ANNEX 1: Natural England's Responses to the Examining Authority's Second Written Questions

The following answers are provided by the Natural England in response to the Examining Authority's second written questions.

Question 1

The document by the Institute of Estuarine and Coastal Studies, Managed Realignment and Regulated Tidal Exchange: Humber Estuary Scenario Briefing Report 1st August 2012 (Reference No: WR21.1– page 388 of the Applicant's Comments on Written Representations), states that –

"...it is suggested that a more functional approach to seeking compensatory habitat is pursued, whereby, more basic criteria are followed in order to deliver an area that provides a functioning estuarine ecosystem.
Furthermore, saltmarsh habitat has an intrinsic functional value which should be acknowledged, and is able to deliver a series of ecosystem services in its own right. Given that the Humber Estuary has lost a considerable area of such habitat historically, then development of such a habitat should not necessarily be treated as a disbenefit. Finally there needs to be a more realistic and integrated approach to the topic of habitat loss, compensation and realignment provision. There will not always be suitable habitat present to provide compensation in the vicinity of the areas of habitat loss, or if they are available, then direct like for like compensation may not be possible. This needs to be addressed, with either an acknowledgement that the provision of a functional if not identical estuarine ecosystem in the same part of the estuary is acceptable, or an acceptance that in order to provide like for like habitat, provision may have to occur elsewhere within the estuary, and as such, without the same structural community components that are associated with the area lost. This appears to be the approach adopted in the current proposals for the Bristol Port Compensation in the Severn Estuary."

Do Natural England and RSPB agree with this?

1. The IECS report is broadly consistent with Natural England's advice in this case.

2. When providing advice on proposed compensation, Natural England seeks to do this in a way that makes ecological sense functionally and is well evidenced, as well as being in line with the published guidance on compensatory measures[1] and complying with the legal requirements of the Habitats Regulations/ Directive. This is a responsibility shared by the competent authority in its function of decision maker.

3. Natural England recognises the importance of saltmarsh habitat and that large areas of saltmarsh have been historically lost from the estuary.[2] With regards to the Humber Estuary SAC, Natural England has advised the applicant that intertidal mudflat habitat should be created in the first instance; however Natural England takes a pragmatic view

[1] Guidance document on Article 6 (4) of the Habitats Directive 91/43/EEC Clarification of the concepts of alternative solutions, imperative reasons of over-riding public interest, compensatory measures, overall coherence, opinion of the Commission January 2007 and Department for Environment, Flood and Rural Affairs Habitats Directive; guidance on the application of article 6 (4) alternative solutions, imperative reasons of over-riding public interest and compensatory measures.
[2] See the Humber Estuary European marine site English Nature's advice given under Regulation 33 (2) of the Conservation (Natural Habitats &c.) Regulations 1994 Interim advice 2003

in the longer term as natural processes result in accretion that will turn the mudflat habitat into saltmarsh habitat. It is likely that Natural England would determine this change from one estuary feature to another to be in line with the conservation objectives which state "subject to natural change". However, when Natural England comes to consider the compensation requirements for the Humber Estuary SPA, functionality becomes the key issue. The mudflats at North Killingholme that will be lost are an extremely important feeding area for several SPA species, including internationally important numbers of black tailed godwits. The functionality provided by the mudflat in terms of relatively undisturbed foraging habitat cannot be replaced by saltmarsh as these birds do not feed on this habitat type. Therefore if it is not possible to create a sufficient area of sustainable mudflat in the long term, there is a risk that the coherence of the network may not be maintained.

4. With regards to the location of compensation, Natural England is of the view that compensation measures delivered close to the affected area have a better chance of successful provision of the function to be lost, than equivalent habitat located some distance away from the impact. Additionally, it is likely to be more difficult to demonstrate in advance that an area located away from the affected site will successfully provide the same ecological function. Natural England would of course be open to considering alternative locations with the caveat that they must provide equivalent functionality and must ultimately meet the requirements of the Habitats Regulations. Natural England understands that this is the case with the Bristol Port compensation scheme on the Severn Estuary. Due to a lack of land availability, the compensation for this development will be provided some distance from the impact; however the selected site was the best option available to recreate the habitats and ecological function that will be lost.

5. Natural England agrees that both the issue of compensation provision and indeed broader estuary management is a shared responsibility that needs to be addressed at a strategic level and in an integrated manner and not just on a case by case basis. Natural England continues to work collaboratively with a number of key groups and partnerships on the estuary to achieve such an outcome. However, maintaining the coherence of the Natura 2000 network must remain the overriding priority and be taken as central to any proposed strategic approach to compensation provision. This brings difficulties with it as any compensation must be specific to the adverse effects predicted. As stated in EC *Guidance document on Article 6(4) of the 'Habitats Directive 92/43/EEC* (2007):

"*Once the biological integrity likely to be damaged and the actual extent of the damage have been identified, the measures in the compensation programme must address specifically those effects, so that the elements of integrity contributing to the overall coherence of the Natura 2000 network are preserved in the long term. Thus, these measures should be the most appropriate to the type of impact predicted and should be focused on objectives and targets clearly addressing the Natura 2000 elements affected. This requires that measures clearly refer to the structural and functional aspects of the site integrity, and the related types of habitat and species populations that are affected*" (see para 1.5.1, p. 16).

<u>Question 2</u>

On the basis of the statement made in paragraph 10 of Annex 1 to RSPB's Written Representation, RSPB's view appears to be that compensation provision should be based on replacing the ecological function of habitat lost to development.

(a) What would be the implications of such an approach for the AMEP proposals?

6. Natural England agrees with the principle that compensation should replicate the ecological function of habitat that will be lost and this is what it has advised the applicant. At Killingholme Marshes foreshore there are 8 species that are part of the SPA non-breeding waterbird assemblage that utilise the mudflats in significant numbers. These species are: shelduck; lapwing; ringed plover; dunlin; black-tailed godwit; bar-tailed godwit; redshank; and curlew. In simple terms, the ecological function provided by the existing area and which compensation must replicate, is the provision of feeding and roosting habitat for these species. The quality of mudflat foraging habitat must be maintained in proximity to a secured roost site in order for both the populations and diversity of foraging SPA waterbirds to be supported.

7. Broadly speaking, all species are likely to be catered for if the needs of the passage black-tailed godwit population present in autumn are met; the species present in the most significant numbers and with specific requirements. The key functional aspects for passage black-tailed godwit are a high quality area of mudflat for foraging, as close as possible to a secured roost at the time of year when birds are undergoing their post-breeding moult. The provision of the roosting site within an area of wet-grassland will provide a roost that is available at all tidal states and an additional foraging resource should the mudflat created be of average quality or lower or should it decline in area more rapidly than expected due to saltmarsh accretion.

(b) In particular how might the nutritional requirements of Black Tailed Godwits be met during the Autumn moult?

8. Black-tailed godwits migrate to the Humber Estuary to undergo their post-breeding moult, where numbers of passage birds result in the peak SPA count occurring during the autumn. Within the SPA, foraging black-tailed godwit numbers peak at Killingholme Marshes Foreshore, coinciding with peak usage at the adjacent North Killingholme Haven Pits, where foraging birds move to roost. Upon making the return migration from their breeding grounds, these two connected foraging and roosting sites are the preferred locality for black-tailed godwits in the Humber Estuary SPA.

9. As autumn and winter progress black-tailed godwit numbers decline both at Killingholme and across the estuary as a whole. Presumably, owing to resource depletion, as large numbers of foraging godwits reduce the amount of food available at Killingholme Marshes foreshore. Birds then distribute more evenly across the mudflats of the Humber Estuary, or leave the SPA entirely as they move to other estuarine sites elsewhere within the SPA network for the remainder of the winter period.

10. It is clear that whilst other areas within the SPA can support wintering black-tailed godwits, after their arrival within the SPA and as the period of moult commences these moulting birds seek to exploit the richest resource first. Therefore, during the autumn moult birds congregate at the most favoured site offering a combination of the greatest prey densities available in proximity to a secure roost site. In order to replicate the functionality provided by the Killingholme area to moulting godwits (both the foreshore and the pits), merely providing an area that could theoretically support some black-tailed godwits (based on prey biomass predictions) will not necessarily maintain the peak numbers of passage black-tailed godwits as a feature of the Humber Estuary SPA.

11. Based on a consideration of the requirements of the black-tailed godwit population potentially displaced, which meets the criterion for international importance in its own right, and the functionality compensatory habitat must replicate in order for these displaced birds to be supported, the following predictions are made both in the short, medium and long term:

a. **Short-term:** Based on the current compensation proposal, the short-term assessment is very straightforward. In the short-term, none of the compensatory habitat will have been created at the time of habitat loss, and in the absence of any habitat clearly the nutritional requirements of black-tailed godwits cannot be met. It is entirely possible these birds will be lost to the SPA resulting in a significant decline in black-tailed godwit numbers on the Humber Estuary. Even if these birds were still supported within the SPA, it is not possible to exclude an increase in mortality, or a reduction in productivity as a result of birds arriving on their breeding grounds in poorer condition.

b. **Potential solutions / recommended option:** Ideally, habitat creation should be prioritised so that habitat loss does not occur before provision of established compensation. Alternatively, European Guidance does suggest that over-compensation (i.e. creation of habitat in addition to the predicted needs of the species / populations displaced) can be considered.

c. **Medium-term:** In the medium-term, once sufficient compensatory mudflat at Cherry Cobb Sands has become established then it is anticipated, but by no means guaranteed, that peak counts of moulting black-tailed godwits that occur during the autumn passage may be able to be supported on areas of established mudflat. Using foraging godwit density as a proxy for mudflat quality it is apparent that quality varies enormously across the Humber Estuary. Godwit densities from high usage areas (i.e. Killingholme) compared to just average usage areas (i.e. densities based on the total SPA count deducting those birds at Killingholme and using the remaining area of mudflat within the SPA) vary by a factor measuring in the hundreds (see below):

    - Black-tailed godwit peak count SPA = 3887
    - Peak count SPA excluding Killingholme = (3,887 – 2,566) = 1,321
    - Killingholme area (100% littoral sediment) = approx 40 ha
    - SPA area of littoral sediment = 9,382 ha
    - SPA area of littoral sediment excluding Killingholme = (9,382 – 40) = 9,342 ha
    - Density Killingholme = 2,566 / 40 = 64.15 birds / ha
    - Density remainder SPA = 1,321 / 9,342 = 0.14 birds / ha
    - Ratio Killingholme density : average SPA density = 458 : 1

d. As it is unlikely that the area selected at Cherry Cobb will replicate the highest quality mudflat area, and could potentially be of average or below average mudflat quality, when considering the maintenance of the coherence of the SPA network, Natural England considered the additional benefits of the offer of a high quality area of wet-grassland. This consideration was based on assurances made by the applicant in relation to Little Old Humber Farm, although specific details were not provided in order for Natural England to critically assess the feasibility of this before. It is now apparent that the specific area offered was already within the applicant's ownership and was not selected based on its appropriateness for the creation of wet-grassland. There are serious concerns owing to the presence of multiple utility lines running across the site that need to remain dry and concerns about the hydrological assessment. In summary, the end result would be a highly engineered scheme with large areas of dry land dissecting multiple smaller compartments of wet-grassland.

e. **Potential solutions / recommended option:** Hypothetically, if a high quality area of wet-grassland was created as close as possible to Cherry Cobb Sands, in an area with additional water inputs and without serious site limitations, such as the utility lines at Old Little Humber Farm, the majority of the concerns described above would be allayed. A few wet-grassland areas at coastal sites in southern England do already support passage populations of black-tailed godwits during their autumn moult. Although provision of habitat on a like for like basis is the priority, and mudflat is the habitat used by peak numbers of foraging black-tailed godwits on their autumn passage within the Humber, limited experience from elsewhere does suggest that a complimentary area of wet-grassland immediately adjacent to the intertidal compensation could both supplement prey availability, as well as provide a roosting site should the wet-grassland be engineered to accommodate lagoons and unvegetated islands.

f. **Long-term:** Natural England's position is based on an area of mudflat being provided in compensation at a ratio of 2:1, but only accepting a decline to a ratio of 1:1 should monitoring prove that displaced SPA waterbirds are still supported within the smaller area. Such a monitoring strategy (as outlined within an Environmental Management and Monitoring Plan) would need to be linked to enforceable management and mitigation measures if the compensation objectives were not met.

g. Geomorphological predictions provided by Black and Veatch demonstrate that, owing to the highly accretory nature of the estuarine environment, over 20-30 years sediment accumulation will gradually transform any mudflat created in compensation to saltmarsh. The five and ten year predictions of mudflat area merely represent points on a line plotting the downward trajectory of mudflat coverage over time within the compensation site. As such, predictions at these given points are not based on shorebird ecology. Although predictions over a longer time-scale become increasingly inaccurate, it is recognised that eventually the continuing downward trajectory would result in an area almost exclusively composed of saltmarsh.

h. As at no point a dynamic equilibrium is reached whereby rates of accretion and erosion provide a sustainable area of compensatory mudflat that will be present in the longer-term (i.e. a like for like basis matching longevity at Killingholme), reference to a ratio of compensatory habitat to the area of habitat lost has little meaning. The ratio would alter depending upon the timescales selected and a change in area at any given point in time reflects the rate of mudflat loss. In the long-term, an area of saltmarsh (an area where large numbers of black-tailed godwits will not feed) clearly cannot meet the foraging requirements provided by a high quality area of mudflat.

i. **Potential solutions / recommended option:** Providing a complementary area of high quality wet-grassland to supplement foraging opportunities for black-tailed godwits (i.e. not the lower quality option currently offered by the applicant at Old Little Humber Farm), could partly address these concerns. In addition, the Environmental Management and Monitoring Plan should be able to outline ongoing management works, such as lowering ground levels within the RTE, that will ensure the long term success of the site. (Also see questions 18 – 21).

(c) Would an approach specifically directed to meeting the needs of Black Tailed Godwits contribute to the overall aims of maintaining the integrity and coherence

of the European sites more or less effectively than an approach based on restoring estuarial habitat at CCS?

12. The approach to compensate for the adverse effects upon the designated habitats of the Humber Estuary SAC is complimentary to the approach adopted to meet the needs of black-tailed godwits and maintain the coherence of the SPA network. Whilst both these designations cover the same area of land ear-marked for development, the compensatory requirements for the SPA are greater owing to a number of compounding factors:

    a. In order to compensate for SAC designated mudflat, it is just the generic habitat type that needs to be recreated. There is no additional measure of distinctiveness or of quality. However, the area of mudflat potentially to be lost is highly distinct as it supports a very specific diversity of SPA waterbirds. It is also of significant quality; it is the finest area of mudflat within the Humber for passage black-tailed godwits and meets the criterion for international importance within its own right.

    b. It is not just the quality and distinctiveness of mudflat that needs to be recreated, but its proximity in relation to a secure roost site and in all likelihood its proximity in relation to alternative less-favoured foraging areas. It is not possible to quantify the importance of these relationships.

(d) Is there evidence of any successful compensation schemes based on such an approach?

13. Having selected a site, creating compensatory habitat is largely dependent upon prevailing environmental conditions within the area selected. The type and proportions of intertidal habitat created will depend on estuarine conditions at the specific locality e.g. sediment loading, wave/tidal energy and height above ordnance datum. The design of a compensation site can try and utilise these existing environmental conditions to create and maintain habitat types where possible; for example the height of a site can be altered by removing material, the nature of the breach can alter scour and the use of regulated tidal exchange can, in the case of Cherry Cobb, maximise the longevity of any mudflat created. However in the case of Cherry Cobb Sands due to the high sediment loads in the Humber estuary careful design of the compensation site will only slow saltmarsh development and without intervention the entire site will develop into saltmarsh habitat within 20-30 years. In order to maximise foraging opportunity for black-tailed godwits, as mudflat is their favoured foraging habitat the primary aim is to maximise both the area of mudflat and the length of time before succession to saltmarsh would occur.

14. There are no examples of an internationally important population of black-tailed godwits being displaced and accommodated within an area of mudflat created by Regulated Tidal Exchange. There are, however, other examples of compensatory habitat being provided in the Humber Estuary and elsewhere. Birds are mobile and tend to adapt quickly to new habitats. Empirical studies show that colonisation can be rapid with often a high degree of bird usage within the first two years, but with differences in the species composition and temporal usage of the sites compared with the surrounding estuary. In other studies, differences between created and natural sites have manifested themselves with a preponderance of generalist, rather than specialist, species on restored sites (Atkinson et al. 2001).

15. Areas of managed realignment within the Humber have all attracted godwits in their early stages of development; Alkborough, Paull Holme Strays and Welwick.The most directly

comparable example is the area of managed realignment created at Paull Holme Strays in the mid-Humber Estuary, as this is the closest scheme to Cherry Cobb which is most likely to reflect estuarine conditions at the proposed site. Whilst black-tailed godwits have been attracted to realignment sites in their early stages of development, usage in the medium to long term is less certain. Certainly none of the sites support foraging birds in similar numbers to the existing peak numbers recorded at Killingholme Foreshore. Foraging numbers of black-tailed godwits at Paull Holme Strays are as follows Mander *et al* (2010):

- 2006 autumn count of foraging black-tailed godwits = 10
- 2007 autumn count of foraging black-tailed godwits = 153
- 2008 autumn count of foraging black-tailed godwits = 0[3]

Question 3

Natural England has a routine monitoring programme which supports reports to the European Commission. Does Natural England also make an assessment of the overall performance over time of the European sites (SACs and SPAs) in the Humber region in relation to their conservation objectives? If so, what does the most recent data show?

16. Natural England does not make an assessment of European site condition across the Humber region. The 'performance' or assessment of favourable condition of SACs and SPAs is undertaken at a site level; or at a feature level across the biogeographic region for reporting to Europe. As set out in our response to the first written questions, the most recent condition assessment for the Humber Estuary SSSI (which underpins the European sites), dated 1 May 2012, states that 97.8% of the site is in favourable or unfavourable recovering condition.

17. Reporting on the condition of features within UK SACs to Europe occurs every 6 years, with the last report being published in 2006. Reporting is currently underway for the next submission. Reporting on the condition of SPAs is also done at a UK level and will not include any regional or local site SPA information. However, in addition to the Humber Estuary SSSI condition assessments, the BTO WeBS Alerts report can also be a useful tool to compare site based trends with regional and national trends. The BTO publishes an alerts system that identifies species that have undergone major declines in numbers and flags these species by issuing an alert.

18. The current Humber Estuary data from the BTO (up to winter 07/08) states that the following species are on high alert (population decline greater than 50%) – pochard, lapwing and mallard; and the following species are on medium alert (population decline between 25% and 50%) – oystercatcher, ringed plover, lapwing, sanderling, dunlin, bar-tailed godwit, redshank, wigeon and mallard.

19. It also states that:

    a. Of the 20 species evaluated, alerts have been triggered for 10 species.

    b. Of the 10 species that have had alerts triggered, three species have had high-alerts triggered.

[3] There appears to have been an error in the IECS report which shows the 2008 count as 0 although this has been corrected verbally and should be 12. These figures compared to a peak count of 2,566 foraging birds at Killingholme Haven Foreshore.

c. Of the 10 species that have had alerts triggered, two alerts have been flagged as precautionary because the species in question exhibits inherent variability in numbers.

d. Of the species on alert, it is thought that site specific factors may be to blame for the decline in lapwing, mallard, sanderling and possibly ringed plover.

Question 4

If there has not been an assessment of overall performance is there anything authoritative that can be said about changes in the extent of different habitat types, trends in numbers and species of birds recorded and the cumulative results of changes in different types of habitat within different sections of the estuary, including habitats lost to development and created as part of managed retreat?

20. With regards to changes in the extent of habitat types, the Environment Agency has undertaken work to inform the Habitats Regulations Assessment of their Flood Risk Management Strategy (FRMS). This work was undertaken in 2010 and provides a spreadsheet of losses and gains in intertidal habitat in the various sections of the Humber Estuary. The work demonstrated that the inner estuary is accreting and there is also a managed realignment site at Alkborough; therefore the inner estuary is 'in the green'. In the middle estuary, losses have occurred more rapidly than previously predicted and even with the provision of Paull Holme Strays managed realignment site, the middle estuary is 'in the red' – i.e. losses to intertidal habitat from coastal squeeze are greater than the provision of new habitat. The outer north bank is accreting, whereas habitat is being lost on the outer south bank. The Environment Agency now have planning permission for a managed realignment site at Donna Nook to compensate for the losses on the outer south bank. The Environment Agency have started construction works at Donna Nook and work is currently on target to enable them to breach the site in 2013.

21. Natural England understands that the work undertaken for the Environment Agency due for completion in early August is still in draft format and therefore suggest that further information on this report should be obtained directly.

22. An assessment was undertaken in 2010 for the Humber Estuary SSSI condition assessment that covered bird species listed on the citation. These were:

- 22 species of wintering waterfowl; Bittern, Dark bellied Brent Goose, Shelduck, Wigeon, Teal, Pochard, Scaup, Goldeneye, Oystercatcher, Avocet, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone.

- 9 species of passage waders; Ringed Plover, Grey Plover, Sanderling, Dunlin, Ruff, Black-tailed Godwit, Whimbrel, Redshank and Greenshank.

The results were as follows:[4]

[4] Species not shown in the table had not experienced a significant increase or decline. Also the results vary slightly from the BTO WeBS alerts as these cover short (5 year), medium (10 year) and long (25 year) trends.

Species whose estuary populations have **increased** significantly*	Species whose estuary populations have **decreased** significantly*
Avocet	Bar-tailed godwit
Black-tailed godwit	Dunlin
Brent Goose (Dark Bellied)	Greenshank
Golden Plover	Grey plover
Teal	Knot
	Lapwing
	Oystercatcher
	Redshank
	Ringed plover
	Ruff
	Sanderling
	Turnstone

* 5 year peak mean, 98/99 - 02/03 compared to 5 year peak mean, 04/05 - 08/09

A change of 5% was the threshold for significance.

23. The changes to bird populations have not been assessed against areas lost and created through development proposals. The question of what is driving changes in bird populations on the estuary is a complex one. There are a variety of possible factors which may include habitat loss, habitat change and provision of managed realignment sites redistributing birds around the estuary. Other responsible factors may be changes in agricultural practice, increased recreational disturbance, and fluctuations in national and international populations of species. Natural England is working closely with partners such as the Humber Estuary Management Scheme to investigate these issues following the recent SSSI condition assessment exercise.

24. With regards to changes to habitat extent; all habitats created as part of compensation measures are monitored by the developer or the Environment Agency to ensure compliance with objectives that include extent. Natural England takes account of these areas in its condition assessment. As an example, units affected by coastal squeeze are currently recorded as 'unfavourable recovering' condition. This is because whilst intertidal habitats are being lost as sea levels rise (and the habitat is therefore in unfavourable condition), the Environment Agency have a programme of managed realignment sites in place to compensate for these losses (and therefore the site can recover).

Question 5

Does the applicant's assessment of cumulative effects contained in EX44.1 of the Supplementary Environmental Information address the full range of potential in-combination effects of AMEP with other plans or projects on European site features?

25. Natural England has now reviewed EX44.1 and found it generally to cover a comprehensive range of plans and projects that could act in-combination with AMEP. However, Natural England would recommend that attention is focussed on a number of specific issues where additional work is required; these should all be capable of resolution:

a. Capital and maintenance dredging and dredge disposal - EX10.4 refers to dredging and states "Loss of the current benthic community as a result of habitat loss will be a permanent effect. It was assessed in the ES, along with the footprint effects of the quay as being significant and is also assessed as significant in its own right". There is no mitigation assessed for this impact in EX10.4 and Natural England advises that the predicted impacts from AMEP on changes to biotope and species distribution need to be considered in-combination with other projects. Natural England also has concerns about the disposal of inerodible material alone and in-combination with other dredge disposals of this type of material.

b. Hydrodynamic and morphological change – it is unclear whether an adequate assessment has been made of all projects that may result in hydrodynamic and/or morphological change. This should include dredging and disposal, as well as existing managed realignment sites, quay construction and the tidal stream generators and should provide further clarity on how these have been assessed.

c. Impacts on SPA birds from the loss of terrestrial habitat – whilst a number of proposed developments are considered, the agreed mitigation is incorrectly described in a number of cases. It is also stated that the provision of mitigation means that there are no residual impacts to consider. This is not the case. Natural England advises that additional work should be undertaken to assess the impacts of in-combination effects on curlew; a species that is affected by a number of developments within the South Humber Gateway and at AMEP.

d. Impacts on lamprey – there are two tidal stream generators (TSG) on the Humber Estuary; one at Upper Burcom off North East Lincolnshire and one at the Deep, off Hull; these have been confused in EX44.1. The TSG that Natural England advises should be considered in-combination with AMEP with regards to impacts on lamprey is the one at the Deep, off Hull.

Question 6

To what extent has Natural England developed an underlying strategy in relation to compensation sites; and to what extent has the approach to compensation in any particular case been determined as a response to the anticipated effects of that individual development on particular habitat types and/or particular species?

26. It is not Natural England's role to develop strategies in relation to compensation on specific European sites. As set out in Natural England's response to question one above, compensation must be specific to the adverse effects predicted for the development under consideration; this is the advice we have provided to the applicant.

27. Nor has Natural England produced a generic strategy, as it is clear that individual projects and the protected features of individual sites affected will vary. The most useful guidance documents are those provided by Defra and the EU Commission. There is some relevant guidance available from Natural England – see for example English Nature Report Number 704 *How the scale of effects on internationally designated nature conservation sites in Britain has been considered in decision making: A review of authoritative decisions* (2006). This Report is attached at Annex 6.

28. There are also a number of initiatives on the Humber that we are involved in that could contribute to such a strategic approach. Natural England is a member of the Humber

Estuary managed realignment group, other members of which include the Environment Agency and Associated British Ports, and charitable organisations – the Wildlife Trust and RSPB. Whilst several members are individually responsible for specific managed realignment sites, the overall aim of the Group is to oversee the monitoring work and evaluate lessons learned from existing sites. To this end the Environment Agency has commissioned a study into existing sites with the aim of assessing their performance to date.

Question 7

In the recent case of Green Port Hull, the compensation requirement for direct and indirect intertidal mudflat was 1:1 (Source MMO: MLA/2011/00332 Further clarification on the Green Port Hull alternatives and IROPI statement). This is to be provided at Chowder Ness and Alkborough. ABP's notes on this provision state –

2. Chowder Ness has been functioning as viable managed retreat for 5 years and has been subjected to comprehensive monitoring to demonstrate its efficacy. For this reason, NE are content to accept that a 1:1 ratio is appropriate as the risk of failure of this compensatory habitat is now negligible.

3. Alkborough – whilst it has been safeguarded under a 2006 agreement between ABP, NE and EA – the land at Alkborough has had less time to become established and still requires some further on-site physical works to fully realise its ecological potential. For this reason NE have taken the view that a 2:1 ratio is appropriate, their comment being "This is because the specific location in question, which is a small area of the Alkborough Flatts Managed Realignment site, is new as far as Habitats Regulations compensation for the GPH development is concerned and a precautionary ratio is appropriate".

Is this an accurate reflection of Natural England's general approach?

29. The provision of compensation for the Green Port Hull development represents an unusual situation. A proposal known as Quay 2005 involving a very similar footprint within the designated site came forward ten years ago. Quay 2005 progressed through the Habitats Regulations to the point where compensation was agreed and provided as part of a package of compensatory measures at Chowder Ness and Welwick. However, whilst the compensation was put in place, Quay 2005 was never built. This meant that compensation for an ABP development at Hull has existed since 2006.

30. Whilst the impacts of Green Port Hull were considered afresh under the Habitats Regulations, it was agreed that the habitat already provided at Chowder Ness (and Welwick) was also suitable compensation for this development. As the habitat is already functioning and monitoring data demonstrates it is utilised by the numbers and species of bird that will be affected by GPH – i.e. the risk of failure is negligible - it was deemed appropriate to provide compensation at a ratio of 1:1.

31. However, there was an additional impact to the SAC that hadn't been considered previously with the Quay 2005 proposal; the loss of 3ha of subtidal (estuary) habitat. As compensation for this impact, it is proposed to manage an area of habitat within Alkborough Flatts managed realignment site to improve its connectivity to the estuary. The land is owned by ABP and therefore does form part of the EA's compensation package for coastal squeeze losses. In this case, the compensation ratio agreed by ABP for the loss of estuary habitat was 2:1.

32. As with all compensation sites, the developer (ABP) will undertake monitoring to ensure that the site objectives are met, and will be responsible for the delivery of effective and timely remedial measures if necessary.

Question 8

In the selection of a site for the provision of new habitat as compensation for habitat lost at Killingholme –

(a) What consideration was given to any particular characteristics of the Killingholme site?

33. The site location and design have been chosen by the applicant. However, as discussed in paragraph 7.12 in its Written Representations, Natural England advised that compensation should be provided in the first instance in the same area of estuary as the impact for which it is compensating. This is because it is generally considered optimal for compensation to be proximate to the area it is compensating.

34. Work undertaken by the Environment Agency for the Humber Estuary Coastal Habitats Management Plan (CHaMP) divided the estuary into three zones based on biotope (habitats and species) work that identified three geomorphologically and ecologically distinct sections of the estuary. This work has informed the compensation requirements for the Environment Agency's Flood Risk Management Strategy (FRMS) and it has been agreed with the EA that if compensation for the FRMS is provided within the same estuary zone as the losses, then it can be assumed that the coherence of the network will be maintained.

35. The Killingholme site is within the middle estuary and is therefore known to have the particular characteristics of the middle estuary zone. It is Natural England's view that if compensation is provided in the middle estuary, it could provide the same ecological function. However, a detailed programme of monitoring will be required to confirm this assumption and this should include a baseline assessment of the environmental conditions at Killingholme.

(b) In particular, what attention has been paid to the particular requirements of Black Tailed Godwits?

36. As set out in Natural England's Written Representations, it is not possible to rule out an adverse effect on site integrity for eight SPA species; however black-tailed godwit is the key species that utilises this area of mudflat for foraging and a peak count of 2,566 birds has been recorded. Black-tailed godwit densities are so high at this location that, despite its limited size, the peak numbers of birds recorded exceeds the threshold for international importance. As such, this one area of mudflat meets the qualifying criteria for SPA status in its own right.

37. Natural England has therefore advised the applicant and their consultants to pay particular attention to the needs of black-tailed godwit as there is the most risk associated with the provision of successful compensation for this species. It is Natural England's view that a managed realignment site that delivers a ratio of 2:1 mudflat creation to mudflat lost is a suitable compensation ratio; however it is acknowledged that this will decline over time. To support the Cherry Cobb Sands intertidal site, it is Natural England's view that an area of optimally managed wet grassland is also required. This should include islands so that the site provides additional foraging and roosting habitat specifically for black-tailed godwit, but will also be utilised by other species affected by the development such as curlew and lapwing. Whilst the applicant has proposed a site

at Old Little Humber Farm, it is clear from the recently submitted information that it will not be possible to create 38ha of wet grassland at this location due to numerous site constraints. Natural England is currently in discussion with the applicant over a proposal to create an alternative wet grassland site adjacent to Cherry Cobb Sands, which is likely to better support black-tailed godwits during their moulting period due to the provision of roosting and foraging habitat in close proximity. Natural England is also in discussion with the applicant over the provision of compensatory habitat to support the SPA birds in the short term.

(c) What weight was given to such factors by Natural England in the assessment of the suitability of Cherry Cobb Sands?

38. The ecological requirements of black-tailed godwits and the specific nature of the functionality currently provided at Killingholme have been central to the continuing advice provided by Natural England. These factors are also central to the ongoing discussions regarding the design of Cherry Cobb Sands and the associated wet grassland elements and the long term sustainability of these habitats. The success of the compensation package will ultimately be assessed through the Environmental Management & Monitoring Plan which will be required by the DCO.

Question 9

The Statement of Common Ground with Natural England has a table of meetings held to discuss compensation and lists 2 consecutive meetings one of 18.7.2011 recording "Major underlying principles of compensation scheme agreed" and 9.8.2011 recording "Broad quanta and habitat types of compensation agreed".

(a) Please provide copies of the minutes of these two meetings.

39. Please find the minutes at Annexes 2 and 3. Please note that these are the applicant's minutes, however Natural England has confirmed that it is happy for them to be submitted. Please note that only a draft version of the 9 August 2011 minutes was issued. The minutes have not been approved or agreed by Natural England.

(b) Are the proposals for development of a compensation site at Cherry Cobb Sands consistent with the principles and broad aims then agreed?

40. The current proposal for a managed realignment site with a Regulated Tidal Exchange scheme and an area of optimally managed wet grassland is consistent with the principles and broad aims agreed in Natural England's meetings with the applicant. It is worth noting that these meetings date from over one year ago and so whilst there have been some changes in the specific details of the compensation proposal, the minutes are consistent with Natural England's current advice with regard to the principles of compensation provision.

(c) If they are not consistent with those principles and broad aims in what way do they diverge and what are the reasons for such divergence?

41. N/A

Question 10

Appendix B to AMEP's June 2012 response to the Panel's First Round Questions is an "NLC Assessment of Mitigation Requirements for Killingholme Marshes" which focuses on Lapwing and Curlew as "… the only species using the area in

significant numbers".

(a) What is the origin of this report and who is it by?

42. The report was submitted by the applicant and is an approach undertaken by North Lincolnshire Council's ecologist to try and quantify the amount of habitat required to mitigate for the loss of Killingholme Marshes. Whilst Natural England recognises the rationale for using wader day calculations, Natural England did not support it in this case as set out in our letter dated 20 September 2011, attached at Annex 4.

(b) Is this study concerned with the foreshore at Killingholme or with the terrestrial area of mixed arable and pasture fields between the Humber Sea Terminal and Immingham Dock: in the Environmental Statement Volume 1 Chapter 11-10 the former is given the name Killingholme Marshes and the latter Killingholme Fields.

43. The assessment only covers the terrestrial habitat between Humber Sea Terminal and Immingham Docks.

Question 11

The Panel has been presented with a report by Roger Morris of Bright Angel Coastal Consultants Ltd, formerly of Natural England, which concludes in paragraph 9.8 that - … it would be extremely unwise to consider the proposed realignment at Cherry Cobb Sands as a viable measure to offset the loss of feeding grounds used by 66% of the internationally important population of Black-tailed Godwit that visit the Humber Estuary each year.

Has information emerged or policy changed such that it is no longer appropriate to seek compensation in accord with the principles agreed in July 2011?

44. Natural England has assumed that reference is made to paragraph 9.6 in the report by Roger Morris.

45. As stated in Natural England's relevant representations and in the Statement of Common Ground on HRA matters, Natural England is in agreement with Roger Morris that the first interim design modelled by Black and Veatch would not have been sufficient to maintain the coherence of the Natura 2000 network. The modelling work demonstrated that a conventional managed realignment site would rapidly accrete and form saltmarsh habitat, and therefore would not provide the same ecological function for black-tailed godwits as the habitat lost. As the panel will be aware, Black and Veatch has now modelled a second interim design and this proposes a Regulated Tidal Exchange scheme. Whilst this demonstrates that a larger area of mudflat habitat can be created and sustained in the longer term, and at a ratio greater than 1:1; there is still an element of risk as an RTE has not been built on the Humber Estuary before. Natural England are working with the applicant to agree an area/s of wet grassland habitat that would be managed to provide additional roosting and foraging habitat as part of a package of compensation. The report by Roger Morris does not reflect the nature of the current compensation proposal or the inclusion of managed wet grassland elements as part of the overall compensation package.

46. Natural England is not aware of any policy changes that would result it in no longer being appropriate to seek compensation in accord with the general principles discussed in and around July 2011. The key point is that the compensatory habitat must provide the same ecological function as the habitat lost to ensure that the coherence of the network is maintained. It is Natural England's view that the first interim design modelled by Black

and Veatch did not achieve this and therefore the applicant commissioned further work on a different design.

Question 12

The reference to the foreshore at Killingholme as providing "feeding grounds used by 66% of the internationally important population of Black-tailed Godwit that visit the Humber Estuary each year" is reflected in the table following para 6.13 of Natural England's written representations.

What is the origin of this figure and how reliable is it?

47. This figure is a simple calculation from the monitoring work undertaken for AMEP at Killingholme foreshore and the estuary population of black-tailed godwit. The Through the Tide Counts were undertaken by the Institute of Estuarine and Coastal Studies from April 2010 to April 2011 and recorded a peak count on the intertidal habitat of 2,566 birds. The Wetland Bird Survey (WeBS) Counts as published in Waterbirds in the UK, Calbrade *et al*., 2010 record a 5 year mean of the peak counts for the whole estuary as 3,887 birds. These figures enable a calculation to be undertaken to demonstrate the importance of Killingholme foreshore; i.e. that 66% of the entire Humber Estuary SPA population was present in a single count. Comparing the site specific data collected by the developer with the published WeBS counts for the whole site is a standard approach utilised to determine the impacts on the designated site. It is therefore as reliable as any dataset presented by a developer in their Environmental Statement. The WeBS data for the Humber Estuary is a robust dataset, although it is acknowledged that there are some gaps where some sectors are not counted regularly.

48. A wetland is considered to be internationally important if it regularly holds at least 1% of the individuals in a population of one species; the international threshold for black-tailed godwit is 470 birds. From this data, it can clearly be demonstrated that the Humber Estuary is an internationally important site for black-tailed godwit.

Question 13

What modelling or other work has been carried out to establish what would happen over the long term to the inter-tidal mudflats at Killingholme in the absence of any further development?

49. In their medium and long term quantum of habitat loss report (supplementary report EX 11.24) the applicant has stated that "By 2050, the CHaMP predicts that 360ha of intertidal will be lost in the middle estuary due to SLR. Adopting a simple pro-rata data approach would suggest that, in the long term 4.32ha of the existing intertidal at Killingholme Marshes will become sub-tidal due to SLR by 2050 and more thereafter." Coastal Habitat Management Plans (CHaMPs) provide advice to inform strategic flood risk and coastal management decisions in order to avoid damage to sites designated under the Ramsar Convention and the Habitats and Birds Directives. Their purpose is to predict long-term deterioration of the integrity of Natura 2000 and Ramsar Sites. The CHaMPs provide the information to establish how habitats in the estuary will develop and change overtime. The work carried out for the CHaMP was divided into a number of sections on the basis of the geomorphological and ecological characteristics of the estuary and did not therefore provide detail on individual frontages. The pro-rata approach as put forward by Able provides the only way to assess how much habitat might be lost over a specific frontage (such as the intertidal mudflats at Killingholme), more detailed work on individual frontages has not been carried out.

Question 14

When making counts of large flocks of Black Tailed Godwits, at roost and when feeding, what level of certainty is there in standard methodology that double counting is not taking place?

50. Human error can never be totally discounted, but counts undertaken by experienced observers will be accurate and error should be low enough as to be insignificant. Errors leading to marginal over-estimates are as likely to occur as errors leading to marginal under-estimates and there is no basis for suggesting that double counting will take place.

51. Peak numbers are based on the maximum number of birds present at the specific point in time that observations took place. As such, the use of the term peak count is somewhat misleading as it does not represent the total number of birds that might utilise an area over a single tidal period, week, month or season. Instead, it represents the minimum total number of birds recorded at a specific area at a single point in time. No attempt has been made to identify individual birds to take into account turnover. For example, a cumulative count of multiple separate flocks of a single bird species moving between foraging and roosting grounds within an estuary over the course of a single tidal cycle could well lead to a count far in excess of the maximum count of a single flock. Over the course of spring passage, as opposed to a single tidal period, a further example could be provided by usage of an estuarine site by ringed plover. Unless bad weather halts progress to their breeding grounds, numbers of passage birds recorded at any one point during the spring will not accumulate and will not reflect the much larger number of birds that could pass through a coastal site giving a better understanding of total site usage. Such cumulative methods have not been adopted in this case. Accordingly whilst the importance of a site for birds may be underestimated, the risk of double counting is also minimised.

Question 15

Recorded numbers of Black Tailed Godwits making seasonal visits to the Humber have increased from a very low level 40 years ago.
Should this affect the view taken of the significance for the conservation objectives of the European sites of disturbance to feeding patterns of Black Tailed Godwits likely to result from development on the Killingholme foreshore?

52. Less than 100 black-tailed godwits wintered in the UK during the 1930s but since the mid-1970s the number of wintering black-tailed godwits has risen steadily to their current sustained high level. Numbers on the Humber Estuary started increasing in the late 1980s (see reference ENRR547 The Humber Estuary; A comprehensive review of its nature conservation interest).

53. The SSSI conservation objectives as set out in the favourable condition table for the Humber Estuary state:

- Habitat Extent: No decrease in extent of listed habitats from established baselines, subject to natural change.
- **Population Size: Maintain the population based on known natural fluctuations at or above the minimum for the site based on either a 5yr mean peak count at designation OR any 5yr period since designation - whichever is highest** [emphasis added].

- Disturbance and Displacement: No specific reduction in numbers either on the site, or from one part of the site to another attributable to anthropogenic factors.
- Variety of Species Maintain diversity as at designation (2004) OR as at any other 5 year period since designation – whichever is most diverse.

54. These conservation objectives for the SSSI make it clear that the aim for the Humber Estuary designated site is to maintain the population of protected bird species at its highest level, subject to natural change. It is therefore appropriate to use current data to assess the significance of the impact for the conservation objectives on the Humber Estuary site. This reflects the 'true' impact of the development regardless of whether there have been changes in the population since designation.

Question 16

The Panel notes the evidence from Dr Steve Percival submitted as part of AMEP's Comments on Written Representations (para 17.11 et seq).
(a) Is there more evidence on the extent to which Black Tailed Godwit flocks move around the estuary and display opportunistic behaviour as well as being loyal to particular sites?

55. Details of black-tailed godwit movements within the Humber Estuary are available within Catley 2009, a document appended to ABP's Environmental Statement to Grimsby Ro-Ro Birth Supplementary Note 1 (attached at Annex 5). This detailed document provides the following information (summarised below):

a. During the early autumn there is considerable movement between sites within the Humber Estuary as new birds arrive and swell the population. Birds can cover reasonably large distances in a short space of time and observations of colour ringed birds has proven the speed at which birds can move around the estuary. On spring tides most birds roost at Blacktoft and Alkborough, Killinholme Haven Pits with smaller numbers at Paull Holme Strays and Welwick, with observations of colour-ringed birds confirming movements between these sites. By mid September and increasingly through October, however, the bulk of the Humber population becomes concentrated in the area adjacent to North Killingholme Haven Pits where the birds roost. This report categorised autumnal movements of black-tailed godwits, based on observations of colour-ringed birds, as follows:

    i. Movements of wintering birds to pastures and feeding areas in East Anglia in mid-winter to early spring

    ii. Arrivals on the Humber in the autumn followed by post-breeding moult and onwards movements to wintering areas further south

    iii. Short stay autumn passage

    iv. Autumn arrivals followed by regular wintering on the Humber

    v. Irregular occurrence in some autumn periods

    vi. Irregular occurrence in some winters but wintering at other sites in other years

vii. Protracted stays on the Humber of juveniles that arrived in the previous autumn

viii. Arrivals on the Humber of birds that have moulted in the Wash earlier in the Autumn

ix. Movements from west coast to east coast

x. Occurrence on the Humber over long time periods

b. Movements of colour ringed birds demonstrate that some birds (such as those within categories 5 and 6), are not consistent in their selection of wintering locations. The attraction of birds to newly created areas of managed realignment in the early stages of development also demonstrates a degree of opportunism within a certain proportion of the population. Other types of movement (such as those within categories 4 and 10) and concentration of birds at Killingholme as autumn progresses demonstrates that a certain proportion of birds are loyal to particular SPAs, and at certain times of year to particular sites within an SPA.

(b) If so, does this increase or decrease confidence that Black Tailed Godwits will use the compensation site for roosting and foraging? Does it increase or decrease confidence that they will continue to use North Killingholme Haven Pits?

56. The distances moved between sites over the course of an autumn strongly suggest that if suitable compensation was provided within the Humber Estuary, such as at Cherry Cobb, then distance alone (i.e. between areas of habitat loss and habitat creation) would not provide a barrier to colonisation. The critical distance, however, is between the favoured roosting and foraging grounds at the point in the autumn when the number of moulting birds reach their peak. This is the time when birds concentrate at Killingholme. At this time, roosting and foraging sites need be as close as possible if functionality is to be maintained. If the compensation does not adequately address roosting requirements, peak numbers of displaced birds are unlikely to be accommodated. It is therefore necessary to provide a roost site at Cherry Cobb (an unvegetated island within a lagoon), ideally in an adjacent area of wet grassland.

57. Following loss of the favoured foraging habitat at Killingholme foreshore then numbers of roosting birds are likely to be reduced at North Killingholme Haven Pits during the autumn moult, regardless of compensation provided at Cherry Cobb. Critically, however, if roost site provision becomes part of the compensation proposal at Cherry Cobb then accommodation will have been made for these displaced birds.

Question 17

Is there currently sufficient evidence from observation of Black Tailed Godwits to make predictions about the likely adaptive behaviour to a loss of a favoured feeding ground located close to a particularly favoured roost during the autumn moult?

58. It is entirely possible that the loss of a favoured feeding ground located to a favoured roost during the autumn moult would result in displaced birds being lost from the SPA, resulting in a significant decline in black-tailed godwit numbers on the Humber Estuary. Even if these birds were still supported within the SPA in the short term, it is not possible to exclude an increase in mortality, or a reduction in productivity as a result of birds arriving on their breeding grounds in poorer condition.

59. The European Management Plan for black-tailed godwits (Anon 2007) states that in Great Britain and Ireland threats to non-breeding birds are acute as the species is especially concentrated at relatively few sites. The black-tailed godwit is sensitive to loss and degradation of its intertidal habitats, in particular through land-claims, sea-level rise and pollution (Smit et al. 1987). As reported in Catley (2009)(attached at Annex 5), black-tailed godwits may be prone to sudden changes in status in particular sites owing to its preference for restricted feeding and roosting areas. If these sites are disturbed or reclaimed the species may undergo dramatic alterations. For example, on the Stour, low tide counts during the winters of 88/89 and 89/90 revealed dramatic changes in numbers and distribution of black-tailed godwits following intertidal reclamation of a major feeding area (Coombes 1991).

Question 18

How much reliance can be placed on Adaptive Management for dealing with uncertainties relating to adaptive behaviour of Black Tailed Godwits?

60. At the time of consent, it is vital that an informed judgement can be made on the adequacy of the proposed compensation measures to maintain the coherence of the Natura 2000 network. Therefore, in the first instance the compensation proposals should be designed to maximise the extent, quality, functionality and longevity of intertidal mudflat and grassland habitat to offset the specific impacts predicted for the development. The site will then be subjected to an ongoing monitoring programme to ensure that the compensation objectives are being met. If the objectives are not achieved, then it is possible that remedial action will be required. This could take the form of dredging out the sediment that has accumulated within the RTE cells to ensure the long term functionality of mudflat habitat. A case by case assessment would be undertaken to determine whether the suggested management could remedy any residual impact as this would depend on the cause eliciting a particular behavioural response.

Question 19

Are there sufficient monitoring requirements in the current proposals to support an Adaptive Management approach?

61. There are currently no agreed monitoring requirements. It is anticipated that an Environmental Monitoring and Management Plan will be developed for the compensation site in consultation with the applicant. It is not possible to develop such a monitoring and management plan until the details of the compensation package have been finalised, and at the time of writing discussions are still ongoing.

Question 20

Should reliance be placed on such measures to respond to specific uncertainties in relation to, e.g., future feeding patterns of Black Tailed Godwits currently feeding at Killingholme Marshes?

62. There are currently no such measures, however if the monitoring determines that the site is not meeting its compensation objectives, then this will inform the need for adaptive management measures.

Question 21

If there can be such reliance, should it be with or without the compensation

habitat being proposed for Cherry Cobb Sands?

63. Whilst the Cherry Cobb Sands site will be monitored to assess delivery of the objectives, the intertidal mudflat habitat has to remain a key element of any compensation package. Without the permanent replacement of the intertidal habitat that will be lost, there will be no measures in place to maintain the coherence of the SPA network. Whilst it is possible that black-tailed godwits may choose to feed elsewhere in the designated site and it may appear that the compensation site is therefore not required by black-tailed godwit, it would be impossible to determine whether this will be the case in the long term. The compensation site must therefore remain in situ and when it meets the required standard, it will be incorporated into the designated site boundary. In this way the coherence of the network will be secured.

Question 22

The Morris Report and Natural England's Written Representation (29 June 2012, paragraph 8.6 to 8.9) are based on a review of the managed retreat design. A new design based on a Regulated Tidal Exchange is now being put forward by Black & Veatch (August 2012), in line with recommendations from the RSPB and the EA.
What level of certainty is there that this new design would deliver adequate compensation for –
(a) The foraging requirements and possibly roosting requirements of migratory birds?

64. As detailed in responses to earlier questions there are still concerns that the compensation currently offered is inadequate in the short, medium and long term (with recommendations provided to address these issues). The short-term issue relates primarily to the timing of the development in relation to the provision of compensatory habitat. The most significant issues in the medium to long term primarily relate to the inadequacy of the wet-grassland proposal and the longevity of mudflat created owing to accretion of saltmarsh.

65. The level of certainty about making such predictions is not altered significantly by changing the design of the compensation proposal from a managed realignment to a regulated tidal exchange at the Cherry Cobb site. There are currently no provisions for roosting sites of the type favoured by black-tailed godwits, but this was also true for the previous iterations for intertidal compensatory habitat creation.

66. There is less experience of regulated tidal exchange, so this is to a degree more experimental. This potential reduction in certainty is more than offset by improved predictions for the extent and longevity of mudflat that will be created by the regulated tidal exchange in comparison to realignment, so that the former is the preferred technique.

(b) Other possible compensation requirements related to the SAC, SPA and Ramsar sites?

67. The new interim design for compensation would provide mudflat in the short to medium term in the Regulated Tidal Exchange areas, without management this will develop into saltmarsh over the longer term. Much of the main realignment area will quickly develop into saltmarsh. Natural England is satisfied from an SAC perspective that this habitat evolution from mudflat to saltmarsh will maintain coherence of the SAC network when incorporated into the SAC and that the compensation proposed will be adequate for the

SAC. The key area of concern relates to the Ramsar and SPA interest and requirements for migratory birds as detailed in question 22(a).

(c) What further assessment does Natural England consider necessary to prove or support this new proposal?

68. Natural England notes that the Black and Veatch report dated August 2012 is an interim report whose purpose is to give confidence that the required amount of compensation can be delivered and to set out the parameters within which a finalised design will be developed. Natural England would wish to see and comment on any further iterations as well as comment on the final design for the compensation site at Cherry Cobb Sands. In addition, in view of report's clear indication that the mudflat habitat at Cherry Cobb Sands is not sustainable in the long-term without management then Natural England would wish to see and comment on proposed management measures necessary to maintain the required extent and quality of mudflat habitat.

Question 68

In the SoCG between your organisations and the applicant a number of issues remain unresolved because you have not been able to fully consider additional information supplied by the applicant.

What is your position now on the additional information?

69. Several of these issues are discussed in Natural England's response to comments on the Relevant Representations; however, a summary is provided in the table below:

Description of issue	Report Number	Comment
Resolved issues		
Thermal plume	EX9.7	Natural England has no concerns over the thermal plume. This issue is resolved
Lighting	EX19.1	Natural England will be consulted on the final lighting plans and therefore this issue is resolved.
Direct and indirect habitat loss	EX11.23 EX11.24	Natural England agrees with the figures presented in EX11.23 – direct habitat losses. EX11.24 has been amended and final agreed spreadsheets for losses to the designated sites have been included in the SOCG on the shadow HRA. This issue is therefore resolved
Impacts on estuary wide processes	EX8.7 EX8.9 EX8.10 EX28.1	These issues are now resolved.
Unresolved issues		
Dredging	EX10.4 EX10.6 EX11.14 EX34.2	Natural England has an outstanding concern regarding the impacts of capital and maintenance dredging and disposal in combination with other projects on the Humber.

Description of issue	Report Number	Comment
Construction and operational noise	EX11.22	Suggestions for noise and height restrictions have been provided to Natural England. Whilst we have not yet had time to fully consider these, it is expected that this issue can be resolved through an appropriately worded requirement.
Old Little Humber Farm	EX28.2	It is Natural England's view that OLHF does not deliver the agreed compensation requirements in terms of extent and quality.
Water voles	EX11.29 EX20.3	Natural England is awaiting clarification on the length of ditches that will be lost and recreated.
Breeding birds	EX11.16 EX20.3	Further work is required on the assessment of impacts and proposed mitigation.
In-combination impacts	EX44.1	Further work is required as set out in the response to question 5

Question 69

To what extent does it address the issues raised in your Relevant Representations or Written Representations on the potential impacts on European sites?

70. The additional information provided by the applicant has helped both clarify and resolve a number of issues raised in the Relevant Representations (RRs) and Written Representations (WRs) on the potential impacts on European sites. There remain, however, a number of outstanding issues in addition to those listed in question 68 above. Those resolved and those outstanding issues are as follows:

Resolved issues:

71. Concern was raised in the RRs and WRs about the proposed piling operations required during the construction of the Marine Energy Park and the disturbance impacts on SPA/Ramsar waterbirds (WR paras 8.29-8.31) and on lamprey (WR para 8.71). Piling restrictions to minimise noise disturbance to waterbirds and to lamprey have now been agreed in principle with the applicant although the precise wording for inclusion in the Deemed Marine Licence is still to be finalised.

Unresolved issues:

Compensation site at Cherry Cobb Sands (WRs paras 8.11-8.28)

72. The detailed compensation measures have not yet been finalised. Natural England has agreed the principles for the compensation measures, as set out in the WRs, which confirms that it is necessary to provide a compensatory ratio of at least 2:1 for the loss of intertidal mudflat, and a ratio of 1:1 for the loss of estuary (subtidal) habitat.

73. It is recognised that a 2:1 ratio is likely to be sufficient to meet the requirements of seven of the eight SPA species displaced (shelduck, ringed plover, dunlin, lapwing, bar-tailed godwit, curlew and redshank), albeit an element of uncertainty remains. For black-tailed godwits, however, it remains possible that 2:1 may not prove to be sufficient. Therefore

there is need for a robust monitoring programme; the details of this will be set out in the EMMP for the compensation site along with any necessary remedial action.

74. A second interim report on the detailed modelling for the Cherry Cobb Sands Compensation site dated August 2012 has been submitted by the applicant. This new report considers an alternative method for creating intertidal habitat at Cherry Cobb Sands (CCS) in which half of the site area will be developed as three Regulated Tidal Exchange (RTE) sites. The results of the detailed modelling give predictions for mudflat creation as: initially 86ha; after 5 years 65.7ha, and after 10 years 56.7ha. Whilst there are a number of assumptions and consequent uncertainties associated with modelling, the predictions for mudflat creation give confidence that the agreed compensatory ratios are achievable certainly in the short and medium term. There is considerably less confidence however about the sustainability of mudflat habitat in the long term; beyond 10 years. The modelling shows that due to the highly accretory nature of the Humber Estuary and without management then almost the entire site would become saltmarsh in between 20 and 30 years.

75. In addition to the managed realignment site at CCS, the need for an area of high quality managed wet grassland to provide foraging habitat for black-tailed godwits along with a roost site located close to the intertidal compensation site has been agreed in principle. This was originally to have been provided at Old Little Humber Farm, however, after consideration of the design proposals it is clear that this site will not deliver a sufficient amount of wet grassland habitat of the required quality to support the displaced birds. Discussions are ongoing to determine whether a site with better prospects for the creation of wet grassland and located closer to the intertidal compensation site can be established. NE would need to be able consider the detailed design and management proposals for such a site before confirming the suitability of this part of the compensation.

76. There are two factors that have yet to be addressed in respect of the timing of the proposed compensation measures:

    a. Firstly, the compensation habitat should be available to SPA/Ramsar waterbirds for the same period of time as the area of lost habitat would have otherwise been present. In other words, the compensation should be like for like on a temporal basis, taking into account natural change. NE accepts that an RTE provides a greater chance of maintaining mudflat for longer than a managed realignment site, however this type of scheme has not previously been used on the Humber Estuary, and therefore there is a high level of uncertainty about how this technique will work in such a sediment-rich environment. What is clear, however, is that due to the high sediment loads in the Humber Estuary careful design of the compensation site will only slow saltmarsh development and in the long term the entire site will develop into saltmarsh habitat; modelling implies this will happen within 20-30 years. It is evident that in order to maintain mudflat habitat of an extent and quality which provides like for like compensation for foraging SPA birds at Cherry Cobb Sands in the long-term then there will need to be intervention management. This is likely to involve a range of measures, such as the rotational dredging of the RTE cells, which will need to be defined by the applicant and agreed as part of the EMMP for the compensation site.

    b. Secondly, the compensation should be available at the time that the habitat being compensated for is lost. As the compensation site at CCS will not be an ecologically functioning mudflat for a number of years after the Killingholme Marshes foreshore is destroyed, the applicant offered to provide a wet

grassland site at Old Little Humber Farm whilst the managed realignment site develops benthic interest. As indicated above, Natural England has advised the applicant that the site at Old Little Humber Farm will not deliver a sufficient amount of wet grassland habitat of the required quality to support the displaced birds and furthermore the work undertaken by the applicant's consultants demonstrates that the site is not capable of providing foraging habitat within the required timescale. Thus the current compensation proposal does not include provision of compensatory habitat which will be ecologically functioning at the time of habitat loss. We understand from recent discussions with the applicant that options for the early creation of wet grassland are under consideration to address this issue.

77. At the current time, and for the reasons outlined above, Natural England is unable to advise that the compensation measures are adequate to maintain the coherence of the Natura 2000 network.

78. A compensation measures workshop involving Natural England and the applicant took place on 17 August when the details of the proposed compensatory measures were discussed along with consideration of additional and alternative options. Significant progress has been made in strengthening the compensation measures both at this workshop and in subsequent discussions. We will continue to advise the applicant on the identification of an acceptable package of measures which is capable of adequately addressing the issues of extent, quality, timing and sustainability of the compensation. We hope that these outstanding issues will be resolved shortly.

Environmental Monitoring and Management Plans (EMMPs) (WRs paras 8.69)

79. It has been agreed that there will be three EMMPs covering: i) the terrestrial environment, ii) the marine environment; and iii) the compensation site. It has also been agreed that these plans will be delivered through provisions within the DCO and DML.

80. The structure and outline content for 2 (terrestrial and marine environments) of the 3 EMMPs have been prepared by Natural England and are now being populated and developed by the applicant. The Compensation Site EMMP will be developed once the details of the compensation have been finalised.

81. In view of the importance of the EMMPs to the successful delivery of the environmental mitigation and compensation measures of the proposed project, Natural England advises that it will be of the utmost importance to finalise and agree all 3 EMMPs before the end of the Examination period.

European Protected Species - Great crested newts (WRs paras 8.35 - 8.46)

82. A draft European Protected Species licence application was re-submitted to Natural England on 12 June 2012. The draft application was assessed and Natural England advised the applicant that should the application be formally submitted then Natural England's view is that the 'Purpose' and 'No Satisfactory Alternative' tests would be met however the information and evidence currently provided within the draft method statement would not meet the 'Favourable Conservation Status' test. This further information and evidence, as detailed in Natural England's formal response to the applicant dated 24 July 2012, is required for the assessment of the 'Favourable Conservation Status' test and, if successful, the issuing of a 'letter of comfort'.