caliginosa</i>	17.1	23
<i>Aporrectodea longa</i>	15.1	20
<i>Allolobophora chlorotica</i>	10.7	14
<i>Lumbricus rubellus</i>	6.5	9

Drains and water supply

13. It is considered that there should just be sufficient water to maintain wet grassland at this site (EX28.3 Part 4, page 14, Section 6.2). Our calculations show that there is just enough in the reservoir in an average year. We would expect the drain flow input to be necessary in at least 50% of years. It will not be appropriate to use water from the lake for reasons addressed below or to roll the site to reduce seepage. Therefore the source of the water top up will have to be the surrounding drains.
14. Cherry Cobb Drain (EX28.3 Part 4, page 11, para 5.4.3). It is not clear when and if this drain contains enough water to be used. When we have walked the site, the water in the drain seemed to be relatively little. No flow information nor if the Environment Agency (EA)/Internal Drainage Board would be willing to grant an abstraction licence from it seems to have been made.
15. Keyingham Drain (EX28.3 Part 4, page 11, para 5.4.4). While salinity measurements were taken, we do not seem to have the normal history of salinity in this drain nor whether the EA would be willing to grant an abstraction licence (with what conditions) to be able to abstract water when there was no saline intrusion. Also we do not have a timescale indicated for when the EA will be repairing the sluice to prevent saltwater intrusion. These aspects need to be answered. Finally, the salinity measurements in Table 2 (EX28.3 Part 4, page 11) are not in a recognisable form – can they be put either into % saltwater or parts per thousand.
16. Annual cycle (EX28.3 Part 4, page 23, Section 8). While we accept this is the desired cycle and in many years it should achieve this, it does depend on the capacities and acceptabilities of the abstraction from one or both drains. It is slightly optimistic.
17. The Applicant needs to show that they will be able to obtain permission to abstract water from the Keyingham Drain (provided it is fresh enough) or the Cherry Cobb Sands Drain (providing it has enough water in at that time of year, which EX28.3 Part 4, Section 8.1.3 implies that it might not have).

Other matters

18. It seems strange to fill in low points (EX28.3 Part 4, page 15, para 6.2.10). Having variation (and especially lower, damper areas) for godwits to feed in would be good.
19. Mention is made of rolling the site to reduce infiltration of water, in order to reduce water loss (EX28.3 Part 4, page 18, para 6.2.27). This is not sensible, given that the aim of the site is to provide soft upper soil for godwits to probe. Further what is proposed also appears contrary to what is said about avoiding 'capping' in EX28.3 Part 4, page 20, Section 6.3.3.
20. Given that the islands in the 'lake' are an important feature, if all the water in it is used up it will make these islands redundant as roosting areas (EX28.3 Part 4, page 18, para 6.2.30). It is therefore important for the site design that it is possible to obtain additional water in winter from the Cherry Cobb Drain or Keyingham Drain (subject to salinity and volumes). This will also remove the 'need' to reduce infiltration of water through the soil (EX28.3 Part 4, page 18, para 6.2.27)
21. Sub-surface irrigation (EX28.3 Part 4, page 17, para 6.2.25) should not be required, but this is only going to be a problem if there is a risk of water levels in surrounding ditches being too low, and these sub-surface drains draining the site.

Existing site conditions

22. The condition of the soil down to 75cm appears to be suitable for the formation of wet grassland and accords with the boreholes BH2-BH5 (EX31.5A) made just to the west of the road) which found similar conditions to 30-80cm.
23. However then there was quite a bit of variation in the next layer which is mostly very sandy clay to 1.9-2.3m deep, below which is loose grey silty sand to 7.05m where the boreholes stopped.
24. No water seeped into the boreholes at 7.05m in any of them. This dryness at 7m is remarkable and suggests the land drains very effectively.
25. It would seem likely that the conditions on the CCSWGS field should be similar to Cherry Cobb Sands Managed Realignment (MR) site just a few metres away. While the surface conditions seem acceptable in terms of water retention, the deeper conditions are more likely to cause problems if water can drain away.
26. The boreholes were dug in April/May 2012 but not the conditions at the time of digging could have some implications for the conditions found. Of course, the field drains may be efficient and cause this remarkable dryness at 7m. Given that there are deeper ground conditions which may cause a problem for water retention, additional measures such as puddled clay may need to be considered at least for the lagoon/scrape.

Design and management

27. We agree the suitability of the size of waterbody (5ha in a 38ha grassland site) and size of islands (0.4ha total for two islands in a 5ha water body). The islands should be butyl-lined, gravel topped and level, otherwise they will become densely vegetated and unusable by godwits.
28. Pumps (EX28.3 Part 4, para 6.2.31). While the use of wind rather than diesel pumps is supported it is suggested that the location of the one on Cherry Cobb Drain may prove to be a risk for birds flying into roost. Will there be enough water in this drain to justify it or is there an alternative position for it which would be suitable? The Keyingham Drain pump should be located as far to the north as possible to minimise the impact on birds using the site.
29. Scrape (EX28.3 Part 4 para 6.2.11). There is some concern that this well intentioned and desirable feature will soon be filled with wetland vegetation – if so, management to remove or control it will have to be secured through the CEMMP. Allowing cattle access to it will help but not greatly.
30. Seed mixture (EX28.3 Part 4, para 6.3.5). It is agreed that a wetland species mix is desirable but avoid the use of *Carex rostrata* in the mix in view of its height.
31. Monitoring (EX28.3 Part 4 para 9.2.6). There is no need to measure ash-free dry weight when there is a conversion available from wet weight.
32. Ornithological monitoring (EX28.3 Part 4, para 9.7.1). It is considered that detailed counts do need to be made and at least fortnightly counts for the period July-October and monthly counts at other times are suggested.

ANNEX B

EX28.3 Part 7 – Compensation Environmental Management and Monitoring

1. Summary

A very poor report that does not appear to have understood the purposes and general principles of monitoring or what monitoring will be required at Cherry Cobb Sands (CCS) compensation site or to have taken into account how the proposed site would be managed and maintained.

2. The purpose of monitoring

- The purpose of monitoring is to define if the site acts as a successful compensation habitat site for that destroyed or lost and if the site is having any detrimental or positive impacts adjacent.
- To be effective the monitoring should also be able to guide any proposed remedial actions that may be required by management actions.
- Monitoring programmes should be to an agreed timescale and budget to prevent “project creep” and assist in concentrating on essential data and practical management issues

3. General principles of monitoring

- All monitoring must establish a pre construction data set, a post construction data set and a control site data set for objective analysis to be made.
- Before a monitoring programme can be established, quantifiable success and failure factors should be agreed.
- These success or failure factors should be used to define potential impacts and test if theory or models used in site design were correct.

4. Part 7's Monitoring for Cherry Cobb Sands

- Section 6 (pages 24-30) recommends monitoring for bird use, invertebrates and fish but appears to have neglected some very significant factors that will require detailed post and pre construction measurements.
- No monitoring is proposed to ensure that the models used in the sites design are accurate, in particular the tidal flows and tidal volumes through the managed realignment breach and the regulated tidal exchange (RTE) structures, accretion or erosion within the managed realignment or RTE areas, sediment in suspension in the swept tidal volumes, sedimentation rates within the RTE “fields”, tidal frequencies, available bird feeding days.
- No monitoring within the RTE “fields” is proposed on oxygen levels, water or mud temperatures, plant colonisation, sediment strengths, sediments grain size, sediment nutrition value.
- No monitoring is proposed on the operation and management of the site such as cost, frequency of water control structure operation throughout a tidal cycle, dredging and flushing methods and efficacy and impacts on invertebrates or bird feeding, sea wall and bund condition, saline intrusion to adjacent farmland or ditches, cost of monitoring.

- Fundamentally no quantitative targets are set for success or failure factors including measuring the area of compensation habitat to be created.
- The existing data sets proposed as a comparison seem very inadequate with little attention to establishing full pre construction data.
- Little detail is given on the establishment of a control site or a fuller data set for the development site at North Killingholme Marshes (**NKM**).
- Only 5 years of monitoring are proposed to establish a quality objective.
- There is an assumption that because the Paull Holme Strays (**PHS**) managed realignment site has attracted invertebrates and birds within a 5 year period, then so will CCS which is a RTE site.
- The Reference section (page 31) contains no monitoring programmes, results or protocols from other managed realignment or RTE sites.

In addition please see additional comments below.

5. Specific comments on specific paragraphs

- Paragraph 14 states:

“An assessment of the likely available feeding resource provided by the intertidal compensation site and the wet grassland predicts the potential available food resource to be **considerably greater** than that required to compensate for the direct and indirect loss of intertidal waterbird foraging habitat as a result of the AMEP development.”

However no references (or cross references) are provided and therefore it is not clear on what this statement is based and therefore the evidence for it.

- Paragraph 15 states that the performance of the Compensation Scheme will need to be assessed by monitoring bird use, provision of invertebrates, habitats for fish nursery. However it excludes the need to monitor the following to provide a full picture of the performance of the compensation scheme:
 - the water control structures
 - the breach
 - water content of the RTE
 - current flow strengths
 - oxygen levels
 - temperatures
 - plant colonisation
 - tidal frequencies
 - RTE dredging method efficacy
 - nutrition values
 - wall and bund condition
 - erosion and accretion within the managed realignment area
 - dredging and flushing impacts on invertebrates
 - mud strengths
 - grain size within the sediment
 - RTE mudflat accretion or erosion

- Para 16 highlights the need to also monitor adjacent CCS foreshore and Stone Creek morphology. But there is no mention of monitoring the development site or establishing a monitoring control site – both of which are required.
- Para 28 reference is made to the Environment Agency report (Allen 2006) for baseline invertebrates data to be used to assess the monitoring data against, but we would question the adequacy of this data as there is only 1 data set from CCS, does not state depth of core taken and no biomass figures is available. Also it is only from mid-foreshore and therefore does not include data from high water or low water transects data which is needed.
- Table 1 (page 8) – Raw Data from CCS intertidal monitoring does not include a source for these data. In addition it does not transfer data calculations into species per m² so cannot be compared with other data provided within references and for sites that the Applicant says are comparable.
- Section 3.3.2- on the NKM Foreshore – as mentioned above the data needs to be transferred and calculated into species per m² to enable comparison. And information provided as to what depth the samples were taken down to.
- CCS Saltmarsh Habitat - para 42 – penultimate sentence states “It is thought that this zone is gradually accreting” –this is meant to be a scientific document, there is plenty of data available on erosion/accretion in this area, and if not it should have been gathered to ensure data was available.
- Para 43 – last sentence states “It is also important to consider that management should have some adaptive element.” But where is the proposed monitoring for this and linking data/results back into proposed management for the site?
- Para 45 states that the site should provide 88ha of intertidal mudflat but information is provided on how is this to be measured?
- Para 46 states that a minimum of 44ha of sustainable mudflat will be provided but again how is this to be measured?
- Para 47 states that the quality of mudflat should be suitable – but there is no mention of oxygen, temperature, nutrition levels etc and therefore how is it to be monitored and then compared with what is required for the relevant species?
- Although para 48 states that a minimum of 44ha of sustainable functioning intertidal mudflat will be provided it does not mention any monitoring for this nor the number of days in a year that the mudflat should be available for.
- Para 55 – second sentence states “...after a five year period of operation should be taken as a nominal quality objective.” However since the desilting, levelling, flushing, dredging are estimated to be mainly from year 8 onward (EX28.3(7), Section 6), five years cannot be established as “the nominal quality objective”.
- In section 4.3.5 entitled adjacent fields – as the existing soils are understood to be highly porous, and as there may be underground land drainage pipes, it is normal on most managed realignment projects to test adjacent fields and ditches for salinity levels. This is not mentioned and we recommend this is necessary to ensure sufficient baseline data is available.

- Para 67 suggests that as PHS had species rich invertebrates after 5 years then the same will apply at CCS – but we wish to highlight that you cannot compare a managed realignment site with a RTE as the latter has far less water volume coming onto the site each tide.
- Para 68 says that the biomass at PHS was the same as outside the site as inside the site but the only comparative data are in Franco and Mazik (2011) (RSPB Written Representations, Annex B2 Dr Prater’s Proof of Evidence, Appendix VI.5), here they do not show the inside and outside are the same but show that consistently inside PHS is lower than outside on CCS (RSPB response to 2nd written questions 7 September 2012; response to Q.22 on page 10).
- Para 71 states that target invertebrates for CCS should be based on NKM – we fully support this target.
- In para 77 the proposed Environmental Steering Committee does not include RSPB. We would welcome being invited to be on the Committee and would suggest that our experience and expertise would prove beneficial. We note that in Part 10 Schedule 3 does include the RSPB within the list of organisations for the advisory group (although the definitions at the start say that the advisory group organisations are contained within Schedule 4 – there is no Schedule 4 provided) – if this is intended to be the same as the Environmental Steering Committee then our comment above is not necessary.
- Para 80 while discussing the breach states “...that the precise location and level of the breach area will be chosen during detailed design...” EX28.3 part 3 is supposed to be the final design for CCS but this statement indicates that another round of design is required and changes may be made as a result. There is no provision for this in the timetable.
- Para 86 on disturbance states “compensation site does not require piling works” however we would refer you to EX28.3 part 3 figure 4-7 page 18 of that report will clearly sets out the requirement for piling.
- Para 89 argues that as the existing footpath will be moved off the old sea wall then CCS may be able to accommodate more bird-days – but as the footpath appears to have very little use, this is a dubious and unscientific conclusion.
- In section 5.3.5 on site maintenance there is no mention of the impacts of dredging on invertebrates or bird disturbance or the operation of the water control structures causing disturbance.
- In section 5.4 environmental management measures– there is no mention of protected species e.g. reptiles and the requirements for pre and post monitoring.
- Para 106 states that “Details of review mechanisms for the predicted impacts, assessment of monitoring information and how remedial action is triggered if quality objectives, are not met require development” – this should have been done already and submitted to the Examining Authority as well as to objectors to ensure they had an opportunity to review and comment on them. There is no extra provision in the examination timetable for this to occur. It is clear that it is necessary and should have been included in Part 7 and Part 10 (the draft legal agreement).
- Para 108 – we do not have the required details to be able to comment properly on this paragraph. As drafted it is unclear exactly what will occur and what evidence this is based on.

- Para 109 again there is no reference to establishing a monitoring control site, in addition to the lack of adequate baseline data this is a serious shortcoming.
- Para 115 seems odd when other sites are identified later. So, it should summarise all areas where bird monitoring will take place, namely in relation to the inter-tidal area:
 - NKM – both during construction and operation
 - North Killingholme Haven Pits – both during construction and operation
 - CCS outside the RTE/managed realignment – during construction and operation
 - CCS RTE/managed realignment – during construction and operation
 - Gather whole Humber and national/international data from BTO WeBS counts to ensure all is considered within an overall framework as well as to see if there are changes in numbers and distribution which may relate to impacts from this development.

Then identify for each of these the specific requirements noting that not only the number of birds should be recorded but also specific disturbance impacts. It maybe that some additional work will be required in the light of aspects raised during the hearing and were not adequately covered before e.g. additional counts at NKM before construction starts. It should be recognized that the fundamental period for black-tailed godwits is the autumn function (July-November) but overall, all seasons are of significance for the SPA assemblage and therefore monitoring requires to be undertaken throughout the year, perhaps with a June gap.

For targets it is essential that bird numbers are included – the whole purpose of the compensation is to offset impact of the SPA and of the monitoring to understand what are the responses by the birds to the development and the compensation measures.

- Section 6.3.1 Intertidal benthic invertebrates. The proposals are basically appropriate but while sampling in spring would fit with the Annex 10.1 at NKM, the data should be gathered at the critical time for the autumn function (August/September). There may need to be an additional autumn survey before construction starts at NKM to provide a good comparator.
- Section 6.3.2 Wet Grassland terrestrial monitoring para 129. We suggest that only earthworm biomass and abundance need to be measured; moreover, there should only be a need to measure wet weight as a dry weight conversion factor is available. In addition the earthworms should be identified to species.
- No specific bird monitoring is defined even though it is identified in para 115. The time and frequency of this should be identified bearing in mind the intended use of the site. Even though it is intended for non-breeding birds, the management of the site will need to take into account breeding birds, so it is worth undertaking a breeding bird survey annually.
- Section 6.5. Fish monitoring it is doubtful that the RTE site, with its shallow and spasmodic flooding, will be attractive to fish. The methods proposed make no reference to the many excellent reports by Dr S Colclough on this. Fish monitoring may have a place within managed realignment sites, but doubtful if any useful data could be gained from this very expensive exercise. However, it is understood that this monitoring is at the wish of the EA.
- Paras 142 and 143 discuss that if the site does not work then the causes could be wide ranging and remedial actions will need to be developed. We would question these statements as the proposed monitoring is only on limited aspects and therefore it will be impossible to define what caused the problem. Possible failure factors and potential remedial action (including the

construction of another compensation site) should be defined now as they are necessary for a complete CEMMP to be submitted.

6. Section 5.3.3 Wet grassland monitoring

There appear to be inconsistencies between EX28.3 part 4 and this section 5.3.3 (part 7) for example Part 7 para 93 (page 21) states:

“Whilst the objective is to produce wet grassland with scrapes, full inundation of new grassland is inadvisable for several years following arable reversion. For the first two to three years the aim should be for high spring water levels in soil, ditches and other water features (but not extensive surface flooding), with natural drying from June to allow ideal sward management.”.

But Part 4 states (at page 13, para 6.1.3) that the water retention would need to be carefully managed to ensure that:

- Flooding of the grassland is avoided over at least the majority of the site because flooding would have the effect of killing soil invertebrates; and
- The soil moisture content is maintained at a high level, especially during the late summer and autumn period, to enable feeding wading birds to probe the soil.

Therefore Part 7 is recommending natural drying from June, but Part 4 is recommending high moisture content during late summer (say July onwards).

Also within Part 7 there is nothing beyond the first few years whereas monitoring management etc will continue to be required for the new wet grassland site.

Also reliance is placed on a number of documents that it is said will be used for the final management and monitoring plan. However many of these documents are not appropriate to use for a wet grassland area for autumn and wintering wader species since they are aimed at providing suitable habitat and conditions for breeding species. For example RSPB 2008a and b – please see Annex D TEMMP for our thoughts on this.

ANNEX C

Contradictions within the report text

EX28.3 Part 3, Siltation

EX28.3 Part 3, paragraph 7.3.9 states “When the average levels in the fields approach rise **above +2.2m OD it will begin to become necessary to remove sediment from the fields** to maintain capacity to manage water levels over the mudflat thereby ensuring the functionality of the mudflat”.

Where as paragraph 6.7.3 “The accretion levels predicted in table 6-6 (page 47) for field 1, **13 years after breaching** are slightly above +2.50m AOD. This indicates there is a risk that saltmarsh will start forming and **the bed level will need to be dredged** to maintain the desired mudflat characteristics. Levels in field 2 are approaching this critical level and so dredging is likely to be needed shortly”.

BUT table 6-6 shows that after year 8 ALL fields are above +2.2m OD and table 6-3 (page 44), shows that fields 1 and 2 are at or above the +2.2m OD threshold for dredging after year 3.

Paragraph 7.4.4 “Based on these average rates of siltation and ignoring the reduction in siltation rates as the operations change as the average level of the mudflat rises, it can be seen that the fields would take between **10 and 12 years to increase in average elevation between +2.1m OD and +2.4m OD**”,

But again table 6-6 shows that after year 8 all fields are between +2.24m and +2.40m OD.

EX28.3 Part 3, Quantity

EX 28.3 Part 5 functionality of compensation package, paragraph 1.2.1 “For the SAC this leads to a **requirement for 73.4ha of intertidal mudflat**”.

Where as EX28.3, Part 3 paragraph 1.2.1 states “The site should provide sustainable **mudflat with a target of 88ha**”. “The minimum requirement is that 44ha of sustainable mudflat should be created”.

Paragraph 4.5.9 “These four fields together provide an area of 60.4ha....**These areas exclude areas taken up by the energy dissipation structure, the distribution channel and the minor drainage channels and pond area....**”

Table 5.2 (page 35) shows 61.3ha of RTE mudflat after 3 years.

Paragraph 7.9.2 “The RTE fields have been shown to be capable of **sustainably delivering an average of about 50 to 54ha of mudflat....and a minimum at any time of 45ha...**”

Paragraph 8.1.3 “The proposed RTE scheme examined in the modelling **provides over 60ha of mudflat....**”

Paragraph 8.2.4 “...at those times when only three fields are in operation **the available area could fall to 46ha.....This makes no allowance for the energy dissipation areas, drainage creeks and ponds...that are required to facilitate management and drainage**”.

This appears to contradict para. 4.6.6 above and potentially there is a further reduction of 3ha per field - see para. 8.2.6. “....around 3 ha in each field might be considered as either not fully functional because of the presence of drainage channels....or...management activities...”

Finally EX28.3 Part 1 para 1.3.1 states "...It has been agreed with Regulators that compensation must be put in place to recreate 94.6ha of habitats (73.4 ha of intertidal mudflat and 21.2 ha of subtidal (estuary)) for the SAC and 101.5 ha for the SPA and the compensation must replace the functional losses of those habitats which provide a food larder for birds that are features of the SPA"

EX28.3 Part 3, Section 1 Introduction, Sub Section 1.2 Objectives of the compensation site modelling

Paragraph 1.2.1 – "For the purposes of this assessment, mudflat is assumed to be intertidal areas below 2.5m AOD", whereas Part 2, para 1.4.7. "Of potential significance however, is the increasing area of intertidal habitat that lies between MHWN (+1.9m AOD) and MHWS (+3.4m AOD); between these levels, saltmarsh can become established...."

EX28.3 Part 3, Section 4 Features of a regulated tidal exchange, Sub Section 4.4 Meeting the requirements

4.4.7 "A minimum depth of inundation of **0.3m on each spring tide** sequence has been identified as a reasonable initial design target..." where as para 4.6.1 states "...so that on **an average tide** it is flooded to a shallow depth of approximately **0.3m**"

EX28.3 Part 3: Section 5 Compensation site operation during the warping phase, Sub Section 5.1 Introduction

5.1.1 "During the warping phase which is expected to last for about three years, the prime objective is to achieve a minimum of 100mm of silty mud." Whereas 5.4.2 "This indicates that with the sluice openings adopted, the minimum required 100mm of warping could be completed in around 18 months..."

ANNEX D

EX11.32 Environmental Monitoring and Management Plan: 2. Terrestrial Habitat – Killingholme (*DRAFT*)

EX11.32 provides an overview of available baseline data and outlines proposed habitat creation and enhancements for biodiversity. It identifies quality objectives for habitats and species at the application site and describes the environmental management and monitoring arrangements that will be applied to the development.

This response considers that part of EX11.32 which deals with the proposals for Mitigation Area 'A', which according to the shadow Habitats Regulations Assessment, '*will be managed to provide a safe and secure foraging area for wetland bird species and especially curlew*'. (Habitats Regulations Assessment Report, Document Ref TR030001/APP/15, page 6-18, para 6.3.50).

The key points which the RSPB wishes to highlight are:

1. The apparently conflicting objectives for Mitigation Area 'A', rolled up into the primary aim. Namely, the land is to be managed for both breeding and wintering waders as well as farmland breeding birds.
2. The report contains no details of the areas of respective habitats to be managed.
3. The lack of numerical targets against which to assess the success of the Mitigation Area A.
4. The lack of detail as to how the feedback mechanisms will work.
5. Inappropriate survey methodology for calculating the number of birds present.
6. Reliance placed on RSPB publications.

1. Objectives for Mitigation Area 'A'

The primary objective of management for the benefit of breeding and wintering wading birds (including curlews), and farmland breeding birds are likely to pull in different directions (page 10, para 33). The management of Mitigation Area 'A' needs to prioritise curlew, as an SPA feature, over farmland birds. If farmland birds cannot be incorporated without detriment to curlew, they should be mitigated for elsewhere.

It is suggested that a correctly managed sward will provide nesting opportunities for in-field species (page 12, para 44). This may conflict with the shorter swards needed by curlew. Mention is then made of managing land to provide winter seed for granivorous birds. This entails letting vegetation grow and set seed during autumn and through winter, which is when curlews will need short swards for feeding.

The priority should be the creation of wet grassland for wintering wading birds, in particular curlew, and not the creation of wet grassland for breeding waders (page 21, paras 68 and 69). Wintering waders are correctly identified as the focal bird group in Table 1 of EX11.27, Breeding Bird Mitigation.

Given that it is intended to herbicide treat, plough and reseed Mitigation Area 'A', it is not clear when this habitat will be available for curlew in relation to the commencement of development (page 26, para 90).

In any event there remains uncertainty as to whether the site identified for Mitigation Area 'A' is suitable for wet grassland (page 21, para 72). Further information needs to be gathered on the water balance of the site. There does not appear to be any contingency plan should the site prove unsuitable. Similar criticism at the lack of hydrological detail was made in the RSPB's Written Submission dated 29th June 2012 (RSPB Written Representations, Annex B2 Dr Prater's Proof of Evidence, page 8, para 4.2.2).

In terms of site management, it is suggested that an Environmental Steering Committee be established that should have an *advisory* remit (page 12, para 41). It is recommended that the remit of any such committee should be more than advisory if monitoring and feedback is to have any meaningful impact. Furthermore, given its extensive expertise in creating and managing wet grassland habitats for birds, the RSPB suggests that it should be included in list of members (page 12, para 42).

2. Habitats to be managed

The proposed seed mix and management (hay meadow cut with aftermath cattle grazing) is considered to be appropriate (pages 22-25, paras 73-88).

Further detail is required on the areas of habitat to be managed. While it is understood that the central core of 16.72ha is to be managed for wading birds (especially curlew), these birds will also use some of the buffer zone for feeding, grading to wider farmland bird use towards the periphery. How are the needs of breeding waders to be accommodated within this regime?

EX11.27 Breeding Bird Mitigation, refers to proposed measures in Mitigation Area 'A' (page 2, Table 1), including fenced plots of biannual farmland seed mix. It is not clear how this, or the other management measure mentioned in EX11.27, will co-exist with management for wintering waders.

It is not clear whether the reference to soil macro-invertebrate fauna refers to earthworms, but earthworm density is considered to be a more appropriate target (page 10, para 34). The right species and biomass of worms will need to be developed on the site, especially on arable conversion.

3. Lack of numerical targets

Numerical targets are required in addition to functional targets (page 9, para 26). For example, the target for curlew should be 'no fewer birds than use the fields at present (in combination with the inter-tidal zone)'. A similar target should be used for Red list farmland birds. The target for Amber and Green species should be catered for as far as possible.

4. Feedback mechanisms

There is mention of a feedback loop from monitoring to management (page 10, para 30), but no mention of what happens should as a result of the monitoring Steering Group advise conflicting management for breeding farmland birds versus curlews versus breeding waders. Clarity is required should this situation arise. The needs of SPA and functionally-linked species should take priority here, followed by Red list species.

5. Inappropriate survey methodology

It is suggested that Breeding Bird Survey (**BBS**) methodology be used (page 26, para 93, page 28, para 103). This is inappropriate for this task. BBS merely gives an index of population trends rather than an absolute figure of the number of territories which should be required for each species.

Furthermore, BBS deals with breeding birds, whereas the primary focus here should be wintering curlews.

In addition there is a misunderstanding of the survey protocols (page 28, para 105). One would only avoid the dawn activity peak if comparing data with other areas not collected at this time, as it would make the dawn survey area appear better. However, the peak activity period may be helpful to get a true indication of the number of pairs present.

The Common Bird Census (**CBC**) is required to get the number of pairs on a single site and the timing and area coverable suggested is not appropriate (page 28, para 103). Dr Prater has much experience of CBC and can still cover up to 300ha of farmed and associated land in a day. It is acceptable for a good observer to cover the area through to mid-afternoon and so get 8 or 9 hours of survey in the day.

As the priority for management here is wintering waders, the number of individual birds will be relevant measure, not pairs.

6. RSPB references

The paper references three RSPB publications:

a) RSPB (2005). Wet Grassland Practical Manual: Breeding Waders.

This is for breeding waders, not passage/wintering birds. It was targeted at lapwing, snipe, curlew and redshank. It gives practical advice on creating scrapes, putting in pipes and sluices etc.

b) RSPB (2008a). RSPB Advice for Farmers - Re-wetting grassland

This document is mainly aimed at management for breeding waders, so the recommendation is for high water levels in the breeding season. It talks about reducing the water table to 40cm below field level from July onwards, but this is when higher water levels would be needed for autumn-feeding black-tailed godwits.

It also advises cutting during August to October dry period (based on breeding bird requirements) but this would be bad for autumn godwit usage - cattle grazing would be better.

c) RSPB (2008b) RSPB Advice for Farmers - Arable Reversion

The draft management plan refers to sowing on ground prone to winter flooding in the early autumn or in spring once the land has drained (page 22, para 77).

In this document the RSPB recommends sowing grassland during August or September (in milder areas). Spring sowing can be successful, but there is a greater risk of drought killing young seedlings.