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Able Marine Energy Park

Material Change 2

Updated Habitats

Regulations Assessment

Report (January 2022)



Able Marine Energy Park: Material Change 2

Habitats Regulations Assessment Report

Part 1: Likely Significant Effect (LSE) Test

Document TR030006/APP/7

Executive Summary

This document sets out the assessment of the likely significant effects of the proposed material change to the Able Marine Energy Park Project on the network of Natura 2000 European protected ecological sites. It provides the necessary information to enable Natural England, as the Government's statutory nature conservation body, to advise on the potential impacts of the project and, in particular, whether an appropriate assessment is required.

The requirement for this Assessment is set out under Article 6 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna, (the 'Habitats Directive'). Article 6 requires that any plan or project which is not directly connected to, or necessary to the management of a Natura 2000 site and which is likely to have a significant effect on the conservation objectives of the site, either individually or in combination with other plans and projects, should be subject to an appropriate assessment.

This Assessment has been prepared with due consideration given to the information provided in Planning Inspectorate's (PINS) tenth advice note on 'Habitat Regulations Assessment relevant to nationally significant infrastructure projects (NSIP)'.

The proposed material change to the Able Marine Energy Park Project was considered to have the potential to have effects on the Humber Estuary SPA, the Humber Estuary Ramsar site and the Humber Estuary SAC. It concludes Likely Significant Effects for eight of the qualifying SPA species (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, knot, shelduck and redshank) and for six of the wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal).

There would also be LSE for the Humber Estuary SAC, for its (a) estuarine habitat; (b) intertidal mudflat, (c) *Salicornia* and other annuals colonising mud and sand; (d) Atlantic sea meadows (*Glauco-Puccinallietalia maritima*); (e) grey seal and (f) river lamprey and sea lamprey populations.

The same conclusions were reached in the HRA Information Report for the consented application¹.

¹ [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000572-16%20-%20Habitat%20Regulations%20Assessment%20Report%20\(15\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000572-16%20-%20Habitat%20Regulations%20Assessment%20Report%20(15).pdf)

1. Introduction and Background

- 1.1. This report forms part of the application for a Material Change (MC2) to the consented Able Marine Energy Park Development (referred to hereafter as the 'Project'). It addresses the nature conservation issues raised by the Project, specifically in relation to the Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'). It comprises the first part of the information to inform the Habitat Regulations Assessment (HRA) for the project, and considers the proposal's potential to have likely significant effects (LSE) on relevant sites of international nature conservation importance.
- 1.2. The document is set out as follows:
 - A brief overview of the Project;
 - An outline of the HRA process;
 - A summary of information on the designated sites of nature conservation interest to be included in the HRA;
 - An update to the baseline for all of the SPA/Ramsar/SAC populations/communities, including:
 - Changes to baseline habitats
 - Changes to baseline bird numbers
 - Changes to development baseline for cumulative
 - An assessment of whether the proposed material changes to the Project would have a likely significant effect with regard to the designated features of the international sites under consideration, or on any designated feature's supporting habitats and species.
- 1.3. The purpose of the report is to update the previous HRA that was undertaken for the DCO, focusing on changes that are proposed to the consented scheme. That HRA could not rule out LSE for a range of qualifying features of the Humber Estuary SPA/Ramsar site, so an Appropriate Assessment was undertaken by the Secretary of State for Transport. That concluded that an adverse effect on integrity could not be discounted with the required degree of certainty. The Project was determined to be both needed and having imperative reasons of overriding public interest (IROPI), and a compensation scheme was agreed.²
- 1.4. Brexit has made no change to the process of HRA so far, so for simplicity the previous language and references to EU Directives are retained in this assessment.

Outline of the Habitats Regulations Assessment Process

- 1.5. The EU Directive 92/43/EEC on the conservation of habitats and of wild flora and fauna (known as the 'Habitats Directive') protects habitats and species of European nature conservation importance. Together with Directive (2009/147/EC) on the

² <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-002225-SoS%20Decision%20letter%20with%20annexes.pdf>

conservation of wild birds (the 'Birds Directive'; European Commission 2009), the Habitats Directive establishes a network of internationally important sites designated for their ecological status. Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds. These sites combine to create a Europe-wide 'Natura 2000' network of designated sites, which are hereafter referred to as 'European Sites'. The term 'European Site' also includes European Marine Sites.

- 1.6. The Habitats Regulations incorporate all SPAs into the definition of 'European sites' and, consequently, the protections afforded to European sites under the Habitats Directive apply to SPAs designated under the Birds Directive.
- 1.7. In addition to sites designated under European nature conservation legislation, it is UK Government policy that internationally important wetlands designated under the Ramsar Convention 1971 (Ramsar sites) are afforded the same protection as SPAs and SACs for the purpose of considering development proposals that may affect them. The Government also affords the same level of protection to potential SPAs (pSPAs), candidate SACs (cSACs), possible SACs (pSACs) and draft SACs (dSACs).
- 1.8. Regulation 63 of the 2017 Conservation of Habitats and Species Regulations defines the procedure for the assessment of the implications of plans or projects on European sites. Under this Regulation, if the proposed development is unconnected with site management and is likely to significantly affect the designated site, the competent authority must undertake an 'appropriate assessment' (Regulation 63(1)).
- 1.9. The Planning Inspectorate (PINS, November 2017) published version 8 of its tenth advice note, on '*Habitat Regulations Assessment relevant to nationally significant infrastructure projects*'³. The note sets out advice, information and recommendations on the approach to the Habitats Regulations. The note should be also read in conjunction with the Habitats Directive, the 2017 Habitats Regulations (as amended), relevant Government Planning Policy, and European guidance. It recommends a four-stage process:
 - i. Screening: Determining whether the plan or project '*either alone or in-combination with other plans or projects*' is likely to have a significant effect on a European site (or sites);
 - ii. Appropriate Assessment: Determining whether, in view of the European site's conservation objectives, the plan or project '*either alone or in-combination with other plans or projects*' would have an adverse effect (or risk of this) on the integrity of the site. If not, the plan can proceed; and
 - iii. Mitigation and Alternatives: Where the plan or project is assessed as having an adverse effect (or risk of this) on the integrity of a site, there should be an examination of mitigation measures and alternative solutions. Mitigation should be considered first, so as to avoid an adverse effect if possible.
 - iv. If it cannot be proven that there is no adverse effect on site integrity, it must be demonstrated that no alternatives to the proposal exist and then imperative

³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/06/Advice-note-10v4.pdf>

reasons of overriding public interest (IROPI) can be considered. This is not considered a standard part of the process and will only be carried out in exceptional circumstances. If consent is granted at this stage compensation is required to ensure the coherence of the Natura site network.

- 1.10. All four stages of the process are referred to cumulatively as the Habitats Regulations Assessment, to clearly distinguish the whole process from the step within it referred to as the 'Appropriate Assessment'.
- 1.11. In respect of step 2, the integrity of a site is defined as the coherence of the site's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated (EC, 2001). An adverse effect on integrity, therefore, is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of designation.
- 1.12. The European Commission's (2018) advice note describes how appropriate assessment (i.e. step 2 above) should be undertaken. This guidance bases the assessment on a series of nine key steps. These steps include consultation, data collection, impact identification and assessment, recommendation of project modification and/or restriction, and reporting. Table 1 below sets out these steps.

Table 1. Key steps in Appropriate Assessment

Step	Description of requirements
1	Defining the need for Appropriate Assessment.
2	Consultation with relevant statutory nature conservation body
3	Consultation with other organisations (e.g. Environment Agency, etc.).
4	Definition of the designated status of the site, the qualifying interests and the site's conservation objectives.
5	Provision of further information – this information includes information already available, new information from surveys and assessments of a technical nature.
6	Consideration of the potential effects.
7	Assessment of the influence of any potential impacts on the integrity of the site.
8	Avoiding adverse effects.
9	Conclusion regarding the potential for the scheme to adversely affect the integrity of the designated site.

- 1.13. Guidance is further provided in Natural England's Standard: HRA Habitats Regulations Assessment (HRA) (NESTND026), including on the 'Determination of Likely Significant

Effects under the Habitats Regulations⁴. This involves a preliminary consideration of whether a qualifying feature is likely to be directly, or indirectly, affected (in which case there is a presumption that a significant effect is likely). In such a case, a fuller consideration should then be applied, using further analysis and information, to confirm and justify the presence or absence of Likely Significant Effects. A Likely Significant Effect is, in this context, any effect that may be reasonably predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects.

- 1.14. Figure 1 is reproduced from Advice Note Ten and shows how effects on European sites are considered.

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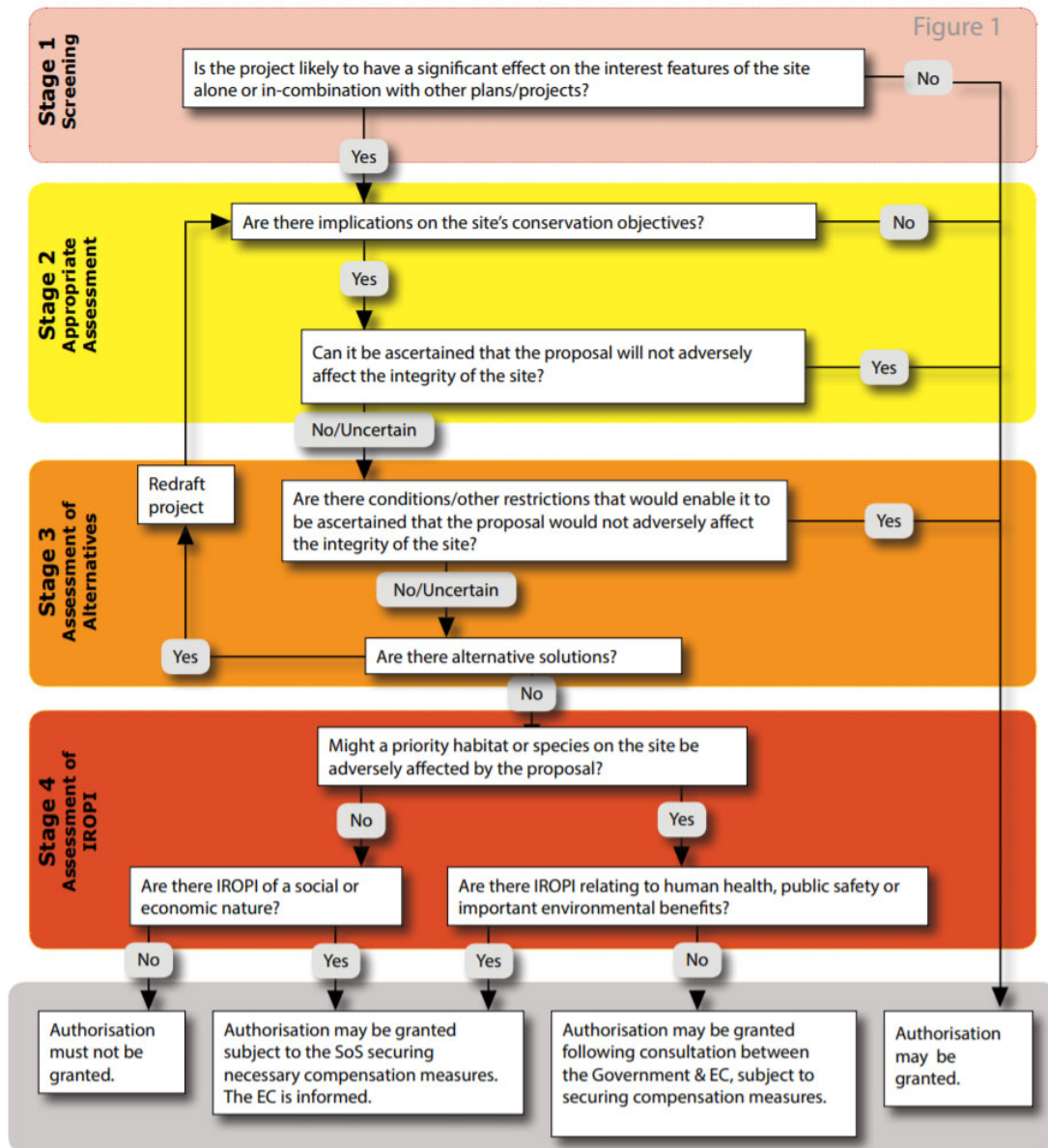


Figure 1. Consideration of projects affecting European sites

2. Project Description

Introduction

- 2.1. A description of the consented Project is set out in Chapter 2 of the shadow HRA Information Report submitted by the Applicant with the original application in December 2011 (see footnote 1).
- 2.2. Details of the proposed material changes are given in Chapter 4 of the Updated Environmental Statement (UES) submitted with the application, and these changes are summarised below. The changes would primarily affect the works on the new quay (Work No. 1), as follows:
 - The specialist berth at the southern end of the quay is to be reclaimed as the twin hulled vessel that was to use the facility has not been constructed.
 - At the northern end of the quay, the quay line is to be set back 61 m over a length of 288 m to create a barge berth that will allow end load in and load out of cargo.
 - The piled relieving slab to the rear of the quay could be raised or it may be omitted altogether subject to detailed design.
 - The flap anchors used to tie back the quay wall piles could be replaced by more conventional steel anchor piles and tie bars.
- 2.3. Though the net effect of the change is that marginally less land would be reclaimed from the estuary, no changes are proposed to the compensation measures already consented by the Secretary of State for the loss of intertidal and estuarine habitat and its possible consequential effects on the waterbird assemblage.
- 2.4. The 50m lighting columns will be repositioned as a consequence of the material change, but the lighting levels will not change as the lanterns will be adjusted to ensure light spill is controlled and no more adverse than that shown in EX19.1⁵. Furthermore, external lighting details are reserved matters and subject to further consultation with Natural England, pursuant to Schedule 11 paragraph 24.
- 2.5. No new operations are proposed as part of the Material Change and consequently there would be no additional noise disturbance. The closer proximity of the barge berth to the shore will make no material difference to the critical noise levels at sensitive environmental receptors. Construction and operational noise contours are shown diagrammatically in ES Appendix 16.8⁶, and show that construction noise dominates the impact assessment. In relation to construction activities, these are no closer so the contours remain valid. Relevantly also, operational noise at NKHP is shown to be lower than baseline levels as presented in ES Table 16.1⁷ (Location ECO1).
- 2.6. In order to facilitate the diversion of the Anglian Water sludge and brine mains which currently outfall within the reclamation area, and to enable staged completion of the

⁵ [Able Marine Energy Park | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000413-16.8%20-%20Noise%20Contours.pdf)

⁶ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000413-16.8%20-%20Noise%20Contours.pdf>

⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000321-16%20-%20Noise%20and%20Vibration.pdf>

quay, a third cross dam will be introduced within the reclamation area to enable early handover of sections of the quay.

- 2.7. The dredging proposals are amended to the extent necessary to dredge the berthing pockets for the amended quay line and to permit greater disposal at sea in the absence of alternative beneficial uses. Dredging volumes required are as assessed in the UES chapters 8 and 10 and are very similar to those in the original ES (with no change in the number of vessel movements), and no change in the effects on aquatic ecology (as set out in the UES Chapter 10: vessel movements associated with the construction phase are actually equivalent or slightly reduced when compared to the consented scenario).
- 2.8. Additionally, the diversion of footpath FP50 in North Lincolnshire will be amended to avoid crossing over existing rail track at the at the end of the Killingholme Branch Line. The path will be diverted to an existing crossing point approximately 200 m north west of the consented location.

3. Consultation

- 3.1. As well as statutory pre-application consultation, engagement has taken place with relevant bodies only where pertinent to the proposed material changes. This has included a meeting on 18th March 2021 with Natural England (Hannah Gooch, Lead Advisor, Sustainable Development) and North Lincolnshire Council (Andrew Taylor, Natural Environment Policy Specialist), subsequent to the issuing of the Scoping Opinion, in order to agree an approach to the material change assessment. It was agreed that that assessment should focus on features that have changed, informed by updated baseline bird data and an updated Preliminary Ecological Appraisal of the current ecological conditions at the site.
- 3.2. A further meeting was held with Natural England (NE) on 15 June 2021 to discuss their response to the statutory consultation, comprising comments on the preliminary environmental information and draft HRA reports that had been issued. Another meeting was held on 22 September 2021 with NE to discuss their Relevant Representation response of 23 August 2021. Details of the points raised by NE and how they have been addressed in the Updated ES and HRA are given in Appendix UES11-4.

4. Site Screening Methodology

- 4.1. The screening process has initially considered all European sites (SPAs, SACs and Ramsar sites, including potential/proposed/candidate sites as well as fully designated ones) within a 20km search zone from the Project. Further consideration of more distant sites was undertaken to investigate where there could be any ecological link to the Project.
- 4.2. For avifauna, a worst-case approach has been adopted, assuming that all birds using the Humber Estuary and its functionally linked habitat within 1km of the Project site could potentially be affected by the proposed development. This represents a worst case for the purposes of this report at this stage of the assessment.
- 4.3. For features considered under the term 'benthic ecology' a screening range of 20km is considered to be sufficient at this stage.
- 4.4. For marine mammals, it is standard practice to apply different screening ranges together with consideration of potential for site connectivity. For seals, such ranges are linked to potential foraging ranges/project level modelling (primarily underwater noise modelling), together with consideration of site connectivity determined from at sea usage data. For cetaceans, interest would be limited to the Southern North Sea SAC – which at 35km distance is located further from the project than the maximum screening range (26km) that applies to the site (JNCC 2020).
- 4.5. Up to date baseline data have been used to determine which qualifying features occur within potential impact zone of the Project, and the importance of those features in the context of their European site populations.
- 4.6. The categories used to report the conclusions of the screening assessment were as follows:
 - **No Likely Significant Effect** - based on available information on the Project and its potential effects, it is considered that there would be no reasonable scientific doubt about the absence of a likely significant effect, either alone or in combination, with respect to the identified feature and site. This determination is based on a number of factors, but mainly the distance between the Project and the designated area and the lack of any direct or indirect impact pathways that could affect the site's designated features;
 - **Likely significant effect** – based on available information the Project would have an impact, either alone or in combination, upon designated features and could lead to significant adverse temporary or long-term change.

5. Plans and Projects to be Considered In-Combination

- 5.1. The projects considered in-combination in the material change application are as follows (those considered in the original application were as set out in the HRA information Report at Section 4.12 (see footnote 1)):
- Able Logistics Park – PA/2009/0600 – North Lincolnshire Council
 - North Killingholme Generating Station (DCO Application)
 - Hornsea Offshore Wind Farm (Zone 4) Project 2 (DCO Application)
 - Yorkshire Energy Park (17/01673/STOUTE – East Riding of Yorkshire Council)
 - Outstrays to Skeffling Managed Realignment Site;
 - South Humber Gateway Mitigation Areas (including Cress Marsh, Novartis and the former Huntsman Tioxide site).
- 5.2. Consideration has also been given to the possible inter-related effects of construction and operation on the Project site at the same time (as part may become operational at the same time as construction continues in other parts).

6. Designated Sites Potentially Affected by the Project

6.1. All European protected sites (designated and proposed) within 20km of the Project have been considered in this assessment. Further consideration has also been given to more distant sites where there could possibly be an ecological link to the Project site.

Humber Estuary SPA

6.2. The AMEP Project lies partly within the Humber Estuary SPA.

Table 2. Information on populations of internationally important species of birds under the Birds Directive using the Humber Estuary European marine site.

ARTICLE 4.1 QUALIFICATION (79/409/EEC): Internationally important populations of regularly occurring Annex 1 species:

Species	Population (5-yr mean of peaks)	Period	International and national importance
Avocet	59 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7%
Bittern	4 individuals – wintering	5 year peak mean 1998/99 – 2002/03	4.0%
Hen harrier	8 individuals – wintering	5 year peak mean 1997/98 – 2001/02	1.1%
Golden plover	30,709 individuals – wintering	5 year peak mean 1996/97 – 2000/01	12.3%
Bar-tailed godwit	2,752 individuals – wintering	5 year peak mean 1996/97 – 2000/01	4.4%
Ruff	128 individuals – passage	5 year peak mean 1996-2000	1.4%
Bittern	2 booming males – breeding	3 year mean 2000-2002	10.5%
Marsh harrier	10 females – breeding	5 year mean 1998-2002	6.3%
Avocet	64 pairs – breeding	5 year mean 1998 – 2002	8.6%
Little tern	51 pairs – breeding	5 year mean 1998-2002	2.1%

ARTICLE 4.2 QUALIFICATION (79/409/EEC): Internationally important populations of regularly occurring migratory species:

Species	Population (5-yr mean of peaks)	Period	International and national importance
Shelduck	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% <i>islandica</i>
Dunlin	22,222 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7% <i>alpina</i> , Western Europe (non-breeding)
Black-tailed godwit	1,113 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.2% <i>islandica</i>
Redshank	4,632 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.6% <i>britannica</i>
Knot	18,500 individuals – passage	5 year peak mean 1996 – 2000	4.1% <i>islandica</i>
Dunlin	20,269 individuals – passage	5 year peak mean 1996 – 2000	1.5% <i>alpina</i> , Western Europe (non-breeding)
Black-tailed godwit	915 individuals – passage	5 year peak mean 1996 – 2000	2.6% <i>islandica</i>
Redshank	7,462 individuals – passage	5 year peak mean 1996 – 2000	5.7% <i>britannica</i>

ARTICLE 4.2 QUALIFICATION (79/409/EEC): Internationally important assemblage of waterbirds:

Importance	Population (5-year mean of peaks 1996/97 – 2000/01)
Humber Estuary SPA supports large populations (>20,000) of wintering waterbirds	In the non-breeding season, the area regularly supports 153,934 individual waterbirds, including dark-bellied brent goose, shelduck, wigeon, teal, mallard, pochard, scaup, goldeneye, bittern, oystercatcher, avocet, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, ruff, black-tailed godwit, bar-tailed godwit, whimbrel, curlew, redshank, greenshank and turnstone.

6.3. The conservation objectives for this site are:

- *“With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified, and subject to natural change: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*
 - *The extent and distribution of the habitats of the qualifying features;*
 - *The structure and function of the habitats of the qualifying features;*
 - *The supporting processes on which the habitats of the qualifying features rely;*
 - *The populations of the qualifying features;*
 - *The distribution of the qualifying features within the site.”*
- 6.4. Further details on these conservation objectives are contained in the Supplementary Advice on Conservation Objectives⁸.
- 6.5. In addition to the above bird species, the SPA also affords protection to their supporting habitats, which have been identified by Natural England in their Advice on Operations⁹ as follows:
- Annual vegetation of driftlines (sand and shingle)
 - Artificial structures such as derelict pier/jetty structures, flood defences
 - Coastal lagoons
 - Freshwater and coastal grazing marsh
 - Freshwater and tidal reedbeds
 - Freshwater wetlands
 - Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture)
 - Intertidal mixed sediments
 - Intertidal sand and muddy sand
 - Intertidal sand and mudflats
 - *Salicornia* and other annuals colonising mud and sand
 - Saltmarsh (Atlantic salt meadows)
 - Sand dunes
 - Supralittoral sand and shingle
 - Tidal reedbeds
 - Water column

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- 6.6. This includes functionally linked habitat outside SPA boundary as well as areas within the SPA.

Humber Estuary Ramsar site

- 6.7. The Humber Estuary Ramsar site is largely coterminous with the SPA, and the Project lies partly within the Ramsar site. Its qualifying features include:
- Range of important estuarine habitats;
 - Internationally important non-breeding waterbird assemblage;
 - Internationally important non-breeding populations of shelduck, golden plover, knot, dunlin, bar-tailed godwit, black-tailed godwit and redshank;
 - Important migration route for river lamprey and sea lamprey;
 - Breeding grey seals;
 - Natterjack toad.
- 6.8. The citation for the Humber Estuary SPA is given in Appendix 1, and that for the Ramsar site in Appendix 2.

Greater Wash SPA

- 6.9. This marine SPA lies 18km from the project at its nearest point. Its qualifying features comprise three breeding bird species (Sandwich tern, common tern and little tern) and three non-breeding species (red-throated diver, little gull and common scoter).
- 6.10. Given its qualifying features, its distance from the Project and the nature of the proposed project, together with the clear lack of any ecological link, it can be safely concluded that there would be no LSE on this SPA, so it is not considered further in this report.

Humber Estuary SAC

- 6.11. AMEP lies partly within the Humber Estuary SAC. Annex I habitats that are a primary reason for the designation of the site include:
- estuaries (including sub-tidal habitat); and
 - mudflats and sandflats not covered by seawater at low tide.
- 6.12. Other Annex I habitats that are present as qualifying features but are not a primary reason for the designation include:
- sandbanks which are slightly covered by seawater all the time;
 - coastal lagoons;
 - *Salicornia* and other annuals colonising mud and sand;
 - Atlantic sea meadows (*Glauco-Puccinallietalia maritima*);
 - embryonic shifting dunes;

- shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes');
 - fixed dunes with herbaceous vegetation ('grey dunes'); and
 - dunes with *Hippophae rhamnoides*.
- 6.13. Grey seals *Halichoerus grypus*, river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* are Annex II species present in the Humber Estuary and are a qualifying feature, but not a primary reason for the site selection.
- 6.14. The Humber Estuary SAC Conservation Objectives are as follows:
- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;
 - The extent and distribution of qualifying natural habitats and habitats of qualifying species
 - The structure and function (including typical species) of qualifying natural habitats
 - The structure and function of the habitats of qualifying species
 - The supporting processes on which qualifying natural habitats and habitats of qualifying species rely
 - The populations of qualifying species, and,
 - The distribution of qualifying species within the site.
- 6.15. The citation for the Humber Estuary SAC is given in Appendix 3.

Southern North Sea SAC

- 6.16. The Southern North Sea SAC lies approximately 35km from the project at its nearest point and has been designated for the Annex II species harbour porpoise only. The distance between the SAC and the project exceeds the maximum screening range of 26km (JNCC 2020). Given the available information, it can be safely concluded that there would be no potential for LSE on the harbour porpoise feature of the SAC and the site is not considered further in this report.

Wash and North Norfolk Coast SAC

- 6.17. The Wash and North Norfolk Coast SAC lies approximately 68km from the project at its nearest point and has been designated for a number of Annex I habitats, together with the Annex II species harbour seal as a primary reason for site selection. The distance between the SAC and the project is within the likely foraging range of harbour seal (120km, Thomson *et al* 2016, MMO 2018), though at sea usage data does not indicate any site connectivity between the SAC and the Humber (MMO 2018). Given the available information, it can be safely concluded that there would be no potential for LSE on the harbour seal feature of the SAC and the site is not considered further in this report.

Berwickshire and North Northumberland Coast SAC

- 6.18. The Berwickshire and North Northumberland Coast SAC, located about 210km from the project, includes the Annex II species grey seal as a primary reason for selection of the site. The distance between the SAC and the project lies well beyond the likely maximum foraging range of grey seal (145km, Thompson *et al*, 1996, MMO 2018). Further, at sea usage data does not indicate any site connectivity between the SAC and the Humber (MMO 2018). Given the available information, it can be safely concluded that there would be no potential for LSE on the grey seal feature of the SAC and the site is not considered further in this report.
- 6.19. Additional consideration has also been given to the shipping routes that would be used to service the Project. This included an assessment of the possible noise and visual disturbance effects on any SPAs/SACs through which these routes may pass in UK waters.
- 6.20. Given that the large majority of shipping movements related to the Project would be directly to/from Europe or the offshore wind development sites, they would not likely to pass regularly through any other UK SPAs or SACs, and would not therefore result in any LSE.

7. Description of the Baseline Environment

Benthic and Marine Habitats

The Humber Estuary

- 7.1. The Humber is an extensive macrotidal estuary on the east coast of England, characterised by a large tidal range and high levels of suspended sediment, with hydrodynamic processes creating a dynamic rapidly changing system with accretion and erosion of intertidal and sub-tidal habitats.
- 7.2. The Humber is a dynamic estuarine system with changes in currents, tidal inundation, salinity etc. that create a difficult environment for many invertebrate organisms to flourish. The invertebrate community that colonises such areas can therefore be restricted to a relatively low number of species that are able to adapt to these environmental rigours.
- 7.3. The same physical conditions also allow for those species that can tolerate them, to be present in very large numbers in the deposited soft sediments, e.g. intertidal soft sediment mudflats. The physico-chemical conditions make estuaries highly productive and through a complex food web are able to support very large numbers of invertebrate organisms such as worms and molluscs, which are able to feed on lower trophic guilds and other available organic material as well as on each other.
- 7.4. Productivity from these communities has been estimated at over 500kg per ha per year on the Humber (IECS, 1994), and forms an important food resource for primary predators such as fish and birds. The importance of the Humber Estuary for birds and fish, and the habitats supporting these, is recognised in a series of International/European conservation designations.

Intertidal Invertebrate Communities

- 7.5. Allen (2006) describes the intertidal benthic community of the middle estuary south shore to be less diverse than in outer estuary, being dominated by *Corophium volutator*, *Streblospio shrubsolii*, *Hediste diversicolor* and the Spionid polychaete *Pygospio elegans*. Low abundances of *Macoma balthica* were also present with numbers increasing towards the outer estuary and in mid shore areas. These communities are typical for an estuarine habitat and primarily structured according to salinity, shore height and presumably sediment type. Whilst some communities are relatively impoverished these appear to be typical for such habitats and some variation in community structure is expected in a dynamic estuary.
- 7.6. The increase in intertidal elevation and colonisation by saltmarsh communities at the AMEP site has led to a loss of mudflat extent and influenced the distribution of several key species of invertebrate such as *Hediste diversicolor*. However, in the muddier areas, the 2015 and 2016 surveys recorded a broadly similar assemblage to that recorded in the baseline of 2010 for the original ES supporting the DCO application in 2011.
- 7.7. The original ES baseline commonly recorded *Tubificoides benedii*, Nematoda, the polychaete *Streblospio shrubsolii* and the amphipod crustacean *Corophium volutator*

from the intertidal survey. The bivalve *Macoma (Limecola) balthica* was widespread and the polychaete *Hediste diversicolor* was present at most of the upper shore stations.

- 7.8. A broadly similar intertidal invertebrate assemblage was recorded in 2015 and 2016 at the AMEP site, although with some restrictions in the extent of the typical intertidal mudflat community correlating to saltmarsh community colonisation.
- 7.9. Allen (2017 & 2020) concluded that the intertidal component of the AMEP development area supports an invertebrate assemblage that is characteristic of the site's location in the middle estuary, '*typical for muddy or sandy intertidal sediments and adjacent subtidal habitats in the mid to outer Humber and generally correspond to those recorded in previous surveys*' (Allen, 2017) and '*the results of the 2016 intertidal benthic survey indicate that the North Killingholme mudflats maintain a variety of infaunal invertebrates including good examples of mid estuary mud assemblages*' Allen, 2020).
- 7.10. It is considered likely that the increase in elevation and saltmarsh colonisation seen in 2015 and 2016 has continued to the present day, with a substantial extent of the AMEP development intertidal frontage now featuring saltmarsh in the upper to mid shore. As such, it is likely that the extent and/or composition of the intertidal invertebrate community recorded in this area will have reduced in response to the increase in elevation and associated saltmarsh development.
- 7.11. On this basis, it is concluded that there is the probability of natural variation in community composition over time, reflecting changes in estuarine dynamics, but given the community adaptation and continued active utilisation of the dredge areas and deposit grounds, no significant change outwith these parameters is expected.

Subtidal Benthic Ecological Data

- 7.12. A range of mud, sands and gravels are present within the subtidal area of middle estuary, these with associated biological communities, and with biotopes describing these in Chapter 10 Table 10-2 of the UES.
- 7.13. The 2016 subtidal survey (Allen, 2020) reported the subtidal bed to feature a very impoverished faunal community typical for the middle Humber and in line with findings from previous surveys (e.g. as described in the DCO ES and supporting documentation e.g. Appendices UES10-3 and UES10-4), including species such as *Capitella* sp., *Arenicolidae* sp. (*Arenicola marina*), *Eurydice pulchra*, *Gammarus salinus*, *Corophium volutator*, *Nematoda* spp., *Polydora cornuta*, *Pygospio elegans*, *Streblospio shrubsolii* and *Tubificoides benedii*.
- 7.14. Allen (2020) concluded that the infaunal communities recorded during the 2015 subtidal survey around the potential dredge disposal areas were typical for dynamic mud, sand or mixed sediment subtidal sediments in the mid to outer Humber Estuary.
- 7.15. The area within which AMEP will directly impact tends to exhibit muddier sediments with muddy sands or sandy muds sometimes with small quantities (<1%) of gravel (slightly gravelly sandy mud or slightly gravelly muddy sand). Additional surrounding habitats that could be affected by the development include included muddy habitats

including sandy muds or muddy sands (or slightly gravelly muddy sand/sandy muds) and two sandier sites (Allen, 2020).

- 7.16. The direct impact and surrounding areas were also characterised by low numbers of *Capitella* sp. but included modest numbers of species such *Corophium volutator* and *Streblospio shrubsolii*. However, many of the taxa present in these areas were recorded at relatively few sites. In terms of biomass the direct impact area was dominated by *Carcinus maenas* (1 site only), *Limecola balthica*, *Corophium volutator*, *Arenicolidae* sp. (*Arenicola marina*) and *Gammarus salinus* these species collectively accounting for over 90% of total biomass.

Saltmarsh Communities

- 7.17. At the time of the original baseline work, there was little or no evidence of substantial saltmarsh vegetation occurring across the central mudflat of the AMEP development, other than some fringing communities on the upper shore adjacent to the flood bank, upstream adjacent to North Killingholme.
- 7.18. However, the potential for accretion of the intertidal mudflat and associated increase in elevation and potential colonisation by saltmarsh was identified in the Examining Authority's Report (2013, paragraph 10.79)¹⁰.
- 7.19. A clear expansion in the extent of saltmarsh communities and corresponding reduction in intertidal mudflat, e.g. as surveyed in 2020 and 2021, has occurred on the intertidal frontage of the proposed AMEP development site since the original ES baseline work of the DCO.

Fish Assemblage

- 7.20. Two species of fish are qualifying features of the Humber Estuary SAC and hence are relevant to the HRA, sea lamprey and river lamprey.
- 7.21. The direct comparison between the different fish baseline data is limited by the use of different sampling methods, with different selectivity, used in different habitats and with variable sampling effort (e.g. within and between seasons). Also, the natural variability in population dynamics (e.g. inter-annual fluctuations in recruitment) may affect the fish species occurrence and abundance in the catches over time.
- 7.22. Considering these factors, and in the context of the wider knowledge of fish assemblages and their distribution in the lower Humber Estuary, there were no significant changes in the baseline for fish at the AMEP site, and the relevant receptors remain the same, including for the two SAC qualifying species, sea lamprey and river lamprey.
- 7.23. The fish fauna recorded at the AMEP site and in the surrounding areas has remained a reflection of the typical assemblage of intertidal and subtidal areas of this part of the estuary, and of the role of these habitats in supporting young stages of estuarine and

¹⁰ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-002249-The%20Able%20Marine%20Energy%20Park%20Order%202021X%20Panel's%20Findings%20and%20Recommendations%20with%20Appendices.zip>

marine migrant fish (especially gobies and flatfish), also through provision of abundant food resources. There was no evidence of preferred use of these areas by migratory fish, confirming earlier observations.

Marine Mammals

- 7.24. One marine mammal species is a qualifying feature of the Humber Estuary SAC and hence is relevant to the HRA, grey seal.
- 7.25. Due to the low frequency of occurrence and high mobility of marine mammals in the low to middle estuary, dedicated surveys were not conducted for the original ES nor to support this material amendment. The occasional presence of these species in the vicinity of the AMEP development relates to the potential presence of prey items (see text on Fish and Invertebrate Communities), and the populations of the species in the wider region e.g. Southern North Sea.

Ornithology

- 7.26. Ornithological data to update the baseline for the Project have been obtained from a range of sources, including the following:
- BTO Wetland Bird Survey (WeBS) high tide (core) counts (2014-15 to 2019-20) - the most up-to-date 5-year mean peak core high tide counts currently available;
 - BTO WeBS low tide counts (November 2011 through to February 2012) - the most recently available low tide counts;
 - Site-specific surveys of the Killingholme Marshes Foreshore and the North Killingholme Haven Pits undertaken by JBA (2019) during the 2017-18 autumn and winter. This included:
 - Autumn Passage – autumn migration. Weekly visits between late September and November.
 - Winter - two surveys per month between October to March inclusive;
 - Spring Passage – spring migration. Weekly visits between March to Mid-May inclusive.
 - ABP data 2018-19 and 2019-20 - through the tide counts of the Killingholme Marshes Foreshore, twice-monthly from October through to March.
 - Additional survey data from the Killingholme Marshes Foreshore collected by Nick Cutts during winter 2020-21.
- 7.27. The data are presented first for the Killingholme Marshes Foreshore and then for North Killingholme Haven Pits.

Killingholme Marshes Foreshore

BTO WeBS Data

- 7.28. Table 3 summarises the most recently available five-year mean peak counts from the Killingholme Marshes Foreshore sector, the five-year means for 2004-8 (as presented

in the original ES) and from the percentages that these comprise of the whole Humber Estuary populations.

Table 3. Five-year BTO Wetland Bird Survey (WeBS) core high tide mean peak count for the Killingholme Marshes Foreshore sector and for the whole Humber Estuary, 2015-16 - 2019-20, and for 2004-08 (as presented in the original ES).

Species	SPA species*	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (15-19)	% SPA mean peak in sector ES	% SPA mean peak in sector update
Mute swan		3	2	1.0%	1.5%
Shelduck	Q	9	75	0.2%	1.7%
Shoveler		11	53	8.9%	24.7%
Gadwall		4	21	2.9%	9.6%
Mallard	A	13	45	0.6%	4.3%
Teal	A	13	244	0.5%	6.6%
Pochard	A	1	0	0.3%	0.0%
Tufted duck		4	2	1.0%	0.7%
Smew		1	0	50.0%	0.0%
Little grebe		2	1	2.2%	2.1%
Grey heron		1	1	2.3%	3.6%
Little egret		0	1	0.0%	0.7%
Cormorant		0	1	0.0%	0.2%
Water rail		0	0	0.0%	0.0%
Moorhen		4	6	2.7%	13.1%
Coot		31	31	2.7%	11.9%
Oystercatcher	A	1	4	0.0%	0.1%
Avocet	Q	0	49	0.0%	2.0%
Lapwing	A	15	730	0.1%	4.4%
Ringed plover		0	68	0.0%	9.3%
Little ringed plover		0	1	0.0%	18.2%
Curlew	A	61	66	1.4%	2.5%
Bar-tailed godwit	Q	0	1	0.0%	0.1%
Black-tailed godwit	Q	50	1524	1.3%	33.5%
Turnstone	A	1	4	0.2%	1.8%
Knot	Q	1	2	0.0%	0.0%
Ruff	Q	0	0	0.0%	0.2%
Dunlin	Q	87	326	0.5%	2.0%
Snipe		0	1	0.0%	1.1%
Common sandpiper		0	0	0.0%	0.6%
Redshank	Q	83	116	1.6%	4.0%

* Q = qualifying species, A = assemblage species.

7.29. The BTO Low Tide Counts from 2011-12 (the most recent available data as no further BTO low tide surveys have been undertaken since 2012) are summarised in Table 4. It should be noted that these surveys did not cover the main mid-winter period, which may also explain the lower numbers of some species in comparison with the other data sets.

Table 4. BTO Low Tide Count totals for the Killingholme Marshes Foreshore sector (CH066), 2011-12.

Species	01/10/ 11	01/03/ 12	01/04/ 12	01/05/ 12	01/06 /12	01/07 /12	01/08 /12	01/09 /12	PEAK
Greylag Goose	0	2	2	4	0	0	0	0	4
Shelduck	0	12	2	1	2	0	0	0	12
Mallard	3	2	2	4	7	0	0	5	7
Teal	11	4	0	0	0	0	0	0	11
Grey Heron	0	0	0	0	1	0	2	0	2
Little Egret	0	1	0	0	2	2	2	0	2
Cormorant	2	0	0	0	0	0	2	0	2
Moorhen	0	0	1	1	0	1	0	0	1
Oystercatcher	0	0	0	0	1	0	0	2	2
Avocet	0	2	5	0	0	0	0	0	5
Little Ringed Plover	0	0	0	0	0	0	1	0	1
Curlew	4	3	0	0	0	0	0	0	4
Black-tailed Godwit	0	0	0	0	0	0	2000	650	2000
Redshank	0	0	0	0	1	0	0	0	1
Black-headed Gull	0	0	0	0	3	4	0	0	4
Common Tern	0	0	0	0	0	1	0	0	1

JBA Data

7.30. The results of the 2017-18 JBA surveys are summarised in Table 5 for the Killingholme Marshes Foreshore (KMFS). The Table gives peak count recorded each month.

Table 5. Monthly peak counts from Killingholme Marshes Foreshore, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Greylag goose	0	0	21	16	12	2	17	11	5	21
Pink-footed goose	0	0	0	0	0	0	0	0	0	0
Mute swan	0	0	0	0	0	0	0	1	0	1
Shelduck	5	168	102	105	64	74	96	41	20	168
Shoveler	0	0	4	0	0	0	0	0	0	4
Gadwall	0	0	0	0	0	0	0	0	0	0
Wigeon	0	125	0	0	0	0	0	0	0	125
Mallard	1	3	2	0	0	0	0	3	0	3
Teal	29	310	298	71	122	173	133	32	0	310
Pochard	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0
Grey heron	1	0	1	1	0	0	0	0	0	1
Little egret	0	2	1	0	0	0	0	1	0	2
Cormorant	0	0	3	0	0	1	2	1	0	3
Marsh harrier	0	0	0	0	0	0	0	0	0	0
Oystercatcher	0	0	0	0	0	0	7	7	7	7
Avocet	0	36	16	0	0	15	34	15	4	36

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Lapwing	0	200	212	342	665	233	18	2	1	665
Grey plover	0	45	0	0	0	0	0	0	0	45
Ringed plover	33	18	0	0	0	5	11	39	28	39
Whimbrel	0	0	0	0	0	0	0	0	0	0
Curlew	4	35	70	60	65	119	136	30	2	136
Bar-tailed godwit	0	0	5	0	0	0	0	0	0	5
Black-tailed godwit	362	267	24	0	6	2	1	0	538	538
Turnstone	2	17	26	0	0	0	1	0	0	26
Knot	0	0	67	0	0	0	0	0	0	67
Ruff	0	0	0	0	0	0	0	0	0	0
Sanderling	0	0	0	0	0	0	0	0	0	0
Dunlin	18	376	503	156	501	12	80	26	42	503
Little stint	0	3	0	0	0	0	0	0	0	3
Snipe	0	3	5	1	0	0	0	0	0	5
Redshank	70	806	284	292	370	135	115	111	0	806
Greenshank	0	2	0	0	0	0	0	0	0	2

ABP DATA 2018-19 and 2019-20

7.31. Data were obtained from ABP from their monitoring surveys undertaken over several sites, including KMFS. The recent data from 2018-19 and 2019-20 for KMFS are summarised in Table 6, which gives the monthly peak counts over this survey period, and the annual peaks for each of the two years. Of particular note are the higher numbers of teal, lapwing and avocet than recorded in previous surveys.

Table 6. ABP Survey Data for Killingholme Marshes Foreshore sector, October-March 2018-19 and 2019-20: monthly peak counts and annual peaks.

Species	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2018-19	Peak 2019-20
Greylag goose	0	25	27	0	3	6	0	27
Mute swan	4	0	0	0	0	0	4	0
Shelduck	31	44	56	48	51	76	76	56
Wigeon	0	2	0	0	4	0	0	4
Mallard	22	3	0	0	1	10	22	10
Teal	413	915	510	828	1064	888	1064	828
Little egret	1	0	0	0	0	0	1	0
Cormorant	4	3	2	1	2	1	0	4
Oystercatcher	0	0	0	0	2	8	8	4
Avocet	251	33	23	0	76	152	104	251
Lapwing	65	372	1642	1550	2374	6	2374	1254
Golden plover	0	0	0	0	1	0	0	1
Grey plover	1	0	0	0	0	0	0	1
Ringed plover	24	16	1	3	6	7	19	24
Curlew	49	62	96	68	63	63	68	96
Bar-tailed godwit	0	0	2	3	14	0	2	14
Black-tailed godwit	2183	22	220	162	372	271	2070	2183

Species	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2018-19	Peak 2019-20
Turnstone	12	37	1	2	7	8	17	37
Sanderling	0	0	0	0	0	2	0	2
Dunlin	455	512	659	680	381	136	680	512
Snipe	4	0	15	5	0	0	4	15
Redshank	184	140	156	170	117	204	204	140

Able Data 2020-21

7.32. The data collected for Able UK by Nick Cutts during December 2020 – March 2021 from the Killingholme Marshes Foreshore are summarised in Table 7, where the total counts from each survey are presented. The surveys commenced in December 2020, so no data were available from autumn 2020, though the autumn period is covered in other years by the other data sets described in this section. As for the ABP surveys, higher peak numbers of teal, lapwing and avocet were recorded in this area than previously.

Table 7. Count totals Killingholme Marshes Foreshore sector, December 2020- March 2021 (Source: Nick Cutts). Note: partial coverage of north end of sector only during Dec-Jan).

Species	09/12/2020	23/12/2020	07/01/2021	21/01/2021	04/02/2021	18/02/2021	05/03/2021	PEAK
Greylag Goose	0	0	0	0	0	13	0	13
Shelduck	8	0	2	0	20	34	13	34
Mallard	2	2	14	4	13	4	8	14
Teal	1466	994	470	520	431	212	354	1466
Oystercatcher	0	0	0	0	0	0	13	13
Avocet	0	0	0	0	0	0	205	205
Lapwing	980	950	310	1121	240	0	0	1121
Golden Plover	0	0	0	0	14	0	0	14
Ringed Plover	0	2	0	0	0	0	0	2
Curlew	6	3	11	2	28	26	29	29
Black-tailed Godwit	0	0	0	0	170	0	0	170
Dunlin	75	35	40	0	22	232	10	232
Redshank	13	71	42	7	53	52	43	71

North Killingholme Haven Pits

BTO WeBS Data

7.33. Tables 8 summarises the most recently available five-year mean peak counts from the North Killingholme Haven Pits (NKHP) sector, the five-year means for 2004-8 (as

presented in the original ES) and from the percentages that these comprise of the whole Humber Estuary populations.

Table 8. Five-year BTO WeBS core high tide mean peak count for the North Killingholme Haven Pits sector and for the whole Humber Estuary, 2014-15 - 2019-20, and for 2004-08 (as presented in the original ES).

Species	SPA species*	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (15-19)	% SPA mean peak in sector ES	% SPA mean peak in sector update
Canada goose		1	0	0.2%	0.0%
Mute swan		1	1	0.3%	0.5%
Shelduck	Q	7	9	0.2%	0.2%
Shoveler		29	8	23.5%	3.7%
Mallard	A	71	13	3.4%	1.2%
Teal	A	30	43	1.1%	1.2%
Tufted duck		1	0	0.2%	0.0%
Little grebe		1	0	1.1%	0.0%
Grey heron		3	1	6.8%	3.6%
Little egret		0	5	0.0%	2.2%
Cormorant		1	0	0.7%	0.1%
Water rail		0	0	0.0%	2.5%
Moorhen		2	0	1.4%	0.4%
Coot		3	0	0.3%	0.0%
Oystercatcher	A	2	2	0.1%	0.0%
Avocet	Q	27	54	5.3%	2.2%
Lapwing	A	276	288	1.6%	1.8%
Ringed plover		1	1	0.1%	0.1%
Curlew	A	12	4	0.3%	0.1%
Black-tailed godwit	Q	3338	3336	85.9%	73.4%
Ruff	Q	1	1	1.6%	1.7%
Dunlin	Q	380	663	2.1%	4.2%
Snipe		4	33	3.4%	25.4%
Common sandpiper		0	0	0.0%	0.6%
Redshank	Q	215	230	4.2%	8.0%

* Q = qualifying species, A = assemblage species.

7.34. The BTO Low Tide Counts from 2011-12 (the most recent available data as no further BTO low tide surveys have been undertaken since 2012) for the NKHP sector are summarised in Table 9. These show lower peak count than WeBS core counts for probably reflecting the timing of the counts at low, rather than high, tide (NKHP is generally more important as a high tide roost), though high numbers of black-tailed godwit were also seen during the low tide counts of that sector. It should be noted that these surveys did not cover the main mid-winter period, which may also explain the lower numbers of some species in comparison with the other data sets.

Table 9. BTO Low Tide Count totals for the North Killingholme Haven Pits sector (CH017), 2011-12.

Species	01/10/ 11	01/03/ 12	01/04/ 12	01/05/ 12	01/06 /12	01/07 /12	01/08 /12	01/09 /12	PEAK
Shelduck	120	89	61	78	138	54	51	72	138
Gadwall	0	2	0	0	0	0	0	0	2
Mallard	0	8	6	4	10	0	10	5	10
Teal	0	6	0	0	0	0	0	0	6
Great Crested Grebe	0	0	0	0	1	0	0	0	1
Cormorant	0	0	0	0	2	0	0	0	2
Oystercatcher	0	8	12	2	8	9	5	0	12
Avocet	0	8	0	0	0	0	0	0	8
Lapwing	0	0	0	0	0	0	0	3	3
Golden Plover	0	0	0	0	0	2	0	0	2
Ringed Plover	0	2	0	4	0	0	0	0	4
Curlew	22	109	4	13	76	106	88	42	109
Bar-tailed Godwit	0	35	0	0	0	0	0	0	35
Black-tailed Godwit	530	219	0	0	288	816	1	21	816
Turnstone	0	0	0	0	0	0	1	0	1
Dunlin	289	0	3	0	0	0	0	71	289
Common Sandpiper	0	0	0	0	0	1	2	0	2
Redshank	33	38	17	2	0	23	3	17	38
Black-headed Gull	0	5	1	0	37	100	203	94	203
Great Black-backed Gull	0	0	2	2	2	7	0	0	7
Herring Gull	0	0	0	8	0	2	0	3	8
Lesser Black-backed Gull	0	0	0	0	0	0	1	4	4

JBA Data

7.35. The results of the 2017-18 JBA surveys are summarised in Table 10 for North Killingholme Haven Pits (NKHP) in Table 10. The Table gives peak count recorded each month.

Table 10. Monthly peak counts from North Killingholme Haven Pits, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Greylag goose	5	0	1	7	16	0	0	3	12	16
Pink-footed goose	0	100	0	0	0	0	0	0	0	100
Mute swan	0	0	0	0	0	0	1	1	0	1
Shelduck	0	3	0	0	3	0	6	5	8	8
Shoveler	0	0	0	0	0	0	1	4	0	4
Gadwall	0	0	0	0	0	2	0	0	0	2
Wigeon	0	0	0	0	0	0	0	0	0	0
Mallard	9	7	40	18	15	4	8	2	0	40
Teal	2	29	24	53	104	23	45	24	0	104

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Pochard	0	0	0	2	4	0	0	0	0	4
Little grebe	0	0	0	0	0	0	5	0	0	5
Grey heron	0	1	2	2	1	0	1	1	1	2
Little egret	10	8	4	0	0	0	5	9	4	10
Cormorant	0	0	0	3	3	0	1	0	0	3
Marsh harrier	0	1	0	0	0	0	1	1	0	1
Oystercatcher	0	0	0	0	0	0	2	2	2	2
Avocet	3	23	44	0	0	0	33	8	2	44
Lapwing	100	180	269	202	38	5	11	0	0	269
Grey plover	0	0	0	0	0	0	0	0	0	0
Ringed plover	0	0	0	0	0	0	0	0	0	0
Whimbrel	0	0	0	0	0	0	0	0	0	0
Curlew	2	4	4	2	0	0	1	0	0	4
Bar-tailed godwit	0	0	0	0	0	0	2	0	0	2
Black-tailed godwit	655	500	2	0	0	0	0	20	1	655
Turnstone	0	0	0	0	0	0	0	0	0	0
Knot	0	0	0	0	0	0	0	0	0	0
Ruff	0	2	0	0	0	0	0	0	0	2
Sanderling	0	0	12	0	0	0	0	0	0	12
Dunlin	20	450	32	24	0	0	0	0	0	450
Little stint	0	0	0	0	0	0	0	0	0	0
Snipe	0	24	18	9	8	26	0	12	0	26
Redshank	0	450	112	24	12	2	227	160	0	450
Greenshank	0	0	0	0	0	0	0	0	0	0

Summary of Baseline Survey Data

- 7.36. The data sources on waterbird numbers within the area that could be affected by the proposed development are summarised in Tables 11 and 12, which gives the peak count for each key species from each source. Overall, there is broad agreement between the sources with regard to the important waterbird populations in this zone, i.e. shelduck, teal, avocet, lapwing, ringed plover, curlew, bar-tailed godwit, black-tailed godwit, dunlin and redshank were all recorded regularly in important numbers in the context of the SPA/Ramsar site. ‘Important’ numbers were identified on the basis of the proportion of the SPA/Ramsar population recorded using the area regularly exceeding 1%. Whilst peak numbers of some other species did on some occasions exceed this 1% criterion, the large majority of records were of numbers well below this threshold, so were not, applying professional judgement, deemed to be ‘important’ in this context.
- 7.37. Though most of the new baseline survey data were obtained through the main winter period (and hence did not cover the late spring or early autumn passage periods), these periods were covered by the WeBS data update and this is not considered to have had any material effect on the conclusions reached.
- 7.38. There are some changes apparent since the original AMEP application, notably a recent increase in peak counts of teal, lapwing and avocet on the Killingholme

Marshes Foreshore. The site has continued to be of major importance for black-tailed godwits. The North Killingholme Haven Pits has also continued to be a very important site for black-tailed godwits, and has continued to support a range of other waterbird species, though with no major changes apparent in comparison with the ES baseline.

Table 11. Overall peak waterbird counts for the Killingholme Marshes Foreshore.

Species	SPA status	ES TTTC	ES WeBS	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 2017-18	ABP 2018-19	ABP 2019-20	NC 2021	% Humber update
Brent goose	A	0	0	0.0%	0	0	0	0	0	0	0.0%
Canada goose		0	0	0.0%	0	0	0	0	0	0	0.0%
Greylag goose		0	0	0.0%	0	0	21	0	27	13	1.7%
Pink-footed goose		0	0	0.0%	0	0	0	0	0	0	0.0%
Mute swan		2	3	1.0%	2	0	1	4	0	0	2.7%
Shelduck	Q	109	9	2.4%	75	138	168	76	56	34	3.7%
Shoveler		0	11	8.9%	53	0	4	0	0	0	24.7%
Gadwall		0	4	2.9%	21	2	0	0	0	0	9.6%
Wigeon	A	24	0	0.7%	0	0	125	0	4	0	4.7%
Mallard	A	14	13	0.7%	45	10	3	22	10	14	4.3%
Teal	A	12	13	0.5%	0	6	310	1064	828	1466	39.6%
Pochard	A	0	1	0.3%	0	0	0	0	0	0	0.0%
Tufted duck		0	4	1.0%	2	0	0	0	0	0	0.7%
Scaup	A	0	0	0.0%	0	0	0	0	0	0	0.0%
Goldeneye	A	0	0	0.0%	0	0	0	0	0	0	0.0%
Smew		0	1	50.0%	0	0	0	0	0	0	0.0%
Great crested grebe		0	0	0.0%	0	1	0	0	0	0	4.3%
Little grebe		0	2	2.2%	1	0	0	0	0	0	2.1%
Bittern	Q	0	0	0.0%	0	0	0	0	0	0	0.0%
Grey heron		0	1	2.3%	0	0	1	0	0	0	3.0%
Little egret		0	0	0.0%	1	0	2	1	0	0	1.0%
Cormorant		2	0	1.4%	1	2	3	0	4	0	1.2%
Water rail		0	0	0.0%	0	0	0	0	0	0	0.0%
Moorhen		0	4	2.7%	6	0	0	0	0	0	13.1%
Coot		2	31	2.7%	31	0	0	0	0	0	11.9%
Oystercatcher	A	12	1	0.4%	4	12	7	8	4	13	0.2%
Avocet	Q	0	0	0.0%	49	8	36	104	251	205	10.1%
Lapwing	A	325	15	1.8%	0	3	665	2374	1254	1121	14.4%
Golden plover	Q	0	0	0.0%	0	2	0	0	1	14	0.0%
Grey plover	A	0	0	0.0%	0	0	45	0	1	0	1.5%
Ringed plover		210	0	17.0%	68	4	39	19	24	2	9.3%
Little ringed plover		0	0	0.0%	1	0	0	0	0	0	18.2%
Whimbrel	A	2	0	2.8%	0	0	0	0	0	0	0.0%
Curlew	A	158	61	3.7%	66	109	136	68	96	29	5.1%
Bar-tailed godwit	Q	123	0	4.4%	1	35	5	2	14	0	2.4%
Black-tailed godwit	Q	2566	50	66.0%	1524	816	538	2070	2183	170	48.0%
Turnstone	A	0	1	0.2%	4	1	26	17	37	0	15.5%

Table 11. Overall peak waterbird counts for the Killingholme Marshes Foreshore.

Species	SPA status	ES TTTC	ES WeBS	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 2017-18	ABP 2018-19	ABP 2019-20	NC 2021	% Humber update
Knot	Q	0	1	0.0%	2	0	67	0	0	0	0.4%
Ruff	Q	1	0	1.6%	0	0	0	0	0	0	0.2%
Sanderling	A	0	0	0.0%	0	0	0	0	2	0	0.3%
Dunlin	Q	1029	87	5.7%	326	289	503	680	512	232	4.3%
Little stint		0	0	0.0%	0	0	3	0	0	0	46.9%
Snipe		0	0	0.0%	1	0	5	4	15	0	11.7%
Common sandpiper		3	0	12.0%	0	2	0	0	0	0	5.8%
Redshank	Q	540	83	10.5%	116	38	806	204	140	71	28.0%
Greenshank	A	0	0	0.0%	0	0	2	0	0	0	4.3%
Black-headed gull		252	0	6.7%	0	203	0	0	0	0	1.8%
Mediterranean gull		2	0	142.9%	0	0	0	0	0	0	0.0%
Common gull		73	0	12.5%	0	0	0	0	0	0	0.0%
Great black-backed gull		0	0	0.0%	0	7	0	0	0	0	2.4%
Herring gull		7	0	7.3%	0	8	0	0	0	0	0.8%
Yellow-legged gull		1	0	27.8%	0	0	0	0	0	0	0.0%
Lesser black-backed gull		0	0	0.0%	0	4	0	0	0	0	5.9%
Common tern		0	0	0.0%	0	0	0	0	0	0	0.0%
Little tern	Q	0	0	0.0%	0	0	0	0	0	0	0.0%

Table 12. Overall peak waterbird counts for the North Killingholme Haven Pits.

Species	SPA status	TTTC ES (IECS)	WeBS Core ES	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 17-18	% Humber update
Brent goose	A	0	0	0.0%	0	0	0	0.0%
Canada goose		0	1	0.2%	0	0	0	0.0%
Greylag goose		0	0	0.0%	0	4	16	1.0%
Pink-footed goose		0	0	0.0%	0	0	100	0.8%
Mute swan		1	1	0.3%	1	0	1	0.7%
Shelduck	Q	9	7	0.2%	9	12	8	0.3%
Shoveler		61	29	49.5%	8	0	4	3.7%
Gadwall		0	0	0.0%	0	0	2	0.9%
Wigeon	A	0	0	0.0%	0	0	0	0.0%
Mallard	A	34	71	3.4%	13	7	40	3.8%
Teal	A	46	30	1.7%	0	11	104	2.8%
Pochard	A	0	0	0.0%	0	0	4	5.0%
Tufted duck		1	1	0.2%	0	0	0	0.0%
Scaup	A	0	0	0.0%	0	0	0	0.0%
Goldeneye	A	0	0	0.0%	0	0	0	0.0%
Smew		1	0	50.0%	0	0	0	0.0%
Great crested grebe		0	0	0.0%	0	0	0	0.0%

Table 12. Overall peak waterbird counts for the North Killingholme Haven Pits.

Species	SPA status	TTTC ES (IECS)	WeBS Core ES	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 17-18	% Humber update
Little grebe		0	1	1.1%	0	0	5	10.3%
Bittern	Q	0	0	0.0%	0	0	0	0.0%
Grey heron		3	3	6.8%	0	2	2	6.1%
Little egret		1	0	2.6%	5	2	10	4.9%
Cormorant		1	1	0.7%	0	2	3	0.9%
Marsh harrier	Q	0	0		0	0	1	
Hen harrier	Q	0	0		0	0	0	
Water rail		2	0	33.3%	0	0	0	2.5%
Moorhen		4	2	2.7%	0	1	0	2.0%
Coot		2	3	0.3%	0	0	0	0.0%
Oystercatcher	A	4	2	0.1%	2	2	2	0.0%
Avocet	Q	16	27	5.3%	54	5	44	2.2%
Lapwing	A	5	276	1.6%	0	0	269	1.6%
Golden plover	Q	1	0	0.0%	0	0	0	0.0%
Grey plover	A	0	0	0.0%	0	0	0	0.0%
Ringed plover		0	1	0.1%	1	0	0	0.1%
Little ringed plover		2	0	52.6%	0	1	0	22.7%
Whimbrel	A	0	0	0.0%	0	0	0	0.0%
Curlew	A	7	12	0.3%	4	4	4	0.2%
Bar-tailed godwit	Q	1	0	0.0%	0	0	2	0.1%
Black-tailed godwit	Q	3800	3338	97.8%	3336	2000	655	73.4%
Turnstone	A	0	0	0.0%	0	0	0	0.1%
Knot	Q	12	0	0.0%	84	0	0	0.4%
Ruff	Q	0	1	1.6%	1	0	2	2.5%
Sanderling	A	0	0	0.0%	0	0	12	2.1%
Dunlin	Q	270	380	2.1%	663	0	450	4.2%
Little stint		0	0	0.0%	0	0	0	0.0%
Snipe		6	4	5.1%	33	0	26	25.4%
Common sandpiper		0	0	0.0%	0	0	0	0.6%
Redshank	Q	249	215	4.8%	230	1	450	15.6%
Greenshank	A	0	0	0.0%	0	0	0	0.0%
Black-headed gull		41	0	1.1%	0	4	0	0.0%
Mediterranean gull		0	0	0.0%	0	0	0	0.0%
Common gull		0	0	0.0%	0	0	0	0.0%
Great black-backed gull		1	0	0.8%	0	0	0	0.0%
Herring gull		0	0	0.0%	0	0	0	0.0%
Yellow-legged gull		0	0	0.0%	0	0	0	0.0%
Lesser black-backed gull		0	0	0.0%	0	0	0	0.0%
Common tern		0	0	0.0%	0	1	0	0.3%
Little tern	Q	0	0	0.0%	0	0	0	0.0%

7.39. The Supporting Habitats that could be affected by the Project include:

- Coastal lagoons
- Freshwater and coastal grazing marsh
- Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture)
- Intertidal sand and mudflats
- *Salicornia* and other annuals colonising mud and sand
- Saltmarsh (Atlantic salt meadows)
- Water column

8. Assessment of Potential for Likely Significant Effect

8.1. The Project will result in a range of likely environmental impacts including, during construction:

- Direct loss of intertidal habitat within the Humber Estuary SPA/Ramsar/SAC through construction of project infrastructure;
- Indirect Loss of intertidal habitat within the Humber Estuary SPA/Ramsar/SAC;
- Loss of fish habitat within the Humber Estuary SPA/Ramsar/SAC;
- Loss of terrestrial habitat functionally linked to the Humber Estuary SPA/Ramsar/SAC;
- Disturbance to birds, fish and marine mammals (noise and visual);
- Underwater noise disturbance affecting fish and marine mammals;
- Dredging and other construction effects on water quality;
- Disposal of dredge spoil.
- Cumulative effects.

8.2. Environmental impacts during operation will likely include:

- Disturbance to birds (noise and visual)
- Maintenance dredging impacts, including boat disturbance;
- Lighting impacts
- Maintenance dredging;

8.3. The key changes from the consented scheme are summarised in Table 13 and relate to changes in habitat loss from the updated scheme. Further details of the habitat losses that would occur as a result of the Material Change and comparison with the losses predicted in the original ES are given in UES11-2 'Change in Habitat Losses within the Designated Site'.

Table 13. Habitat loss from the consented and the updated Projects.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
Direct - reclamation to construct quay	1130	Estuaries	13.5	10.4	Within the reclamation site. The set back berth has reduced the area of subtidal loss
	1140/1310	Mudflat/sandflat not covered by seawater at low tide	31.5	31.3	Within the reclamation site - supports a range of waterfowl. Quay redesign has led to slightly reduced loss.
	1330	Mudflat with pioneer saltmarsh Saltmarsh	0	1.9	New loss as this community has recently colonised this area.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
Indirect functional loss through disturbance	1140/1310	Mudflat/sandflat not covered by seawater at low tide.	11.6	7.7	To the south of the reclamation site - potentially disturbed by operational activity on the quay following completion of construction (275m disturbance zone)
	1330	Mudflat with pioneer saltmarsh Saltmarsh	0	4.7	New loss as this community has recently colonised this area.
Compensation Area Changes	1330	Saltmarsh	1.8	2.0	At Cherry Cobb Sands to form the channel across the foreshore from the existing flood defence to Cherry Cobb Sands Creek - this habitat would become mudflat offsetting the loss of Habitat type 1140. Area increased from 1.8 to 2ha in SoCG.

8.4. There would be no change in the extent of the noise disturbance resulting from the proposed material change as the quay piling will be no closer as consequence of the proposed changes (Updated ES, Chapter 16).

8.5. Pressures identified by Natural England in their Advice on Operations relating to 'Construction of Port and Harbour Structures' comprise the following:

8.6. Medium-high risk

- Above water noise
- Abrasion/disturbance of the substrate on the surface of the seabed
- Barrier to species movement
- Changes in suspended solids (water clarity)
- Emergence regime changes, including tidal level change considerations
- Habitat structure changes - removal of substratum (extraction)
- Introduction of light
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Physical change (to another seabed type)
- Physical change (to another sediment type)
- Physical loss (to land or freshwater habitat)
- Removal of non-target species
- Smothering and siltation rate changes (Heavy)
- Smothering and siltation rate changes (Light)
- Underwater noise changes
- Vibration
- Visual disturbance

- Water flow (tidal current) changes, including sediment transport considerations
- Wave exposure changes

8.7. Low Risk

- Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
- Collision below water with static or moving objects not naturally found in the marine environment
- Deoxygenation
- Hydrocarbon & PAH contamination
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of invasive non-indigenous species (INIS)
- Nutrient enrichment
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
- Transition elements & organo-metal (e.g. TBT) contamination

8.8. Pressures identified by Natural England in their Advice on Operations relating to 'Operation of Ports and Harbours' comprise the following:

8.9. Medium-high risk

- Introduction of light

8.10. Low Risk

- Above water noise
- Abrasion/disturbance of the substrate on the surface of the seabed
- Barrier to species movement
- Changes in suspended solids (water clarity)
- Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
- Collision below water with static or moving objects not naturally found in the marine environment
- Hydrocarbon & PAH contamination
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of invasive non-indigenous species (INIS)
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Smothering and siltation rate changes (Light)
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
- Transition elements & organo-metal (e.g. TBT) contamination

- Underwater noise changes
- Visual disturbance

8.11. Medium-high risks are described by Natural England as follows: “Pressure is commonly induced by activity at a level that needs to be considered further as part of an assessment”; and low risks as “Unless there are evidence based case or site specific factors that increase the risk, or uncertainty on the level of pressure on a receptor, this pressure generally does not occur at a level of concern and should not require consideration as part of an assessment.”

8.12. All of these have been considered during the LSE assessment. Assessment matrices are given in Appendices 4 and 5 (which have taken into account consideration of all these risks for each qualifying species/feature, particularly those identified as ‘medium-high’). These impacts will be investigated in further detail during the appropriate assessment stage, for the qualifying features for the species/populations where LSE could not be ruled out.

9. Screening Statement

- 9.1. The only European Protected Natura 2000 sites that could be affected by the proposed development are the Humber Estuary SPA, the Humber Estuary Ramsar site and the Humber Estuary SAC.
- 9.2. This screening statement updates the one presented in the original application and agreed with the Applicant, Natural England and the MMO in the Statement of Common Ground on Shadow Habitats Regulations Assessment (HRA SoCG)¹¹.
- 9.3. That agreed approach determined that there could be LSE for all species that occurred in numbers $\geq 1\%$ of the Humber Estuary population, and will be affected by loss / changes in habitat and / or disturbance.

Table 14. Likely Significant Effects on Bird Populations.

Effect	Internationally important Populations of Regularly Occurring Annex I Species			Internationally Important Migratory Species		Other Species of Waterfowl Assemblage
	Breeding	Passage	Wintering	Passage	Wintering	
Permanent direct loss of intertidal mudflat	-	-	Bar-tailed godwit	Black-tailed godwit, dunlin and redshank	Black-tailed godwit, dunlin, redshank and shelduck	Curlew, lapwing and ringed plover
Indirect changes in intertidal mudflat		-	Bar-tailed godwit	Black-tailed godwit, dunlin and redshank	Black-tailed godwit, dunlin, redshank and shelduck	Curlew, lapwing and ringed plover
Loss of terrestrial habitat	Marsh harrier	-				Curlew and lapwing
Disturbance to birds at KMFS and NKHP	Avocet and marsh harrier	-	Avocet and bar-tailed godwit	Black-tailed godwit, dunlin and redshank	Black-tailed godwit, dunlin, redshank and shelduck	Curlew, lapwing, mallard, ringed plover, shoveler and teal
Loss of NKHP as a roost site due to loss of intertidal mudflats at KMFS	-	-	Bar-tailed godwit	Black-tailed godwit, dunlin and redshank	Black-tailed godwit, dunlin, redshank and shelduck	Curlew, lapwing and ringed plover

- 9.4. No LSE was concluded in the consented application for the following species:

¹¹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001606-SOCCG09%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20Natural%20England%20and%20the%20Marine%20Management%20Organisation.pdf>

- Not recorded by Through-The-Tide-Count surveys at KMFS/NKHP – arctic tern, bittern, barnacle goose, Bewick’s swan, black-throated diver, brent goose, common scoter, common tern, curlew sandpiper, eider, great white egret, garganey, goosander, green sandpiper, greenshank, greylag goose, goldeneye, great crested grebe, hen harrier, jack snipe, kittiwake, little stint, long-tailed duck, little tern, pink-footed goose, pintail, red-throated diver, roseate tern, sanderling, shag, scaup, spotted redshank, whooper swan, wood sandpiper, woodcock.
 - Not reliant on habitats at KMFS /NKHP – black-headed gull, common gull, coot, grey heron, herring gull, gadwall, great black-backed gull, lesser black-backed gull and Mediterranean gull.
 - Species that although they occurred in numbers $\geq 1\%$ their ecology makes them resilient to impacts (e.g. through their use of cover at NKHP) - moorhen, snipe.
 - Only one or two birds recorded by TTTC, or percentage of Humber Estuary population recorded is so low as to be insignificant – Canada goose, cormorant, golden plover, grey plover, little grebe, little egret, knot, mute swan, oystercatcher, pochard, ruff, smew, tufted duck, turnstone, water rail, whimbrel, wigeon and yellow-legged gull.
- 9.5. LSE was excluded for the loss of sub-tidal habitat in respect of the SPA and the bird interests of the Ramsar site, as none of the bird species significantly affected are reliant on the sub-tidal habitat.
- 9.6. LSE was also excluded in respect of the effects of lighting on the remaining intertidal habitats at KMFS (given the location and effect of the lighting shown on the figures in Supplementary Information EX19.1 - Lighting Lux Plans¹²).
- 9.7. LSE on birds was excluded in respect of the construction of the compensation site at Cherry Cobb Sands and the loss of the arable fields, on the basis that there will be no difference between the existing situation and the proposed situation (i.e. SPA birds still being able to utilise arable land adjacent to the compensation site) and work will only be undertaken between April to October when bird numbers are lowest and environmental conditions (food availability, daylight length and temperatures) most benign. Effects will be further mitigated by the diversion of the footpath, and screening of the existing intertidal habitats provided by the existing embankment.
- 9.8. In-combination effects were concluded not to occur for the remaining non-LSE bird species for one of the following reasons:
- they were not reliant on the habitats lost (including coot, heron and gadwall);
 - there were only records of one or two birds; or
 - they occurred in a such a small percentage of the Humber Estuary population as to be insignificant.

¹² https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001612-OS-003_TR030001_Able%20UK%20Ltd_Supplementary%20Environmental%20Information_File%20%20of%20.zip

Update to baseline

9.9. Whilst there have been some population changes since the original consent was issued, including increased numbers of teal, lapwing and avocet using the Killingholme Marshes Foreshore, in terms of the criteria agreed for LSE in the SoCG, there were no additional species reaching the originally agreed criteria for potential LSE. The Likely Significant Effect tests for the Humber Estuary SPA are summarised in Appendix 4.

Supporting Habitat Loss

9.10. There would be a direct loss of intertidal habitat within the SPA along the south shore of the river Humber through the construction of AMEP (see Table 13 above). As any direct loss of SPA supporting habitat would be considered as an LSE, this has been taken forward for Appropriate Assessment. The Supporting Habitats that could be affected by the Project include:

- Coastal lagoons
- Freshwater and coastal grazing marsh
- Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture)
- Intertidal sand and mudflats
- Salicornia and other annuals colonising mud and sand
- Saltmarsh (Atlantic salt meadows)
- Water column

9.11. There has been a change in the baseline habitat at Killingholme foreshore since the original application, with accretion followed by saltmarsh colonisation.

Additional Ramsar Qualifying Features

9.12. The Ramsar citation does not identify any additional ornithological qualifying features.

9.13. Non-avian Ramsar features include river lamprey, sea lamprey and grey seals (which are also features of the Humber Estuary SAC) and natterjack toad. LSE could not be ruled out for grey seal, sea lamprey and river lamprey, so these have been taken forward for Appropriate Assessment.

SAC

9.14. The Likely Significant Effect tests for the Humber Estuary SAC are summarised in Appendix 5. The following LSE are identified:

- Permanent direct loss of estuarine habitat (H1130)
- Permanent direct loss of intertidal mudflat and mudflat with pioneer saltmarsh (H1140/1310)
- Permanent direct loss of saltmarsh (H1330)
- Indirect effects on estuarine habitat (H1130).

- Indirect effects on intertidal mudflat and mudflat with pioneer saltmarsh (H1140/1310)
- Indirect effects on saltmarsh (H1330)
- Disturbance to grey seal, sea lamprey and river lamprey (S1364 and S1099).

In-combination Effects

- 9.15. The qualifying interest habitats listed on the Humber Estuary SAC citation for which LSE was not identified for AMEP alone (e.g. sandbanks which are slightly covered by the sea at all times and various dune communities) will not be affected at all by AMEP, and hence an in-combination assessment for them is not necessary (this remains the same position as agreed for the consented DCO statement of common ground (ERM 2012)).
- 9.16. The SPA qualifying bird species for which LSE was not identified for AMEP alone were largely species that were not recorded as part of site-specific surveys or only records infrequently/in trivial numbers, and hence will not be affected at all by AMEP. In-combination ornithological effects were also concluded for the consented DCO not to occur because either (a) they were not reliant on the habitats lost (e.g. gull species recorded and others such as coot, heron and gadwall); or (b) there were only records of one or two birds; or they occurred in a such a small percentage of the Humber Estuary population as to be insignificant. That remains the case for the proposed material change.

Transboundary Screening

- 9.17. It was concluded in the original application (in the Planning Inspectorate Transboundary Screening Matrix¹³) that transboundary issues required notification under Regulation 24 of the EIA Regulations, with Iceland identified as the country to be notified. That remains unchanged as a result of the proposed Material Change to the development.

Conclusion

- 9.18. The previous assessment of LSE for the Project in 2012 concluded LSE on the grounds set out in Table 3.3 of the HRA SoCG, and agreed at paragraph 3.6.7 (*ibid*), for the following species:

Qualifying Species:

- Avocet;
- Marsh harrier;
- Bar-tailed godwit;
- Black-tailed godwit;
- Dunlin;

¹³ https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001351-120816_Able_Transboundary%20Screening%20Matrix.pdf

- Redshank;
- Knot; and
- Shelduck.

Additional Assemblage Species:

- Curlew;
- Lapwing;
- Mallard
- Ringed plover;
- Shoveler; and
- Teal.

Supporting Habitat:

- Coastal lagoons
- Freshwater and coastal grazing marsh
- Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture)
- Intertidal sand and mudflats
- *Salicornia* and other annuals colonising mud and sand
- Saltmarsh (Atlantic salt meadows)
- Water column

9.19. With regard to the potential effects on the Humber SAC, the following features have been identified for which LSE cannot be ruled out, and therefore require Appropriate Assessment:

- Estuarine habitats;
- Intertidal mudflats;
- *Salicornia* and other annuals colonising mud and sand;
- Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*);
- Grey seal;
- Sea lamprey; and
- River lamprey.

9.20. The proposed material changes and minor changes to the baseline ornithological and ecological conditions do not make any difference to this conclusion.

9.21. Further information to inform the Appropriate Assessment will be provided as a separate report.

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APPENDIX 1: HUMBER ESTUARY SPA CITATION

EC Directive 79/409 on the Conservation of Wild Birds

Name: Humber Estuary

Unitary Authorities/Counties: City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire

Component SSSIs: The SPA encompasses all or parts of the following Sites of Special Scientific Interest (SSSIs): Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby-Theddlethorpe Dunes SSSI, and The Lagoons SSSI.

Site description: The Humber Estuary is located on the east coast of England, and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus*, avocet *Recurvirostra avosetta* and little tern *Sterna albifrons*.

Size of SPA: The SPA covers an area of 37,630.24 ha.

Qualifying species:

The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex I species	Count and season	Period	% of GB population
Avocet <i>Recurvirostra avosetta</i>	59 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7%
Bittern <i>Botaurus stellaris</i>	4 individuals – wintering	5 year peak mean 1998/99 – 2002/03	4.0%
Hen harrier <i>Circus cyaneus</i>	8 individuals – wintering	5 year peak mean 1997/98 – 2001/02	1.1%
Golden plover <i>Pluvialis apricaria</i>	30,709 individuals – wintering	5 year peak mean 1996/97 – 2000/01	12.3%
Bar-tailed godwit <i>Limosa lapponica</i>	2,752 individuals – wintering	5 year peak mean 1996/97 – 2000/01	4.4%
Ruff <i>Philomachus pugnax</i>	128 individuals – passage	5 year peak mean 1996-2000	1.4%
Bittern <i>Botaurus stellaris</i>	2 booming males – breeding	3 year mean 2000-2002	10.5%
Marsh harrier <i>Circus aeruginosus</i>	10 females – breeding	5 year mean 1998-2002	6.3%
Avocet <i>Recurvirostra avosetta</i>	64 pairs – breeding	5 year mean 1998 – 2002	8.6%
Little tern <i>Sterna albifrons</i>	51 pairs – breeding	5 year mean 1998-2002	2.1%

The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Migratory species	Count and season	Period	% of subspecies/ population
Shelduck <i>Tadorna tadorna</i>	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot <i>Calidris canutus</i>	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% <i>islandica</i>
Dunlin <i>Calidris alpina</i>	22,222 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7% <i>alpina</i> , Western Europe (non-breeding)
Black-tailed godwit <i>Limosa limosa</i>	1,113 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.2% <i>islandica</i>
Redshank <i>Tringa totanus</i>	4,632 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.6% <i>britannica</i>
Knot <i>Calidris canutus</i>	18,500 individuals – passage	5 year peak mean 1996 – 2000	4.1% <i>islandica</i>
Dunlin <i>Calidris alpina</i>	20,269 individuals – passage	5 year peak mean 1996 – 2000	1.5% <i>alpina</i> , Western Europe (non-breeding)
Black-tailed godwit <i>Limosa limosa</i>	915 individuals – passage	5 year peak mean 1996 – 2000	2.6% <i>islandica</i>
Redshank <i>Tringa totanus</i>	7,462 individuals – passage	5 year peak mean 1996 – 2000	5.7% <i>britannica</i>

Bird counts from: Wetland Bird Survey (WeBS) database and *The Humber Estuary: A comprehensive review of its nature conservation interest* (Allen et al. 2003).

Assemblage qualification:

The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

In the non-breeding season, the area regularly supports 153,934 individual waterbirds (five year peak mean 1996/97 – 2000/01), including dark-bellied brent goose *Branta bernicla bernicla*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, mallard *Anas platyrhynchos*, pochard *Aythya ferina*, scaup *Aythya marila*, goldeneye *Bucephala clangula*, bittern *Botaurus stellaris*, oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, ringed plover *Charadrius hiaticula*, golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *C. alba*, dunlin *C. alpina*, ruff *Philomachus pugnax*, black-tailed godwit *Limosa limosa*, bar-tailed godwit *L. lapponica*, whimbrel *Numenius phaeopus*, curlew *N. arquata*, redshank *Tringa totanus*, greenshank *T. nebularia* and turnstone *Arenaria interpres*.

Non-qualifying species of interest: The SPA is used by non-breeding merlin *Falco columbarius*, peregrine *F. peregrinus* and short-eared owl *Asio flammeus*, and breeding common tern *Sterna hirundo* and kingfisher *Alcedo atthis* (all species listed in Annex I to the EC Birds Directive) in numbers of less than European importance (less than 1% of the GB population).

Status of SPA:

Humber Flats, Marshes and Coast (Phase 1) SPA was classified on 28 July 1994.

The extended and renamed Humber Estuary SPA was classified on 31 August 2007.

APPENDIX 2: HUMBER ESTUARY RAMSAR SITE CITATION

Site: Humber Estuary

Coordinates: 053 32 59 N, 000 03 25 E Area: 37,988 ha

The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer.

Ramsar criterion 1

The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass *Spartina anglica* and annual glasswort *Salicornia* communities. Low to mid marsh communities are mostly represented by sea aster *Aster tripolium*, common saltmarsh grass *Puccinellia maritima* and sea purslane *Atriplex portulacoides* communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch *Elytrigia atherica* (*Elymus pycnanthus*) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed *Phragmites australis* fen and sea club rush *Bolboschoenus maritimus* swamp with the couch grass *Elytrigia repens* (*Elymus repens*) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon.

Ramsar criterion 3

The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.

Ramsar criterion 5

Assemblages of international importance:

153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Common shelduck, *Tadorna tadorna*

Northwestern Europe (breeding) population

4,464 individuals, wintering, representing an average of 1.5% of the population (5 year peak mean 1996/7-2000/1)

Eurasian golden plover, *Pluvialis apricaria*

altifrons subspecies – NW Europe, W Continental Europe, NW Africa population 30,709 individuals, wintering, representing an average of 3.3% of the population (5 year peak mean 1996/7-2000/1)

Red knot, *Calidris canutus islandica* subspecies

28,165 individuals, wintering, representing an average of 6.3% of the population (5 year peak mean 1996/7-2000/1)

Dunlin, *Calidris alpina*

alpina subspecies – Western Europe (non-breeding) population

22,222 individuals, wintering, representing an average of 1.7% of the population (5 year peak mean 1996/7-2000/1)

Black-tailed godwit, *Limosa limosa islandica* subspecies

1,113 individuals, wintering, representing an average of 3.2% of the population (5 year peak mean 1996/7-2000/1)

Bar-tailed godwit, *Limosa lapponica lapponica* subspecies

2,752 individuals, wintering, representing an average of 2.3% of the population (5 year peak mean 1996/7-2000/1)

Common redshank, *Tringa totanus brittanica* subspecies

4,632 individuals, wintering, representing an average of 3.6% of the population (5 year peak mean 1996/7-2000/1)

Ramsar criterion 8

The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.

APPENDIX 3 HUMBER ESTUARY SAC CITATION

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Humber Estuary
Unitary Authority/County:	City of Kingston upon Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire
SAC status:	Designated on 10 December 2009
Grid reference:	TA345110
SAC EU code:	UK0030170
Area (ha):	36657.15
Component SSSI:	Humber Estuary

Site description:

The Humber is the second largest coastal plain **Estuary** in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.

The Humber is a muddy, macro-tidal estuary, fed by a number of rivers including the Rivers Ouse, Trent and Hull. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. The extensive mud and sand flats support a range of benthic communities, which in turn are an important feeding resource for birds and fish. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers.

Habitats within the Humber Estuary include **Atlantic salt meadows** and a range of sand dune types in the outer estuary, together with **Sandbanks which are slightly covered by sea water all the time**, extensive intertidal mudflats, **Salicornia and other annuals colonising mud and sand**, and **Coastal lagoons**. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. These are best-represented at the confluence of the Rivers Ouse and Trent at Blacktoft Sands.

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. The sand dunes are features of the outer estuary on both the north and south banks particularly on Spurn peninsula and along the Lincolnshire coast south of Cleethorpes.

Examples of both **Fixed dunes with herbaceous vegetation ('grey dunes')** and **Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')** occur on both banks of the estuary and along the coast. Native sea buckthorn **Dunes with *Hippophae rhamnoides*** also occurs on both sides of the estuary.

Significant fish species include **river lamprey *Lampetra fluviatilis*** and **sea lamprey *Petromyzon marinus*** which breed in the River Derwent, a tributary of the River Ouse. **Grey seals *Halichoerus grypus*** come ashore in autumn to form breeding colonies on the sandy shores of the south bank at Donna Nook.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*
- Dunes with *Hippophae rhamnoides*
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide

- Fixed dunes with herbaceous vegetation ('grey dunes')*
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Grey seal *Halichoerus grypus*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

Annex I priority habitats are denoted by an asterisk (*)

Appendix 4. Humber Estuary SPA and Ramsar site species and habitats and their exposure to risk of any effect from the AMEP proposed Material Change¹⁴. Q = qualifying species (as per SPA citation and/or SPA Review), A = assemblage species (as listed in SPA Review and citation, jncc.defra.gov.uk).

Species	Humber Estuary SPA	Humber Estuary Ramsar site	Present within potential impact zone ¹⁵ of project in 'non-trivial' numbers	Consented scheme LSE	Material change LSE	Comments
Avocet (breeding and wintering)	Q		✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Bittern (breeding and wintering)	Q					Only seen in potential impact zone infrequently in low numbers, no LSE
Hen harrier (wintering)	Q					Only seen in potential impact zone infrequently in low numbers, no LSE
Golden plover (wintering)	Q	Q				Only seen in potential impact zone infrequently in low numbers, no LSE
Bar-tailed godwit (wintering)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Ruff (passage)	Q					Not present in potential impact zone, no LSE
Marsh harrier (breeding)	Q		✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Little tern (breeding)	Q					Not present in potential impact zone, no LSE
Shelduck (wintering)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.

¹⁴ This Table relates only to the proposed Material Change and therefore only to the AMEP site. There would be no change to the Cherry Cobb Sands compensation site (and no effect of the Material Change on that site) so that has not been considered as part of the assessment summarised here.

¹⁵ Potential impact zone was defined as the site plus a precautionary buffer of 300m buffer (to exceed the maximum likely disturbance to the most sensitive species, curlew, for which a 275m disturbance zone was agreed in the SoCG), though consideration was also given to effects over a wider area as appropriate (e.g wider effects on seals and fish).

Species	Humber Estuary SPA	Humber Estuary Ramsar site	Present within potential impact zone ¹⁵ of project in 'non-trivial' numbers	Consented scheme LSE	Material change LSE	Comments
Knot (wintering and passage)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Dunlin (wintering and passage)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Black-tailed godwit (wintering and passage)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Redshank (wintering and passage)	Q	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out
Brent goose (non-breeding)	A					Only seen in potential impact zone very infrequently in low numbers, no LSE
Wigeon (non-breeding)						Only seen in potential impact zone very infrequently in low numbers, no LSE
Teal (non-breeding)			✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out
Mallard (non-breeding)			✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out
Shoveler (non-breeding)			✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out
Pochard (non-breeding)						Only seen in potential impact zone infrequently in low numbers, no LSE
Scaup (non-breeding)						Only seen in potential impact zone very infrequently in low numbers, no LSE

Species	Humber Estuary SPA	Humber Estuary Ramsar site	Present within potential impact zone ¹⁵ of project in 'non-trivial' numbers	Consented scheme LSE	Material change LSE	Comments
Goldeneye (non-breeding)						Only seen in potential impact zone infrequently in low numbers, no LSE
Oystercatcher (non-breeding)						Only seen in potential impact zone infrequently in low numbers, no LSE
Ringed Plover (non-breeding)	A	Q	✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Grey plover (non-breeding)						Only seen in potential impact zone infrequently in low numbers, no LSE
Lapwing (non-breeding)	A		✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Sanderling (non-breeding)	A	Q				Only seen in potential impact zone infrequently in low numbers, no LSE
Whimbrel (non-breeding)	A					Only seen in potential impact zone infrequently in low numbers, no LSE
Curlew (non-breeding)	A		✓	✓	✓	Regularly present in potential impact zone in non-trivial numbers, LSE cannot be ruled out.
Greenshank (non-breeding)	A					Only seen in potential impact zone infrequently in low numbers, no LSE
Turnstone (non-breeding)	A					Only seen in potential impact zone infrequently in low numbers, no LSE
Grey seal		Q		✓	✓	
River lamprey		Q		✓	✓	
Sea lamprey		Q		✓	✓	
Natterjack toad		Q				No suitable habitat in potential impact zone, no LSE

Species	Humber Estuary SPA	Humber Estuary Ramsar site	Present within potential impact zone ¹⁵ of project in 'non-trivial' numbers	Consented scheme LSE	Material change LSE	Comments
Coastal lagoons				✓	✓	
Freshwater and coastal grazing marsh				✓	✓	
Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture)				✓	✓	
Intertidal sand and mudflats				✓	✓	
<i>Salicornia</i> and other annuals colonising mud and sand				✓	✓	
Saltmarsh (Atlantic salt meadows)				✓	✓	
Water column				✓	✓	
Other supporting habitats						No direct or indirect loss, so no LSE

Appendix 5. Summary of Like Significant Effects on the Humber Estuary SAC resulting from the consented scheme and from the proposed Material Change¹⁶.

Potential Effect	Significance of Effect on SAC Qualifying Interest Features (ES)	Proposed material change
Permanent direct loss of estuarine habitat (H1130)	Likely Significant Effect due to losses of habitat under the footprint of the new quay, effects on sea and river lamprey and the effects of capital and maintenance dredging and disposal. Appropriate Assessment (AA) required.	No change - LSE
Permanent direct loss of intertidal mudflat and mudflat with pioneer saltmarsh (H1140/1310)	Likely Significant Effect predominantly due to losses caused by the new quay. Effects of dredging and disposal as per estuarine habitat above. AA required.	No change - LSE
Permanent direct loss of saltmarsh (H1330)	Likely Significant Effect due to loss of saltmarsh for breach on compensation site. AA required.	No change - LSE. Additional loss of saltmarsh will occur as result of colonisation of reclamation area
Indirect effects on estuarine habitat (H1130).	Likely Significant Effect with changes in the composition of the estuarine habitats present to the north and south of the quay. AA required.	No change - LSE
	No Likely Significant Effect has been concluded about the effects on sub-tidal habitat for lamprey, the effects of the compensation site at CCS on the hydrodynamics of the estuary and the effects on water temperatures of the relocation of the power station outfall pipes for reasons listed below.	No change - no LSE
	No likely significant effects on sea or river lamprey due to the small indirect changes (see <i>Annex B</i>).	No change - no LSE
	Relocation of the outfalls to the front of the new quay will change the thermal plume, but there will be no significant changes to the temperatures of the receiving water (<i>EX9.7 – Assessment of the Relocation of the E.ON and Centrica Outfalls on Thermal Recirculation</i>). The relocation has yet to be agreed with E.ON and Centrica, however, the receiving water will be no warmer with AMEP even if the outfalls remain in their current location.	No change - no LSE
Indirect effects on intertidal mudflat and mudflat with pioneer saltmarsh (H1140/1310)	Likely Significant Effect predominantly due to changes in habitat to the north and south of the new quay and geomorphological changes due to rise in water levels. AA required.	No change - LSE
	No Likely Significant Effect has been concluded about the effects of erosion at the breach location of the compensation site at CCS and due to the discharge from the pumping station and increased wave heights due to the new quay. The reasons are set out below.	No change - no LSE

¹⁶ This Table relates only to the proposed Material Change and therefore only to the AMEP site. There would be no change to the Cherry Cobb Sands compensation site (and no effect of the Material Change on that site) so that has not been considered as part of the assessment summarised here.

Potential Effect	Significance of Effect on SAC Qualifying Interest Features (ES)	Proposed material change
	Downstream of the breach at the compensation site, erosion and enlargement of the CCS Creek is predicted with increases predominantly in the depth of the creek and also its width closer to the breach, although it will remain unchanged at the “downstream” location (Black & Veatch, 2012 ¹).	No change - no LSE
	A channel will be initiated by dredging a short section of intertidal habitat seaward of the pumping station (see <i>Tables 12.2 and 12.3</i> of the SoCG for the ES), so there will be no significant erosion effects.	No change - no LSE
	Increased wave heights due to the new quay will be small and localised and any erosion resulting will be offset by accretion resulting from the sheltering effect of the quay as described in <i>Supplementary Information EX 8.7 Modelling of Final Quay Design</i> .	No change - no LSE
Indirect effects on saltmarsh (H1330)	Likely Significant Effect due to the transformation of existing habitat types into saltmarsh (see <i>Annex B</i>). AA required.	No change - LSE
Disturbance to grey seal, sea and river lamprey (S1364 and S1099)	Likely Significant Effect as piling for the new quay construction will create underwater noise which could affect grey seal and migratory movements of sea and river lamprey. AA required.	No change - LSE

Able Marine Energy Park: Material Change 2 Habitats Regulations Assessment Report

Part 2: Information to Inform an Appropriate Assessment

Document TR030006/APP/7

Ecology Consulting Report to Able UK Ltd

January 2022

Executive Summary

The requirement for this Assessment is set out under Article 6 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna, (the 'Habitats Directive'). Article 6 requires that any plan or project which is not directly connected to, or necessary to the management of a Natura 2000 site and which is likely to have a significant effect on the conservation objectives of the site, either individually or in combination with other plans and projects, should be subject to an appropriate assessment.

Part 1 of the HRA report concluded that the Able Marine Energy Park (AMEP) project would have Likely Significant Effects (LSE) on eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, knot, redshank and shelduck) and on six of the wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal).

LSE was also recorded for seven features of the Humber Estuary SAC/Ramsar site (estuarine habitats, intertidal mudflats, *Salicornia* and other annuals colonising mud and sand, Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*), grey seal, sea lamprey and river lamprey).

This report, forming Part 2 of the HRA, provides the competent authority with the information required to assess and review the information and make its determination of effect for an Appropriate Assessment.

It is concluded that the Project would continue to adversely affect the ecological integrity of the Humber Estuary SPA and Ramsar site, and the Humber Estuary SAC. Since the original HRA was carried out, the amount of mudflat has reduced in size as it has converted to saltmarsh; the new quay alignment proposed by the Material Change also removes a slightly smaller amount of mudflat. The compensation proposals remain the same and so it is concluded that the adverse effect on integrity would continue to be adequately compensated for.

1. Introduction and Background

- 1.1. This report forms part of the application for a material change to the consented Able Marine Energy Park (referred to hereafter as the 'Project'). It addresses the nature conservation issues raised by the Project, specifically in relation to the Conservation of Habitats and Species Regulations 2017, the 'Habitats Regulations'. It comprises the second part of the information to inform the Habitat Regulations Assessment (HRA) for the project, and provides information required to inform an Appropriate Assessment of the likely significant effects previously identified (in Part 1 LSE Test) on relevant sites of international nature conservation importance (i.e. the Humber Estuary SPA/Ramsar site/SAC).
- 1.2. Part 1 of the HRA report, the Likely Significant Effect report, concluded that the Project had the potential to affect the Humber Estuary SPA/Ramsar site/SAC but no others. It concluded Likely Significant Effects on eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, redshank, shelduck and redshank) and on six of the wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal). LSE was also concluded for seven features of the Humber Estuary SAC; estuarine habitats, intertidal mudflats, *Salicornia* and other annuals colonising mud and sand, Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*), grey seal, sea lamprey and river lamprey.
- 1.3. As a result of the conclusions, it is necessary to undertake an Appropriate Assessment under the Habitats Regulations with regard to those Likely Significant Effects identified for these species. Sufficient information must be provided to allow the competent authority to assess and review the information and make its own determination of effect for an Appropriate Assessment. This report provides that required information. It reviews the Appropriate Assessment carried out for the original DCO application in light of the proposed material change and any changes that have occurred in the baseline ecological conditions.

2. Legislative Framework

- 2.1. Under the Habitats Regulations a development that is likely to have a significant effect on an SPA requires Appropriate Assessment under Regulation 63 of those Regulations.
- 2.2. The first test under the Habitats Regulations is whether the development is likely to have a significant effect on any of the populations of importance for which the site has been designated. If it is, as determined by the Competent Authority, then an Appropriate Assessment needs to be carried out by the Competent Authority to determine whether the development could adversely affect the ecological integrity of the SPA (National Planning Policy Framework (NPPF), Natural England's Standard: HRA Habitats Regulations Assessment¹ and the Planning Inspectorate (2017) Habitat Regulations Assessment Advice Note Ten. In this context ecological integrity is defined in "Managing Natura 2000 Sites" (European Communities 2000) as:

1 [REDACTED]

“the coherence of the site’s ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified”

- 2.3. In Part 1 of the HRA report it was concluded that the proposed Project could result in Likely Significant Effects on the Humber Estuary SPA/Ramsar avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, redshank, shelduck, knot, curlew, lapwing, mallard, ringed plover, shoveler and teal populations (together with their Supporting Habitat; coastal lagoons, freshwater and coastal grazing marsh, inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture), intertidal sand and mudflats, *Salicornia* and other annuals colonising mud and sand, Saltmarsh (Atlantic salt meadows) and water column).
- 2.4. There would also be LSE for the Humber Estuary SAC/Ramsar, for its (a) estuarine habitats, (b) intertidal mudflats, (c) sandbanks which are slightly covered by seawater all the time; (d) *Salicornia* and other annuals colonising mud and sand; (e) Atlantic sea meadows (*Glauco-Puccinallietalia maritima*); (f) grey seal, (g) sea lamprey and (h) river lamprey populations.

3. Scope of this assessment

- 3.1. The scope of this report is to provide the information required to allow the competent authority to assess and review the information and make its own determination of effect for an Appropriate Assessment.
- 3.2. The first part of the HRA report identified the following features of the Humber Estuary SPA/Ramsar/SAC populations for which LSE could not be ruled out, and therefore require Appropriate Assessment:

Qualifying Species:

- Avocet;
- Marsh harrier;
- Bar-tailed godwit;
- Black-tailed godwit;
- Dunlin;
- Redshank;
- Knot; and
- Shelduck.

Additional Assemblage Species:

- Curlew;
- Lapwing;
- Mallard
- Ringed plover;
- Shoveler; and

- Teal.

Supporting Habitat:

- Coastal lagoons;
- Freshwater and coastal grazing marsh;
- Inland areas of wet grassland, rough grassland and agricultural land (both arable land and permanent pasture);
- Intertidal sand and mudflats;
- *Salicornia* and other annuals colonising mud and sand;
- Saltmarsh (Atlantic salt meadows);
- Water column.

3.3. With regard to the potential effects on the Humber SAC, the following features have been identified for which LSE cannot be ruled out, and therefore require Appropriate Assessment:

- Estuarine habitats;
- Intertidal mudflats;
- *Salicornia* and other annuals colonising mud and sand;
- Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*);
- Grey seal;
- Sea lamprey; and
- River lamprey.

3.4. The likely significant effects identified above are the same habitats and species identified for the consented scheme and agreed between the Applicant, Natural England and the MMO as recorded in a Statement of Common Ground (SoCG) in August 2012².

3.5. This second part of the HRA therefore focuses on these species and their supporting habitats. The specific likely significant effects on the SAC (as agreed in the SoCG) were as follow:

- The effects of permanent loss of estuarine habitat from the footprint of the development.
- The effects of capital and maintenance dredging on estuarine habitats and intertidal mudflats.
- The effects of disposal of dredged material on estuarine habitats and intertidal mudflats.
- The effects of the permanent direct loss of intertidal mudflat from Killingholme Marshes Foreshore (KMFS) due to the footprint of the development.

² <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001606-SOCG009%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20Natural%20England%20and%20the%20Marine%20Management%20Organisation.pdf>

- The effects of the permanent loss of saltmarsh.
 - The effects of indirect habitat changes on qualifying habitats (estuarine habitat, intertidal mudflat and saltmarsh).
 - The effects of underwater noise from piling on the feeding behaviour of grey seals and the migratory movements of river lamprey.
- 3.6. The specific likely significant effects on the SPA (as agreed in the SoCG) were as follows:
- The effects of the permanent direct loss of estuarine and specifically intertidal mudflats from KMFS on waterfowl that it supports.
 - functional loss of 11.6 ha of mudflat habitat as a result of disturbance.
 - The effects on the use of North Killingholme Haven Pits (NKHP) as a roost if the feeding areas on the mudflats at Killingholme Marches Foreshore (KMFS) are lost.
 - The disturbance effects on birds due to piling activities during construction of the new quay.
 - The disturbance effects on birds using NKHP from construction activities other than piling, and operation of AMEP.
 - The effects of loss of terrestrial habitat within the AMEP site at North Killingholme which is used by SPA birds (predominantly curlew).
- 3.7. As for the original DCO assessment, the possibility of ‘in combination’ effects has been considered in relation to other proposed developments that could affect these SPA species. Consideration of present day in-combination effects is included within this report in relation to whether site integrity might adversely be affected by the Project in combination with any other developments in the region.

4. Consultation

- 4.1. This current document has been updated following engagement and statutory consultation with NE prior to the material change application being submitted.

5. Key Ornithological Interests: Baseline Conditions Update relating to SPA species

- 5.1. This section provides information on the baseline numbers, distribution and behaviour of the 14 bird species that have been taken forward for Appropriate Assessment, examining their use of the baseline survey area (defined to include all of the potential impact zone of the development). The data are presented first for the Killingholme Marshes Foreshore and then for North Killingholme Haven Pits.

Killingholme Marshes Foreshore

- 5.2. The data sources on waterbird numbers within the Killingholme Marshes Foreshore area that could be affected by the proposed development are summarised in Table 1,

which gives the peak count for each key species from each source. Overall, there is broad agreement between the sources with regard to the important waterbird populations in this zone. Symbols in the Table following the species name indicate where there have been notable changes in numbers from the original ES baseline.

Table 1. Overall peak waterbird (and marsh harrier) counts for the Killingholme Marshes Foreshore.

Species	SPA status *	ES TTTC	ES WeBS	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 2017-18	ABP 2018-19	ABP 2019-20	NC 2021	% Humber update
Shelduck	Q	109	9	2.4%	75	138	168	76	56	34	3.7%
Shoveler	A	0	11	8.9%	53	0	4	0	0	0	24.7%
Mallard	A	14	13	0.7%	45	10	3	22	10	14	4.3%
Teal ↑	A	12	13	0.5%	0	6	310	1064	828	1466	39.6%
Marsh harrier	Q	0	0	0%	0	0	0	0	0	0	0%
Avocet ↑	Q	0	0	0%	49	8	36	104	251	205	10.1%
Lapwing ↑	A	325	15	1.8%	0	3	665	2374	1254	1121	14.4%
Ringed plover ↓	A	210	0	17.0%	68	4	39	19	24	2	9.3%
Curlew	A	158	61	3.7%	66	109	136	68	96	29	5.1%
Bar-tailed godwit ↓	Q	123	0	4.4%	1	35	5	2	14	0	2.4%
Black-tailed godwit	Q	2566	50	66.0%	1524	816	538	2070	2183	170	48.0%
Dunlin	Q	1029	87	5.7%	326	289	503	680	512	232	4.3%
Knot	Q	0	1	0%	2	0	67	0	0	0	0.4%
Redshank	Q	540	83	10.5%	116	38	806	204	140	71	28.0%

* Q = qualifying species, A = assemblage species. Species in bold present in more than 1% of the SPA population at the site.

5.3. Table 2 summarises the monthly pattern of occurrence from the **British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) core counts**, showing the peak count each month over the most recently available five-year period.

Table 2. BTO WeBS Core Count Monthly Peak counts 2015-16 – 2019-20, Killingholme Marshes Foreshore

Species	Jan	Feb	Mar	Apr	May	Aug	Sep	Oct	Nov	Dec
Shelduck	50	221	102	43	60	75	49	81	105	32
Shoveler	78	47	58	40	10	3	93	0	70	91
Mallard	47	23	16	8	18	58	73	43	46	98
Teal	428	273	150	63	2	12	67	298	303	296
Marsh Harrier	0	0	0	0	0	0	0	0	0	0
Avocet	0	13	131	33	24	0	0	48	2	15
Lapwing	1930	876	22	4	6	4	0	26	445	363
Ringed Plover	1	1	5	0	0	305	22	2	0	0
Curlew	68	66	105	16	13	48	53	65	97	120
Bar-tailed Godwit	1	0	0	0	0	0	0	0	0	6
Black-tailed Godwit	19	600	578	420	63	1650	2450	1120	1982	2400
Knot	0	0	0	0	0	0	0	12	0	0

Species	Jan	Feb	Mar	Apr	May	Aug	Sep	Oct	Nov	Dec
Dunlin	245	400	202	0	61	6	680	91	609	1000
Redshank	166	154	58	210	0	52	82	101	203	180

Note: Species in bold present in more than 1% of the SPA population at the site.

5.4. The **BTO Low Tide Counts** from 2012-13 (the most recent available) are summarised in Table 3.

Table 3. BTO Low Tide Count totals for the Killingholme Marshes Foreshore sector (CH066), 2011-12.

Species	01/10/ 11	01/03/ 12	01/04/ 12	01/05/ 12	01/06 /12	01/07 /12	01/08 /12	01/09 /12	PEAK
Shelduck	0	12	2	1	2	0	0	0	12
Shoveler	0	0	0	0	0	0	0	0	0
Mallard	3	2	2	4	7	0	0	5	7
Teal	11	4	0	0	0	0	0	0	11
Marsh Harrier	0	0	0	0	0	0	0	0	0
Avocet	0	2	5	0	0	0	0	0	5
Lapwing	0	0	0	0	0	0	0	0	0
Ringed Plover	0	0	0	0	0	0	0	0	0
Curlew	4	3	0	0	0	0	0	0	4
Bar-tailed Godwit	0	0	0	0	0	0	0	0	0
Black-tailed Godwit	0	0	0	0	0	0	2000	650	2000
Knot	0	0	0	0	0	0	0	0	0
Dunlin	0	0	0	0	0	0	0	0	0
Redshank	0	0	0	0	1	0	0	0	1

Note: Species in bold present in more than 1% of the SPA population at the site.

5.5. The results of the September 2017- May 2018 JBA surveys are summarised in Tables 4.

Table 4. Monthly peak counts from Killingholme Marshes Foreshore, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Shelduck	5	168	102	105	64	74	96	41	20	168
Shoveler	0	0	4	0	0	0	0	0	0	4
Mallard	1	3	2	0	0	0	0	3	0	3
Teal	29	310	298	71	122	173	133	32	0	310
Marsh Harrier	0	0	0	0	0	0	0	0	0	0
Avocet	0	36	16	0	0	15	34	15	4	36
Lapwing	0	200	212	342	665	233	18	2	1	665
Ringed plover	33	18	0	0	0	5	11	39	28	39
Curlew	4	35	70	60	65	119	136	30	2	136
Bar-tailed godwit	0	0	5	0	0	0	0	0	0	5
Black-tailed godwit	362	267	24	0	6	2	1	0	538	538
Knot	0	0	0	0	0	0	0	0	0	0

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Dunlin	18	376	503	156	501	12	80	26	42	503
Redshank	70	806	284	292	370	135	115	111	0	806

Note: Species in bold present in more than 1% of the SPA population at the site.

ABP DATA 2018-19 and 2019-20

- 5.6. Data were obtained from ABP from their monitoring surveys undertaken over several sites, including KMFS. The recent data from 2018-19 and 2019-20 for KMFS are summarised in Table 5, which gives the monthly peak counts over this survey period, and the annual peaks for each of the two years. Of particular note are the higher numbers of teal, lapwing and avocet than recorded in previous surveys.
- 5.7. Further analysis of the use of KMFS by these three species is presented in Appendix UES11-3. The recent increased use of the site by these species is likely to have been influenced by recent changes in the intertidal habitat caused by accretion and consequential saltmarsh colonisation of former mudflat at the site. This has enabled some species to feed for longer through the tidal cycle and provides roosting habitat even through high tide states (at least during neap tides). Teal and avocet now make use of the site for both feeding and roosting in higher numbers than previously recorded, and there has been increased use by lapwing, though predominantly for roosting. The site continues to be important for black-tailed godwit for both feeding and roosting, particularly in autumn/early winter though also in spring (see Tables 1-3).

Table 5. ABP Survey Data for Killingholme Marshes Foreshore sector, October-March 2018-19 and 2019-20: monthly peak counts and annual peaks.

Species	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2018-19	Peak 2019-20
Shelduck	31	44	56	48	51	76	76	56
Shoveler	0	0	0	0	0	0	0	0
Mallard	22	3	0	0	1	10	22	10
Teal	413	915	510	828	1064	888	1064	828
Marsh Harrier	0	0	0	0	0	0	0	0
Avocet	251	33	23	0	76	152	104	251
Lapwing	65	372	1642	1550	2374	6	2374	1254
Ringed plover	24	16	1	3	6	7	19	24
Curlew	49	62	96	68	63	63	68	96
Bar-tailed godwit	0	0	2	3	14	0	2	14
Black-tailed godwit	2183	22	220	162	372	271	2070	2183
Knot	0	0	0	0	0	0	0	0
Dunlin	455	512	659	680	381	136	680	512
Redshank	184	140	156	170	117	204	204	140

Note: Species in bold present in more than 1% of the SPA population at the site.

Able Data 2020-21

5.8. The data collected for Able UK by Nick Cutts during December 2020 – March 2021 from the Killingholme Marshes Foreshore are summarised in Table 6, where the total counts from each survey are presented.

Table 6. Count totals Killingholme Marshes Foreshore sector, December 2020- March 2021 (Source: Nick Cutts). Note: partial coverage of north end of sector only during Dec-Jan).

Species	09/12/2020	23/12/2020	07/01/2021	21/01/2021	04/02/2021	18/02/2021	05/03/2021	PEAK
Shelduck	8	0	2	0	20	34	13	34
Shoveler	0	0	0	0	0	0	0	0
Mallard	2	2	14	4	13	4	8	14
Teal	1466	994	470	520	431	212	354	1466
Marsh Harrier	0	0	0	0	0	0	0	0
Avocet	0	0	0	0	0	0	205	205
Lapwing	980	950	310	1121	240	0	0	1121
Ringed Plover	0	2	0	0	0	0	0	2
Curlew	6	3	11	2	28	26	29	29
Bar-tailed Godwit	0	0	0	0	0	0	0	0
Black-tailed Godwit	0	0	0	0	170	0	0	170
Knot	0	0	0	0	0	0	0	0
Dunlin	75	35	40	0	22	232	10	232
Redshank	13	71	42	7	53	52	43	71

Note: Species in bold present in more than 1% of the SPA population at the site.

North Killingholme Haven Pits

5.9. The data sources on waterbird numbers within the North Killingholme Haven Pits sector that could be affected by the proposed development are summarised in Table 7, which gives the peak count for each key species from each source. Overall, there is broad agreement between the sources with regard to the important waterbird populations in this zone. Symbols in the Table following the species name indicate where there have been notable changes in numbers from the original ES baseline.

Table 7. Overall peak waterbird (and marsh harrier) counts for the North Killingholme Haven Pits.

Species	SPA status*	TTTC ES (IECS)	WeBS Core ES	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 17-18	% Humber update
Shelduck	Q	9	7	0.2%	9	12	8	0.3%
Shoveler	A	61	29	49.5%	8	0	4	3.7%

Table 7. Overall peak waterbird (and marsh harrier) counts for the North Killingholme Haven Pits.

Species	SPA status*	TTTC ES (IECS)	WeBS Core ES	% Humber ES	WeBS Core 15-19	WeBS Low 11-12	JBA 17-18	% Humber update
Mallard	A	34	71	3.4%	13	7	40	3.8%
Teal ↑	A	46	30	1.7%	0	11	104	2.8%
Marsh harrier	Q	0	0	0%	0	0	1	>1%
Avocet ↑	Q	16	27	5.3%	54	5	44	2.2%
Lapwing	A	5	276	1.6%	0	0	269	1.6%
Ringed plover	A	0	1	0.1%	1	0	0	0.1%
Curlew	A	7	12	0.3%	4	4	4	0.2%
Bar-tailed godwit	Q	1	0	0.0%	0	0	2	0.1%
Black-tailed godwit	Q	3800	3338	97.8%	3336	2000	655	73.4%
Knot	Q	12	0	0.0%	84	0	0	0.4%
Dunlin ↑	Q	270	380	2.1%	663	0	450	4.2%
Redshank	Q	249	215	4.8%	230	1	450	15.6%

* Q = qualifying species, A = assemblage species. Species in bold present in more than 1% of the SPA population at the site.

5.10. Table 8 summarises the monthly pattern of occurrence from the **British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) core counts**, showing the peak count each month over the most recently available five-year period.

Table 8. BTO WeBS Core Count Monthly Peak counts 2015-16 – 2019-20, North Killingholme Haven Pits

Species	Jan	Feb	Mar	Apr	May	Aug	Sep	Oct	Nov	Dec
Shelduck	6	24	14	13	9	16	7	1	1	0
Shoveler	27	34	19	7	0	5	1	34	20	46
Mallard	77	35	22	18	12	29	130	45	54	84
Teal	133	53	67	18	0	19	15	34	73	58
Marsh Harrier	0	0	0	0	0	0	0	0	0	0
Avocet	0	0	61	33	40	6	205	175	33	5
Lapwing	74	134	7	5	0	341	128	246	775	611
Ringed Plover	0	0	0	0	0	4	2	1	0	0
Curlew	5	22	7	12	3	16	6	7	8	7
Bar-tailed Godwit	0	0	0	0	0	0	0	0	0	0
Black-tailed Godwit	1	390	222	123	170	3350	5400	4600	2710	11
Knot	0	0	0	0	0	0	420	285	0	0
Dunlin	3	375	1	2	0	45	160	2950	1510	138
Redshank	91	232	251	43	1	451	345	157	355	240

Note: Species in bold present in more than 1% of the SPA population at the site.

5.11. The **BTO Low Tide Counts** from 2012-13 (the most recent available) are summarised in Table 9. This shows generally lower peak count than WeBS core counts which

probably reflect the timing of the counts at low, rather than high, tide (the pits are more important as a high tide roost than as a low tide feeding area).

Table 9. BTO Low Tide Count totals for the North Killingholme Haven Pits sector (CH017), 2011-12.

Species	01/10/ 11	01/03/ 12	01/04/ 12	01/05/ 12	01/06 /12	01/07 /12	01/08 /12	01/09 /12	PEAK
Shelduck	120	89	61	78	138	54	51	72	138
Shoveler	0	0	0	0	0	0	0	0	0
Mallard	0	8	6	4	10	0	10	5	10
Teal	0	6	0	0	0	0	0	0	6
Marsh Harrier	0	0	0	0	0	0	0	0	0
Avocet	0	8	0	0	0	0	0	0	8
Lapwing	0	0	0	0	0	0	0	3	3
Ringed Plover	0	2	0	4	0	0	0	0	4
Curlew	22	109	4	13	76	106	88	42	109
Bar-tailed Godwit	0	35	0	0	0	0	0	0	35
Black-tailed Godwit	530	219	0	0	288	816	1	21	816
Knot	0	0	0	0	0	0	0	0	0
Dunlin	289	0	3	0	0	0	0	71	289
Redshank	33	38	17	2	0	23	3	17	38

Note: Species in bold present in more than 1% of the SPA population at the site.

5.12. The results of the September 2017- May 2018 JBA surveys are summarised in Table 10.

Table 10. Monthly peak counts from North Killingholme Haven Pits, September 2017- May 2018 (Source: JBA 2019).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	PEAK
Shelduck	0	3	0	0	3	0	6	5	8	8
Shoveler	0	0	0	0	0	0	1	4	0	4
Mallard	9	7	40	18	15	4	8	2	0	40
Teal	2	29	24	53	104	23	45	24	0	104
Marsh harrier	0	1	0	0	0	0	1	1	0	1
Avocet	3	23	44	0	0	0	33	8	2	44
Lapwing	100	180	269	202	38	5	11	0	0	269
Ringed plover	0	0	0	0	0	0	0	0	0	0
Curlew	2	4	4	2	0	0	1	0	0	4
Bar-tailed godwit	0	0	0	0	0	0	2	0	0	2
Black-tailed godwit	655	500	2	0	0	0	0	20	1	655
Knot	0	0	0	0	0	0	0	0	0	0
Dunlin	20	450	32	24	0	0	0	0	0	450
Redshank	0	450	112	24	12	2	227	160	0	450

Note: Species in bold present in more than 1% of the SPA population at the site.

Terrestrial Fields

- 5.13. As noted in the original ES (paragraphs 11.5.90 *et seq.*), some of the Killingholme Fields (the terrestrial fields located between the Humber Sea Terminal and Immingham Dock) are regularly used by waterbird species associated with the Humber Estuary. The fields were identified in the original ES as providing functionally linked land for the SPA, particularly for feeding and roosting curlew (with a peak count of 106, or 2.4% of the Humber Estuary population at that time). Redshank, black-tailed godwit, lapwing, redshank, whimbrel, and shelduck were also recorded during the original ES baseline surveys but in numbers below 1% of the Humber Estuary population.
- 5.14. A further survey in autumn 2016 (Cutts and Hemingway 2017³) found reduced curlew numbers present in the AMEP fields than previously (peak 15, equivalent to 0.6% of the Humber population), possibly because of their less favourable condition (with a longer sward developed as arable/improved grassland fields have reverted to neutral grassland). The same study reported a higher use (peak 110 curlew, 4.1% of the Humber population) on grassland on the adjacent operational Tank Farm (outside the AMEP site), over both high and low tide periods, so the species was simply preferring other nearby grassland at the time.
- 5.15. Additional to the reduction in suitability of the remaining terrestrial fields within the AMEP site, as the development is being implemented more of these fields are being removed, as reported also in the updated Phase 1 habitat survey in Appendix UES11-1). Overall, therefore, use of this part of the AMEP site by curlew is likely to continue to reduce, but has been mitigated for by the creation of alternative wetland habitat at the Halton Marshes Wet Grassland Mitigation Area (following agreement to transfer the mitigation measures to this site from the previous Mitigation Area A).
- 5.16. Furthermore, curlew use of the KMFS has not increased numerically since the original ES (see Table 1 above), though the area does hold a higher proportion of the Humber population (5% compared with 3.7% previously), as a result of a decline in the curlew population elsewhere in the estuary.

6. Key Ecological Interests: Baseline Conditions Update relating to SAC species and habitats

Estuarine Habitats

- 6.1. A range of mud, sands and gravels are present within the subtidal area of middle estuary, these with associated biological communities, and with biotopes describing these in Chapter 10 Table 10-2 of the Updated ES.
- 6.2. The area within which AMEP will directly impact tends to exhibit muddier sediments with muddy sands or sandy muds sometimes with small quantities (<1%) of gravel (slightly gravelly sandy mud or slightly gravelly muddy sand). Additional surrounding habitats that could be affected by the development include included muddy habitats

³ Cutts, N. & K. Hemingway. 2017. *Able Curlew Fields and North Killingholme Frontage Ornithological Survey Programme Autumn 2016*. Report to Able UK Ltd. Institute of Estuarine & Coastal Studies, University of Hull.

including sandy muds or muddy sands (or slightly gravelly muddy sand/sandy muds) and two sandier sites (Allen, 2020: Appendix UES10-4).

- 6.3. The direct impact and surrounding areas were also characterised by low numbers of *Capitella* sp. but included modest numbers of species such *Corophium volutator* and *Streblospio shrubsolii*. However, many of the taxa present in these areas were recorded at relatively few sites. In terms of biomass the direct impact area was dominated by *Carcinus maenas* (1 site only), *Limecola balthica*, *Corophium volutator*, *Arenicolidae* sp. (*Arenicola marina*) and *Gammarus salinus* these species collectively accounting for over 90% of total biomass.

Intertidal mudflats

- 6.4. Allen (2006) describes the intertidal benthic community of the middle estuary south shore to be less diverse than in outer estuary, being dominated by *Corophium volutator*, *Streblospio shrubsolii*, *Hediste diversicolor* and the Spionid polychaete *Pygospio elegans*. Low abundances of *Macoma balthica* were also present with numbers increasing towards the outer estuary and in mid shore areas. These communities are typical for an estuarine habitat and primarily structured according to salinity, shore height and presumably sediment type. Whilst some communities are relatively impoverished these appear to be typical for such habitats and some variation in community structure is expected in a dynamic estuary.
- 6.5. The increase in intertidal elevation and colonisation by saltmarsh communities at the AMEP site has led to a loss of mudflat extent and influenced the distribution of several key species of invertebrate such as *Hediste diversicolor*. However, in the muddier areas, the 2015 and 2016 surveys (UES Appendices UES10-3 and UES10-4) recorded a broadly similar assemblage to that recorded in the baseline of 2010 for the original ES.
- 6.6. The original ES baseline commonly recorded *Tubificoides benedii*, Nematoda, the polychaete *Streblospio shrubsolii* and the amphipod crustacean *Corophium volutator* from the intertidal survey. The bivalve *Macoma (Limecola) balthica* was widespread and the polychaete *Hediste diversicolor* was present at most of the upper shore stations.
- 6.7. A broadly similar intertidal invertebrate assemblage was recorded in 2015 and 2016 at the AMEP site (Appendices UES10-3 and UES10-4), although with some restrictions in the extent of the typical intertidal mudflat community correlating to saltmarsh community colonisation.
- 6.8. It is considered likely that the increase in elevation and saltmarsh colonisation seen in 2015 and 2016 has continued to the present day, with a substantial extent of the AMEP development intertidal frontage now featuring saltmarsh in the upper to mid shore. As such, it is likely that the extent and/or composition of the intertidal invertebrate community recorded in this area will have altered in response to the increase in elevation and associated saltmarsh development.
- 6.9. The 2016 subtidal survey (Allen, 2020: Appendix UES10-4) reported the subtidal bed to feature a very impoverished faunal community typical for the middle Humber and in line with findings from previous surveys (as described in the original ES and in the Updated ES supporting documentation Appendices UES10-3 and UES10-4), including species such as *Capitella* sp., *Arenicolidae* sp. (*Arenicola marina*), *Eurydice pulchra*,

Gammarus salinus, *Corophium volutator*, *Nematoda* spp., *Polydora cornuta*, *Pygospio elegans*, *Streblospio shrubsolii* and *Tubificoides benedii*.

- 6.10. Allen (2016) concluded that the infaunal communities recorded during the 2015 subtidal survey around the potential dredge disposal areas were typical for dynamic mud, sand or mixed sediment subtidal sediments in the mid to outer Humber Estuary.
- 6.11. On this basis, it is concluded that there is the probability of natural variation in community composition over time, reflecting changes in estuarine dynamics, but given the community adaptation and continued active utilisation of the dredge deposit grounds, no significant change outwith these parameters is expected.

Saltmarsh: (1) *Salicornia* and other annuals colonising mud and sand, and (2) Atlantic sea meadows (*Glauco-Puccinallietalia maritimae*)

- 6.12. At the time of the original baseline work, there was little or no evidence of substantial saltmarsh vegetation occurring across the central mudflat of the AMEP development, other than some fringing communities on the upper shore adjacent to the flood bank, upstream adjacent to North Killingholme.
- 6.13. However, the potential for accretion of the intertidal mudflat and associated increase in elevation and potential colonisation by saltmarsh was identified in the Examining Authorities Report (2013).
- 6.14. A clear expansion in the extent of saltmarsh communities e.g. as surveyed in 2020 and 2021 (Appendix UES10-1: Thomson Environmental Consultants, 2020. North Killingholme Marshes Saltmarsh Survey 2020), has occurred on the intertidal frontage of the proposed AMEP development site since the original ES baseline work of the DCO.

Grey Seal

- 6.15. Due to the low frequency of occurrence and high mobility of marine mammals in the low to middle estuary, dedicated surveys were not conducted for the original ES nor to support this material amendment. The occasional presence of grey seal in the vicinity of the AMEP development relates to the potential presence of prey items, and the populations of the species in the wider region e.g. Southern North Sea. The Humber Estuary SAC breeding grey seal colony at Donna Nook has shown a major increase since the original application, more than doubling in the last decade from around 2,000 individuals to recent counts of over 5,000 (Special Committee on Seals 2021⁴).
- 6.16. As set out in the UES Chapter 10, there is the potential for any changes to the invertebrate and fish communities in the vicinity of the AMEP development to have an associated impact on grey seals through changes to prey composition and availability. However, the invertebrate and fish community composition remain the same as identified in the original ES and thus the nature of the effects will not change. No changes to the impacts on grey seals have been identified resulting from the material amendment to the proposed development.

- 6.17. The assessment of the effects of the material change on grey seals in the UES Chapter 10 also acknowledges that the assessment guidance for marine mammals in relation to underwater noise and vibration has been supplemented by NOAA (2018⁵) but concludes that the proposed mitigation for grey seal would not need to be changed.

River Lamprey and Sea Lamprey

- 6.18. The direct comparison between the different fish baseline data is limited by the use of different sampling methods, with different selectivity, used in different habitats and with variable sampling effort (e.g. within and between seasons). Also, the natural variability in population dynamics (e.g. inter-annual fluctuations in recruitment) may affect the fish species occurrence and abundance in the catches over time.
- 6.19. Considering these factors, and in the context of the wider knowledge of fish assemblages and their distribution in the lower Humber Estuary, there were no significant changes in the baseline for fish at the AMEP site. There was no evidence of preferred use of these areas by migratory fish, confirming earlier observations. Only a single river lamprey was recorded, during the November-December 2013 subtidal otter trawling (from the control area north of the AMEP site; see Updated ES Table 10-10), and no sea lamprey.

7. Ecological Integrity Test

- 7.1. As there has been deemed to be a likely significant effect on the SPA/SAC (as has been concluded for the AMEP Project Material Change in Part 1 of the HRA report), then the Competent Authority will be required to decide whether the plan or project would adversely affect the integrity of the site, in the light of the relevant conservation objectives. An adverse effect on integrity is one that is likely to prevent the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation.
- 7.2. The Conservation Objectives for the Humber Estuary SPA⁶ are as follows:
- “Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*
- *The extent and distribution of the habitats of the qualifying features*
 - *The structure and function of the habitats of the qualifying features*
 - *The supporting processes on which the habitats of the qualifying features rely*
 - *The population of each of the qualifying features, and,*
 - *The distribution of the qualifying features within the site.”*

⁵ National Oceanic and Atmospheric Administration, 2018. Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. NOAA Technical Memorandum NMFS-OPR-59, April 2018. National Oceanic and Atmospheric Administration National Marine Fisheries Service.

⁶ Source: Natural England web site: [REDACTED]

- 7.3. The conservation objectives for the Humber Estuary SAC are as follows:
- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;
 - The extent and distribution of qualifying natural habitats and habitats of qualifying species
 - The structure and function (including typical species) of qualifying natural habitats
 - The structure and function of the habitats of qualifying species
 - The supporting processes on which qualifying natural habitats and habitats of qualifying species rely
 - The populations of qualifying species, and,
 - The distribution of qualifying species within the site.
- 7.4. Site-specific objectives were also considered in the assessment for all LSE species/communities, as set out in Natural England's Supplementary Advice on Conservation Objectives for the Humber Estuary SPA⁷ and for the Humber Estuary SAC⁸.

8. Assessment of Effects on SPA, Ramsar and SAC Species and Communities

Construction Phase

- 8.1. As set out in the original ES and the Updated ES Aquatic Ecology and Terrestrial Ecology and Nature Conservation chapters (Chapters 10 and 11 of both documents), the main potential effects of the construction of the Development on SPA/Ramsar ornithological features are considered to be:
- Direct loss of intertidal habitat within the Humber Estuary SPA/Ramsar through construction of project infrastructure;
 - Indirect Loss of intertidal habitat within the Humber Estuary SPA/Ramsar;
 - Loss of fish habitat within the Humber Estuary SPA/Ramsar that could affect bird foraging;
 - Loss of terrestrial habitat functionally linked to the Humber Estuary SPA/SAC;
 - Disturbance to birds and fish (noise and visual);
 - Underwater noise disturbance affecting fish;
 - Dredging and other construction effects on water quality;
 - Disposal of dredge spoil.

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- Cumulative effects.
- 8.2. The main potential effects of the construction of the Development on SAC/Ramsar ecological features are considered to be:
- Direct loss of intertidal habitat within the Humber Estuary SAC/Ramsar through construction of project infrastructure;
 - Indirect Loss of intertidal habitat within the Humber Estuary SAC/Ramsar;
 - Loss of fish habitat within the Humber Estuary SAC/Ramsar;
 - Disturbance to fish and marine mammals (noise and visual);
 - Underwater noise disturbance affecting fish and marine mammals;
 - Dredging and other construction effects on water quality;
 - Disposal of dredge spoil.
 - Cumulative effects.
- 8.3. Each of these is considered in relation to the Integrity Test, in conjunction with the specific pressures identified by Natural England in their Advice on Operations relating to 'Construction of Port and Harbour Structures'. The following are given by NE as medium-high risk category:
- Above water noise
 - Abrasion/disturbance of the substrate on the surface of the seabed
 - Barrier to species movement
 - Changes in suspended solids (water clarity)
 - Emergence regime changes, including tidal level change considerations
 - Habitat structure changes - removal of substratum (extraction)
 - Introduction of light
 - Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
 - Physical change (to another seabed type)
 - Physical change (to another sediment type)
 - Physical loss (to land or freshwater habitat)
 - Removal of non-target species
 - Smothering and siltation rate changes (Heavy)
 - Smothering and siltation rate changes (Light)
 - Underwater noise changes
 - Vibration
 - Visual disturbance
 - Water flow (tidal current) changes, including sediment transport considerations
 - Wave exposure changes.

8.4. Low risk pressures during construction included the following, though it should be noted that NE states for these that “*Unless there are evidence-based case or site-specific factors that increase the risk, or uncertainty on the level of pressure on a receptor, this pressure generally does not occur at a level of concern and should not require consideration as part of an assessment.*” These have therefore been considered, but it was concluded that there are no factors at this site that would increase the risk above low, so they are not considered as possible risks to site integrity.

- Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
- Collision below water with static or moving objects not naturally found in the marine environment
- Deoxygenation
- Hydrocarbon & PAH contamination
- Introduction of other substances (solid, liquid or gas)
- Introduction or spread of invasive non-indigenous species (INIS)
- Nutrient enrichment
- Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
- Transition elements & organo-metal (e.g. TBT) contamination.

Change in Construction Phase Effects from the proposed Material Change

8.5. The key changes from the consented scheme affecting the Humber Estuary SPA, SAC and Ramsar site are summarised in Table 11, and relate to changes in habitat loss from the updated scheme. Table 11 shows the immediate (short-term) impacts of the scheme. Medium-term (30-year timescale) and long-term (100 year timescale) are explained in UES Appendix 11-2 but are deemed to be less significant due to the natural changes that would occur over decadal timescales to Killingholme Marshes foreshore without the scheme. In other words, its natural change from mudflat to saltmarsh and the impact of rising sea levels. The HRA is therefore based on the more critical short-term impacts.

Table 11. Habitat loss from the consented and the updated Projects.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
Direct - reclamation to construct quay	1130	Estuaries	13.5	10.4	Within the reclamation site. The set back berth has reduced the area of subtidal loss
	1140/1310	Mudflat/sandflat not covered by seawater at low tide. Mudflat with pioneer saltmarsh	31.5	31.3	Within the reclamation site - supports a range of waterfowl. Quay redesign has led to slightly reduced loss.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
	1330	Saltmarsh	0	1.9	New loss of this community as has recently colonised this area.
Indirect functional loss through disturbance	1140/1310	Mudflat/sandflat not covered by seawater at low tide. Mudflat with pioneer saltmarsh	11.6	7.7	To the south of the reclamation site - potentially disturbed by operational activity on the quay following completion of construction (275m disturbance zone)
	1330	Saltmarsh	0	4.7	New loss of this community as has recently colonised this area.
Compensation Area Changes	1330	Saltmarsh	1.8	2.0	At Cherry Cobb Sands to form the channel across the foreshore from the existing flood defence to Cherry Cobb Sands Creek - this habitat would become mudflat offsetting the loss of Habitat type 1140. Area increased from 1.8 to 2ha in SoCG.

Note: further details of the change in habitat loss resulting from the proposed Material Change 2 are given in Appendix UES 11-2.

- 8.6. The principal changes in direct habitat loss from the reclamation works to construct the quay results from two processes. Firstly, a small reduction in the reclamation area through the quay redesign (resulting in a small reduction in the loss of estuary and mudflat habitat). Secondly, there has been colonisation of the mudflat by saltmarsh, which has resulted in an increase in the loss of saltmarsh habitat. The latter has also resulted in changes to the indirect functional loss of habitat through disturbance, with a reduced loss of mudflat and increased loss of saltmarsh.
- 8.7. There would be no change in the extent of the noise disturbance resulting from the proposed material change as the quay piling will be no closer as consequence of the proposed changes (Updated ES, Chapter 16). No new operations are proposed as part of the Material Change and consequently there would be no additional noise disturbance (it is noted in Part 1 of this report that operational noise levels are predicted to be no greater than baseline noise levels. This is predominantly because of baseline noise generated from C.RO Port). There would be some change to the planned lighting regime in order to accommodate the new quay alignment (the 50m lighting columns will be repositioned, but the lighting levels will not change as the lanterns will be adjusted to ensure light spill is controlled) but lighting levels are subject to approval under Schedule 11 of the extant DCO, Requirement 24 and require consultation with Natural England before being approved by the local planning authority.
- 8.8. The dredging proposals are amended to the extent necessary to dredge the berthing pockets for the amended quay line and to permit greater disposal at sea in the absence of alternative beneficial uses. Dredging volumes required are as assessed in the UES chapters 8 and 10, and are very similar to those in the original ES (with no change in the number of vessel movements), and no change in the effects on aquatic

ecology (as set out in the UES Chapter 10: vessel movements associated with the construction phase are actually equivalent or slightly reduced when compared to the consented scenario).

- 8.9. As set out in Chapter 8 of the UES, the proposed AMEP Amended Quay layout would lead to no significant change in the assessed impacts on water levels, flood tide flows or waves. A localised region of flow acceleration is predicted off the downstream end of the quay during the ebb tide. The Amended Quay layout is predicted to slightly reduce by 29,000 wet tonnes per year the average annual disposal and slightly reduce the annual siltation by about 26,000 wet tonnes per year downstream. The maintenance dredging requirements will increase of up to 41,000 m³/year for muddy sediments and a decrease of 34,000 m³/year for sandy sediments into the AMEP Berth Pockets.
- 8.10. Chapter 8 of the UES proposed (at 8.5.2) alternate and additional mitigation, which has been considered in terms of the implications on the Humber Estuary designated features. This includes:
- Placement by barge of material dredged by CSD into sites HU081 and HU082 to spread impact during the placement period.
 - Consideration of placing greater quantity of material being placed into HU082 than HU081 to reduce potential for increased tidal currents around HU081.
 - Target placement of any glacial till dredged by BHD to HU082, so that changes caused by placement at HU081 occur for a shorter period.
 - Programme of bathymetric survey over HU081 and HU082 and in their vicinity during and after placement.
 - Use ongoing LiDAR monitoring as a source for surveillance of foreshore around Hawkins Point.
 - Current measurements pre- and post- construction of AMEP at the South Killingholme Oil Jetty to establish the significance of any changes to ebb tidal currents after construction of AMEP.
- 8.11. None of these are likely to make any material difference to the ecological effects and none would result in any adverse effect on integrity.
- 8.12. Chapter 10 of the UES found no significant changes have been identified compared to those described in the DCO (2014) and the Examining Authority's Report (2013). No significant effects were identified other than those assessed in the original ES from the DCO, and it was concluded that the mitigation measures provided in Chapter 10 Aquatic Ecology of the original ES are considered to remain valid, with no significant residual impacts to the aquatic ecology of the Humber Estuary expected following their discharge.

Operational Phase

- 8.13. The main potential effects of the operation of the Development on birds are considered to be:
- Disturbance to birds (noise and visual, including lighting);
 - Maintenance dredging, including boat disturbance;

- Lighting impacts; and
 - Cumulative effects.
- 8.14. The only operational phase pressure identified by NE in the medium-high risk category is the introduction of light, so specific consideration of this has been made in this assessment.
- 8.15. Low risk pressures identified by NE relating to ‘Operation of Ports and Harbours’ comprise the following, though as for the low risk construction phase pressures, there are not any factors at this site that would increase the risk above low, so they are not considered as possible risks to site integrity.
- Above water noise
 - Abrasion/disturbance of the substrate on the surface of the seabed
 - Barrier to species movement
 - Changes in suspended solids (water clarity)
 - Collision above water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
 - Collision below water with static or moving objects not naturally found in the marine environment
 - Hydrocarbon & PAH contamination
 - Introduction of other substances (solid, liquid or gas)
 - Introduction or spread of invasive non-indigenous species (INIS)
 - Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
 - Smothering and siltation rate changes (Light)
 - Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
 - Transition elements & organo-metal (e.g. TBT) contamination
 - Underwater noise changes
 - Visual disturbance

Change in Operational Phase Effects from the proposed Material Change

- 8.16. The quay redesign will not change the operational phase effects of the Development. The recent colonisation of the mudflat by saltmarsh has resulted in changes to the indirect functional loss of habitat through disturbance that will occur during the operational phase, with a reduced loss of mudflat and increased loss of saltmarsh.
- 8.17. There would be no change in the extent of the operational noise disturbance resulting from the proposed material change. Operational noise levels are much less than construction noise levels and are not critical to the impact assessment. No new operations are proposed as part of the Material Change and consequently there would be no additional noise disturbance. There would be some change to the planned lighting regime in order to accommodate the new quay alignment (the 50m

lighting columns will be repositioned, but the lighting levels will not change as the lanterns will be adjusted to ensure light spill is controlled), but lighting levels are subject to approval under Schedule 11 of the extant DCO, Requirement 24 and require consultation with Natural England before being approved by the local planning authority.

- 8.18. There will be indirect functional habitat loss through disturbance during the operational phase of the development, likely displacing internationally important populations of regularly occurring Annex I species, migratory species and the waterfowl assemblage, due to the effective reduction in extent and distribution of the habitat supporting birds. As a result, **adverse effect on integrity** has been concluded for this functional loss.
- 8.19. The Project (including the proposed Material Change) would not, subject to the mitigation secured by the DCO, have any other operational phase effects on any SPA or SAC species/community, so would, following the implementation of the agreed mitigation measures, result in **no adverse effect on integrity**, with regard to any other operational phase impacts.

In-combination Assessment

- 8.20. Plans and projects considered in-combination with the material change application are as follows (those considered in the original application were as set out in the HRA information Report at Section 4.12):
- Able Logistics Park – PA/2009/0600 – North Lincolnshire Council;
 - North Killingholme Generating Station (DCO Application);
 - Hornsea Offshore Wind Farm (Zone 4) Project 2 (DCO Application);
 - Yorkshire Energy Park (17/01673/STOUTE – East Riding of Yorkshire Council);
 - Outstrays to Skeffling Managed Realignment Site;
 - South Humber Gateway Mitigation Areas (including Cress Marsh, Novartis and the former Huntsman Tioxide site).
- 8.21. Consideration has also been given to the possible inter-related effects of construction and operation on the Project site at the same time (as parts may become operational at the same time as construction continues in other parts). However, the greater magnitude effects of the construction phase would mean that the operational phase impacts would not materially increase those, even if they were occurring simultaneously within the site.
- 8.22. With mitigation measures implemented (as set out in Section 7), it is likely that cumulative / in-combination impacts across developments will be reduced to minor levels, and that there would be **no adverse effect on integrity** for these effects for the proposed material change (taking into account the results of the cumulative assessment for the projects listed above, the proposed changes to the AMEP development and the updated ecological baseline).

Assessment Update

- 8.23. The shadow Appropriate Assessment for the Humber Estuary SAC is summarised in Table 12, comparing the outcome of the DCO Appropriate Assessment with the assessment for the updated Project incorporating Material Change 2.
- 8.24. **Adverse effect on integrity** was concluded for loss of sub-tidal estuarine habitat, loss of intertidal mudflat and loss of saltmarsh.
- 8.25. **No adverse effect on integrity** was found for disturbance to grey seals and river and sea lampreys.
- 8.26. The shadow Appropriate Assessment for the Humber Estuary SPA is summarised in Table 13, comparing the outcome of the DCO Appropriate Assessment with the assessment for the updated Project incorporating Material Change 2.
- 8.27. **Adverse effect on integrity** was concluded for all eight qualifying species of the Humber Estuary Special Protected Area (SPA) and Ramsar site (avocet, marsh harrier, bar-tailed godwit, black-tailed godwit, dunlin, knot, redshank and shelduck) and for the six wintering waterbird assemblage species (curlew, lapwing, mallard, ringed plover, shoveler and teal) for which LSE was identified, though direct loss of estuarine habitat (including intertidal mud, saltmarsh and sub-tidal), and through indirect functional loss as a result of disturbance. It could also not be ruled out that the continued use of NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, could be affected once mudflats at KMFS were lost.
- 8.28. **No adverse effect on integrity** was found for (1) loss of terrestrial habitat (due to the provision of replacement foraging and roosting habitat in Halton Marshes Wet Grassland Mitigation Area), for (2) disturbance within NKHP (as a result of the protection from disturbance as set out in the extant DCO at Schedule 11 Requirement 42), for (3) lighting effects on NKHP (through implementation of the agreed lighting mitigation), and (4) from piling (based on the adoption of agreed measures for managing piling activities, are set out in Schedule 8 paragraphs 37-43 of the extant DCO).

Table 12. Shadow Appropriate Assessment for the Humber Estuary SAC/Ramsar: ES/SoCG and update in light of the proposed material change.

Issue	Assessment (ES, SoCG)	Impact of Material Change and Updated Baseline	Assessment update (after material change)
Effects on estuarine habitat (H1130)	<p>Permanent direct losses of 45 ha (31.5 ha of intertidal mudflat and 13.5 ha of sub-tidal habitat) and medium and longer term changes to habitat arising from the quay presence (see <i>ES Annex B</i>). The effects result in an adverse effect due to a reduction in the extent and distribution of habitat for which no mitigation is possible.</p> <p>The effects of capital and maintenance dredging and disposal on sub-tidal habitat and benthic communities - no adverse effect on integrity .</p> <p>The effects on the wider estuary have been assessed (Deltares, 2012). EA has indicated that an allowance should be made for the change of 5 ha of intertidal habitat to sub-tidal. AHPL's has therefore, taken a precautionary approach and accepted this view and included 10 ha of intertidal mudflat in the habitat provided as compensation taking account of the 2:1 ratio for compensatory mudflat (see <i>ES Table 5.1</i> and <i>Annex B</i>).</p> <p>Migratory movements of lamprey will not be affected by the presence of the new quay as described in <i>Annex 10.2</i> of the ES</p>	<p>Quay re-design has reduced direct loss of estuarine habitat.</p> <p>Additionally, habitat change resulting primarily from effects of the Humber International Terminal (HIT) since the original ES (accretion of saltmarsh) has meant that the habitats affected will include more saltmarsh and less intertidal mudflat</p>	<p>Permanent direct loss amended to 43.6 ha (31.3 ha of intertidal mudflat and 10.4 ha of sub-tidal habitat, plus an additional loss of 1.9ha of colonising saltmarsh), but no change to conclusions reached, i.e. adverse effect on integrity.</p> <p>No adverse effect on integrity from capital and maintenance dredging – no material change in vessel movements.</p>
Effects on intertidal mudflat and mudflat with pioneer saltmarsh (H1140/1310)	<p>Adverse effect concluded because of permanent direct loss for the new quay (31.5 ha), and in the longer term the indirect effects of the quay will result in the transformation of intertidal mudflat to saltmarsh (<i>ES Annex B</i>). These effects result in a reduction in the extent and distribution of intertidal mudflat, for which no mitigation is possible.</p> <p>The effects on intertidal mudflat as part of the effects on the wider estuary are as described above.</p>	<p>Quay re-design has reduced direct loss of intertidal habitat.</p> <p>Additionally, some of the loss that was intertidal mudflat previously has now been colonised by saltmarsh, so intertidal mudflat loss is</p>	<p>Permanent loss of intertidal mudflat reduced to 31.3ha, but conclusions unchanged, i.e. adverse effect on integrity.</p>

Issue	Assessment (ES, SoCG)	Impact of Material Change and Updated Baseline	Assessment update (after material change)
		reduced further.	
Effects on saltmarsh (H1330)	Adverse effect concluded as a reduction in the extent of saltmarsh (2 ha) occurs for which no mitigation is possible.	Loss of saltmarsh increased as a result of recent colonisation of the direct habitat loss area for the quay.	Additional direct loss of 1.9ha of saltmarsh (as result of colonisation of mudflat), but no change to conclusion, i.e. adverse effect on integrity.
Disturbance to grey seals and river and sea lampreys (S1364, S1095 and S1099)	No adverse effect concluded with the implementation of the mitigation measures listed in <i>ES Section 4.4</i> .	Change to quay design.	No change to previous conclusion of no adverse effect on integrity.

Table 13. Shadow Appropriate Assessment for the Humber Estuary SPA/Ramsar: ES/SoCG and update in light of the proposed material change

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
Effects on estuarine habitat (H1130)	Adverse effect concluded on internationally important populations of regularly occurring <i>Annex I</i> species, migratory species and the waterfowl assemblage, due to the reduction in extent and distribution of the habitat supporting birds. No mitigation is possible	Quay re-design has reduced direct loss of estuarine habitat. Additionally, habitat change resulting primarily from effects of the Humber International Terminal (HIT) since the original ES (accretion of saltmarsh) has meant that the habitats affected will include more saltmarsh and less intertidal mudflat	No change in conclusion - adverse effect on integrity.

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
Effects on intertidal mudflat and mudflar with pioneer saltmarsh (H1140/1310)	Adverse effect concluded on internationally important populations of regularly occurring <i>Annex I</i> species, migratory species and the waterfowl assemblage, due to the reduction in extent and distribution of the habitat supporting birds. No mitigation is possible	Quay re-design has reduced direct loss of intertidal habitat. Additionally, some of the take area that was intertidal previously has now been colonised by saltmarsh, so intertidal loss reduced further.	No change in conclusion - adverse effect on integrity.
	Cannot confirm the continued use of NKHP as a roost site by waders from KMFS, particularly black-tailed godwit, once mudflats at KMFS lost. The effect cannot be mitigated. Therefore, as scientific doubt remains as to the absence of adverse effects, the competent authority cannot be certain that the scheme will not adversely affect the integrity of the European site.	No change - no construction proposed any closer to the NKHP than DCO	No change in conclusion - adverse effect on integrity.
Loss of terrestrial habitat	No adverse effect due to the provision of replacement foraging and roosting habitat in Mitigation Area A.	No change. Halton Marshes Wet Grassland Mitigation Area has been implemented as a substitute for Mitigation Area A	No change in conclusion - no adverse effect on integrity.
Disturbance effects on birds	Indirect functional habitat loss through disturbance to internationally important populations of regularly occurring <i>Annex I</i> species, migratory species and the waterfowl assemblage, due to the effective reduction in extent and distribution of the habitat supporting birds. No mitigation is possible.	Some of the mudflat that was intertidal previously has now been colonised by saltmarsh, so intertidal loss reduced.	No change in conclusion - adverse effect on integrity.
	No adverse effect on birds within NKHP based on a commitment to limit noise at site boundary.	No change.	No change in conclusion - no adverse effect on integrity
	No adverse effects on birds using Mitigation Area A based on commitments to noise limits and to distance limits and storage heights within the operational buffer.	No change. Halton Marshes Wet Grassland Mitigation Area has been implemented as a substitute for Mitigation Area A	No change in conclusion - no adverse effect on integrity

Issue	Assessment (ES, SoCG)	Relevant material change	Assessment update (material change)
	No adverse effects on birds at NKHP from lighting within the AMEP site as described in <i>Supplementary Information EX19.1 - Lighting Lux Plans</i> .	No change.	No change in conclusion - no adverse effect on integrity
	No adverse effects from piling based on adoption of measures agreed in the piling methods statement, which are set out in Schedule 8 of the DCO	No change.	No change in conclusion - no adverse effect on integrity

9. Mitigation

- 9.1. The mitigation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:
- provisions under Schedule 8 of the DCO to ensure functional aspects of the Humber Estuary SAC are maintained, including constraints on aspects of works timing to avoid reduce impacts from underwater noise and vibration from piling work, provision of a Marine Mammal Observer to ensure no impacts to marine mammals (including Grey Seals) present in the vicinity of the construction works, and reduce noise and lighting impacts to birds.
 - provisions to provide greenfield terrestrial foraging and roosting habitat for birds from the SPA assemblage (predominantly curlew), to replace that lost to AMEP and to reduce noise and lighting impacts to birds.
- 9.2. Further detail on the agreed mitigation measures pertaining to the development are provided in the original Terrestrial Ecology and Nature Conservation ES chapter⁹ and the original DCO (Appendix UES1-1). Measures will be secured through the approval of various plans and method statements as specified in Schedule 8 and 11 of the extant DCO.
- 9.3. These requirements have been reviewed in light of the proposed material change and the updated baseline, and it has been concluded that they all would still be required for the material change, but that none would need any modification.
- 9.4. It is noted that a separate application for a non-material change to the DCO to move the location of Mitigation A to Halton Marshes has been approved, though this does not affect the outcome of the Appropriate Assessment.

10. Summary and Conclusion

- 10.1. This report has provided baseline data and analysis to inform the assessment process should the Competent Authority determine that an Appropriate Assessment is required (as was concluded in the Likely Significant Effects report), drawing on information provided in the Project ES.
- 10.2. The SPA and SAC Conservation Objectives (as set out in Section 6 above) against which this assessment needs to be made seek to maintain the habitats of the qualifying species in favourable condition.
- 10.3. The predicted effects of the Project on the relevant SPA and SAC qualifying habitat and assemblage species in the context of the Habitats Regulations have been assessed above, and are summarised in Tables 12 (construction phase) and Table 13 (operational phase). The predicted effects have been assessed against the SPA and SAC Conservation Objectives, to determine whether there would be any adverse

⁹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000315-11%20-%20Ecology%20and%20Nature%20Conservation.pdf>

effect of the development on the ecological integrity of the Humber Estuary SPA/SAC/Ramsar site.

- 10.4. The same conclusion was reached for the material change as for the original DCO application, i.e. that the AMEP project would have an adverse effect on the ecological integrity of the SPA and of the SAC, through direct loss of habitat and through indirect functional loss as a result of disturbance. The residual effects of the AMEP proposals alone, taking account of the mitigation, will have an adverse effect on the integrity of the Humber Estuary SAC, SPA and Ramsar site due to the reduction in the extent and distribution of qualifying interest habitats (estuarine habitats, intertidal mudflat and saltmarsh), and a deterioration in the quality of these habitats for qualifying bird species. In addition, there will be significant disturbance to these bird species, and their populations and distribution will be affected.
- 10.5. In summarising the likely effects on the qualifying populations/communities for the SPA/SAC/Ramsar site, the assessment process illustrated in the flow diagram in the Planning Inspectorate's Advice Note 10 (reproduced in Figure 1 of Part 1 of the HRA report) is undertaken as follows:
- *"Is the project likely to have significant effect on the site?"*
 - For eight qualifying species, and six assemblage species of the Humber Estuary SPA/Ramsar, and for six features of the Humber Estuary SAC/Ramsar, this cannot, under the definition of likely significant effect under the Habitats Regulations, be ruled out, so the next stage is:
 - *"Assess the implications of the effects of the proposal for the site's conservation objectives"*
 - *"Will the project affect integrity of the site?"*
 - Yes. Qualifying and assemblage species have been identified as being significantly affected by the Project. In terms of the relevant tests under the Habitat Regulations, it has been concluded that the proposed development would threaten the ecological integrity of the Humber Estuary SPA/SAC/Ramsar site.
- 10.6. The impacts that could have an adverse effect on integrity of the Humber Estuary SAC/Ramsar (and hence requiring compensation) are the same as those for the original DCO scheme, and are as follows:
- Permanent direct loss of 43.6 ha estuarine habitats (31.3 ha of intertidal mudflat and 10.4 ha of sub-tidal habitat, plus an additional loss of 1.9ha of colonising saltmarsh).
- 10.7. The impacts that could have an adverse effect on integrity of the Humber Estuary SPA/Ramsar (and hence requiring compensation) are also the same as those for the original DCO scheme, and are as follows:
- Adverse effect on internationally important populations of regularly occurring Annex I species, migratory species and the waterfowl assemblage, due to the reduction in extent and distribution of the habitat supporting birds.
 - The continued use of NKHP as a roost site by waders from KMFS cannot be confirmed, particularly black-tailed godwit, once the mudflats at KMFS are lost.

- Indirect functional habitat loss through disturbance to internationally important populations of regularly occurring Annex I species, migratory species and the waterfowl assemblage, due to the effective reduction in extent and distribution of the habitat supporting birds.

10.8. A compensation scheme was agreed for the original DCO and, given that the magnitude of the impacts is slightly reduced on that scheme (but the compensation scheme remains unchanged), that scheme can be expected to still provide the appropriate quantum of compensation, as set out in the AMEP Compensation Environmental Management and Monitoring Plan (agreed in January 2016). Further details of the losses and compensation ratios for the habitat that will be lost are reviewed in Technical Appendix UES11-2.