

ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

VOLUME 1: MAIN REPORT

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
Version No: FINAL
April 2021



CONTENTS

CHAPTER 1	Introduction
CHAPTER 2	Environmental Assessment Process
CHAPTER 3	Planning Policy and Context
CHAPTER 4	Description of Changes to Development
CHAPTER 5	Scoping and Consultation
CHAPTER 6	Description of Committed Developments
CHAPTER 7	Geology, Hydrology and Ground Conditions
CHAPTER 8	Hydrodynamic and Sedimentary Regime
CHAPTER 9	Water and Sediment Quality
CHAPTER 10	Aquatic Ecology
CHAPTER 11	Ecology and Nature Conservation
CHAPTER 12	Commercial Fisheries
CHAPTER 13	Drainage and Flood Risk
CHAPTER 14	Navigation
CHAPTER 15	Traffic and Transport
CHAPTER 16	Noise and Vibration
CHAPTER 17	Air Quality
CHAPTER 18	Marine Archaeology
CHAPTER 19	Light
CHAPTER 20	Landscape and Visual Impact
CHAPTER 21	Socio-Economic
CHAPTER 22	Aviation
CHAPTER 23	Waste
CHAPTER 24	Health
CHAPTER 25	Other Environmental Issues
CHAPTER 26	Cumulative and In-Combination Effects
CHAPTER 27	Summary of Mitigation and Monitoring
CHAPTER 28	Conclusion
CHAPTER 29	Acronyms and Abbreviations.

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CONTENTS

1.1.0 BACKGROUND	1-1
Development Consent Order	1-1
Previous Amendments	1-1
Summary of Proposed Material Amendment (Material Change 2)	1-2
Requirements & Purpose of Report	1-3
1.2.0 LOCATION AND DESCRIPTION OF SITE	1-4
The AMEP Site	1-4
The Compensation Site	1-17
The Marine Site	1-19
1.3.0 THE SUBMISSION	1-22
DCO Material Amendment Submission.....	1-22
Preliminary Environmental Information Report	1-24
Compliance with EIA Regulations.....	1-26
1.4.0 VIEWING THE PEIR AND REPRESENTATIONS	1-27
Requesting Copies of PEIR Documents	1-27
Consultation & Representations	1-27

DOCUMENT REFERENCES

TABLES

Table 1-1: Update of Planning Permissions for the AMEP Site – End of 2011	1-6
Table 1-2: Local Planning Permissions Granted for the AMEP Site – Post DCO.....	1-7
Table 1-3: Planning Permissions in Surrounding Area Accompanied by an ES Granted since DCO (2014).....	1-14
Table 1-4: Withdrawn Plans	1-22
Table 1-5: List of New, Revised and Retained Plans and Drawings.....	1-23

FIGURES

Figure 1-1: Aerial Photograph of AMEP Site January 2012 (Pre-DCO in Force)	1-5
Figure 1-2: Aerial Photograph of AMEP Site April 2019 (Post-DCO in Force)	1-5
Figure 1-3: Mitigation Area B, Completed 2014.....	1-11
Figure 1-4: Major Developments Consented in the vicinity of DCO since October 2014	1-12
Figure 1-5: Cherry Cob Sands Compensation Site and Wet Grassland	1-17

Figure 1-6: OtSMRS Area Plan1-19
Figure 1-7: Decadel Change in Estuary Bathymetry 2008-2018.....1-20

APPENDICES

- Appendix U1-1: AMEP Development Consent Order
- Appendix U1-2: Variation 2 of the Deemed Marine License
- Appendix U1-3: AMEP Planning Consents 2012 Onwards (Drawing no. AME-002-00102 Rev A)
- Appendix U1-4: Correspondence Regarding List of Consultees

1.1.0 Background

- 1.1.1 This Preliminary Environmental Information Report (PEIR) has been prepared by SLR Consulting Limited (SLR) on behalf of Able UK Limited ('the client' and 'the Applicant') and sets out the results of various updated technical assessments and a compliance review of the original Environmental Impact Assessment submitted in support of a Development Consent Order (DCO) application for the Able Marine Energy Park (AMEP).
- 1.1.2 The application for the DCO was made in December 2011 and was accompanied by an Environmental Statement (ES). During the examination of the proposals additional environmental information was submitted by the Applicant and was incorporated into the ES for the project. The documents forming the project ES are listed at Schedule 11, paragraph 1 of the AMEP DCO, and this complete set of documents is referred to in this PEIR as 'the original ES'.
- 1.1.3 This PEIR is necessitated by proposals for a material amendment (also referred to as 'material change 2') to the as consented DCO proposals. Further information regarding the DCO, the application site and its surrounding area is provided below.
- 1.1.4 A description of the Environmental Impact Assessment Process is provided within Chapter 2, whilst the applicable planning policy and context are provided within Chapter 3. Chapter 4 provides a description of changes to the development, whilst the formal scoping exercise and any pre-application consultation is detailed within Chapter 5. Finally, a description of committed developments considered for the purposes of assessing 'cumulative effects' are provided within Chapter 6.
- 1.1.5 Further information regarding the content and structure of the PEIR is provided within Section 1.3.0 below.

Development Consent Order

- 1.1.6 The DCO for the Able Marine Energy Park (AMEP) was made on 13th January 2014, laid before Parliament on 10th February 2014 and subsequently came into force on 29th October 2014 (Statutory Instrument 2014 No. 2935). A copy of the DCO is provided within Technical Appendix U1-1.
- 1.1.7 The DCO permits, *inter alia*, the development of a new quay and associated development at Killingholme in North Lincolnshire, on the south bank of the Humber Estuary. Briefly, the development on the south bank comprises a quay, reclaimed estuarine habitat and the provision of onshore facilities for the manufacture, assembly and storage of components relating to the offshore renewable energy sector. The DCO further permits other associated development comprising environmental habitat on the north bank of the Humber in the East Riding of Yorkshire authoritative area.
- 1.1.8 The authorised development is described in Schedule 1 of the DCO 'Authorised Development', and Chapter 4 of this PEIR provides a description of the changes to the development proposed as part of the material amendment submission.

Previous Amendments

- 1.1.9 It should be noted that the Deemed Marine Licence at Schedule 8 of the DCO has been varied twice by the Marine Management Organisation. Variation No. 1 was issued on 23rd June 2017 and

Variation 2 was issued on 16th September 2020. A copy of the later variation is provided within Technical Appendix U1-2.

- 1.1.10 In addition, on 27th July 2020, the Secretary of State for Transport approved extending the 5-year time limit for the commencement of the approved tidal works as required under the provisions of Article 23 of the DCO.
- 1.1.11 Finally, a submission for a non-material amendment to the DCO was submitted to the Secretary of State in August 2018. This submission sought to move an area proposed for ecological mitigation (Area A) to a new site outside the order limits next to two other areas being utilised for ecological mitigation (Halton Marshes Wet Grassland Scheme), thereby allowing all three areas to operate as a single unit. This submission has yet to be determined by the Secretary of State and is currently progressing through further consultation considering 'Likely Significant Effects' associated with the Habitats Regulations Assessment. It is expected that the non-material amendment submission is likely to be determined during Q2 of 2021.
- 1.1.12 The DCO will be implemented in Q2 2021, commencing with the construction of a surface water pumping station which forms part of the associated development which supports the wider AMEP scheme.

Summary of Proposed Material Amendment (Material Change 2)

- 1.1.13 Following the issuing of the DCO, it has become apparent that a number of minor amendments are desirable for the AMEP scheme to be implemented. These minor amendments can be summarised as follows:
- Changes to the proposed quay layout to reclaim the specialist berth at the southern end of the quay, and to set back the quay line at the northern end of the quay to create a barge berth;
 - The addition of options to the form of construction of the quay whereby the piled relieving slab to the rear of the quay could be raised or omitted entirely (subject to detailed design), and the quay wall piles could be restrained with more conventional steel anchor piles and tie bars in lieu of flap anchors;
 - A change to the approved diversion of footpath FP50 in North Lincolnshire to avoid crossing over the existing rail track at the end of the Killingholme Branch Line;
 - Provision of a third cross dam within the reclamation area to enable greater flexibility for staged completion, and early handover of sections of the quay;
 - A change to the consented deposit location for 1.1M tonnes of clay to be dredged from the berthing pocket, to permit its disposal at HU082 or another approved location if required; and
 - An amendment to the sequencing of the quay works (as illustrated on the consented DCO drawings AMEP_P1D_D_101 to 103; Indicative Sequence Plan View[s]) to enable those works to commence at the southern end of the quay and progress northwards.
- 1.1.14 It should be noted that the changes to the proposed quay layout would result in a reduction in footprint area reclaimed from the estuary. The DCO quay alignment has a footprint of 45 hectares, whilst the proposed quay alignment within the material amendment would equate to a footprint of

43.6 hectares; a reduction of approximately 1.4 hectares.

- 1.1.15 In addition to the above, there are no alterations proposed to the operating life or decommissioning of the site. As such, these elements remain as considered and assessed within the original ES.
- 1.1.16 Full details of the proposed material amendment are provided within Chapter 4 of this PEIR: Description of Changes to Development.

Requirements & Purpose of Report

- 1.1.17 An application for material amendment to the DCO (Material Amendment Application) is to be submitted under Schedule 6 of the Planning Act 2008 and Part 2 of the Infrastructure Planning (Changes to, Revocation of, Development Consent Orders) Regulations 2011.
- 1.1.18 The proposed change is considered to represent 'EIA development' as it meets the definition of Schedule 2 development as set out in The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'); namely, the proposals represent a change to a Schedule 1 development, where that development is already authorised (by virtue of the AMEP DCO), and the changes have the potential to give rise to significant effects of a new or different nature to those reported in the original ES.
- 1.1.19 On this basis, the purpose of this PEIR is to provide preliminary environmental information to enable consultation on the proposals in advance of submitting an application to the Planning Inspectorate.

1.2.0 Location and Description of Site

- 1.2.1 The DCO incorporates three distinct areas, the terrestrial 'AMEP Site' and 'Compensation Site', as well as a quay within the Humber Estuary which is referenced as the 'Marine Site'. Whilst a description of these areas is provided below, it should be noted that the proposed material amendment, and the content of this PEIR, relate entirely to the 'AMEP Site' and 'Marine Site'. As such, the minor amendments do not relate to, or have an effect upon, the 'Compensation Site'. These three areas are briefly described below together with changes that have occurred since the original ES.

The AMEP Site

- 1.2.2 As detailed within Chapter 1, paragraphs 1.2.2 to 1.2.4 of the original ES:

"The proposed AMEP site is located east of North Killingholme, within North Lincolnshire, on the south bank of the River Humber. The site is approximately 1km downstream of the Humber Sea Terminal (HST) and immediately upstream of the South Killingholme Oil Jetty.

The site, excluding the area of ecological mitigation, covers approximately 268 ha, of which approximately 122.4 ha is covered by existing consent for port related storage, 100.3 hectares is existing arable land that will be developed for industrial use and 45 ha is reclaimed land from the estuary to provide a new quay. A further 47.8 ha of existing arable land will be converted to managed grassland to mitigate for the effects of the development on ecological receptors including birds that use the adjacent Humber Estuary SPA.

A large proportion of the site's terrestrial area currently comprises hard-standing for the storage of imported cars, particularly in the north-east/east of the site and in the west of the site. A railway line passes through the site, and a redundant sewage works can be found to the south-west of the site. Former clay pits to the north of the site, which are now flooded, are classified as a Site of Special Scientific Interest (SSSI) and are also part of the Natura 2000 network of sites. A raised embankment along the eastern boundary supports a flood defence wall, which protects the site from tidal flooding."

Development of AMEP since the Application

- 1.2.3 In the years since the DCO came into force (October 2014), the Applicant has developed the site, both in accordance with planning permissions extant at the time of the application and in accordance with further planning consents obtained under the Town and Country Planning Act 1990 (TCPA). In some cases, works have been undertaken to progress development in accordance with the DCO and in other cases it was to enable use of the site for purposes other than those permitted by the DCO, namely, car storage.
- 1.2.4 Chapter 3, Table 3.2 and Figure 3.1 of the original ES provided details of the extant planning consents within the AMEP site. Table 1-1 below replicates that information with the addition of a column to provide an update, as of April 2021, of the status of the referenced planning permissions. Planning permissions for the AMEP site obtained since the DCO application, and their current status, are summarised in Table 1-2 below.
- 1.2.5 For clarity, a drawing showing AMEP planning consents since 2012, including applications identified within Tables 1-1 and 1-2, is provided within Appendix U1-3 (drawing no. AME-002-00102 Rev A).

1.2.6 Aerial pictures showing the development of the site at the time of the application and more recently are reproduced in Figures 1-1 and 1-2 below.

Figure 1-1: Aerial Photograph of AMEP Site January 2012 (Pre-DCO in Force)



Figure 1-2: Aerial Photograph of AMEP Site April 2019 (Post-DCO in Force)



Table 1-1: Update of Planning Permissions for the AMEP Site – End of 2011

Planning Ref.	Location	Details	Status (as detailed within original ES)	Commentary as of April 2021
PA/2005/0562	Area D, AHPF, Rosper Road, North Killingholme, DN40 3JP	Planning permission to construct a port related storage facility including erection of various buildings, construction of car parking, erection of lighting towers and 2.4 m high electrified security fencing.	Granted 14/11/2006	This was substantially implemented and the site operational, at the time of the DCO application, so was already considered in the baseline of the ES. This parcel of land has not changed since the DCO application.
PA/2007/0101	Area C, AHPF, Rosper Road, North Killingholme, DN40 3JP	Planning permission to tarmac the 22.11 ha site for port-related external storage, to include the construction of 2 workshop buildings, a modular office building, a modular security building, construction of a wash pad wash bay and associated staff and visitor car parking and install a 3 m high security fencing, lighting towers and a sewage treatment plant.	Granted 16/01/2008	This was substantially implemented and the site was operational at the time of the DCO. This parcel of land has not materially changed since the DCO application.
PA/2008/1401	Area B Able Humber Port Facilities, Rosper Road, North Killingholme, DN40 3JP	Planning permission to remove condition 1 on PA/2004/1528 (use to be discontinued on or before 31 December 2008) and condition 9 on PA/2002/1828 (site to have a permeable surface at all times) in connection with use of land for vehicle distribution and storage.	Granted 18/12/2008	This was fully implemented at the time of the DCO so was already considered in the baseline of the original ES. This parcel of land has not changed since the DCO application.
PA/2008/1428	Area G, AHPF, Rosper Road, North Killingholme, DN40 3JP	Remove Condition 1 (no access to and egress from Haven Road) and Condition 2 (the use shall be discontinued before 31/12/2008) on planning permission PA/2004/1601.	Granted 19/12/2008	This was fully implemented at the time of the DCO so was already considered in the baseline of the original ES. This parcel of land has not changed since the DCO application.
PA/2008/0571	Area D1 & D2, AHPF, Rosper Road, North Killingholme, DN40 3JP	Remove Condition 1 of planning permission 2004/1528 to make permanent the existing temporary consented use of vehicle storage and distribution, erect a single storey cabin, workshop and office building, raise ground levels to 3.1-4.0 m OD and surface with tarmac, install 3 m high electrified fencing with bird deflectors and erect 4 No. 30 m high lighting masts on land off Rosper Road.	Granted 22/12/2008	This planning permission was partly implemented at the time of the DCO application and lighting and hard paving was constructed in 2019. This parcel of land can be used for its consented purpose under the DCO without further development.
PA/2008/1375	Area E, AHPF, Rosper	Planning permission to vary Condition 3 on application	Granted	This was partially implemented at the time of

Planning Ref.	Location	Details	Status (as detailed within original ES)	Commentary as of April 2021
	Road, North Killingholme, DN40 3JP	PA/2006/0039 dated 01/08/2007 (relating to low level shrubbery and hedging) to replace the words 'Within ten months of the permission...' to 'Prior to the commencement of operation...'	22/12/2008	the DCO application and was fully implemented in 2017/18, resulting in completion of ground raising and hard surfacing of the area. This parcel of land can be used for external storage under the DCO without further development.
PA/2010/1263	Land Off, Rosper Road, North Killingholme, DN40 3JP	Planning permission to construct a test foundation (12 x 12 m) and a tower (5 m diameter) with a total height of 67 m (approximately).	Granted 06/12/2010	This permission has lapsed and was never implemented.
DECC 01.08.10.04/439C	West of the MOD Tank Farm	Construction and operation of a biomass fuelled generating station at South Killingholme, near Immingham	Granted 10/08/2011	This permission has lapsed and was never implemented.

Table 1-2: Local Planning Permissions Granted for the AMEP Site – Post DCO

Planning Ref.	Description of Development	Status	Commentary as of April 2021
PA/2013/0519	Planning permission for consent for enabling works associated with the construction of AMEP, a Nationally Significant Infrastructure Project which will include and extend beyond this application site. The proposal is to remove topsoil from three fields currently in agricultural use (amounting to approximately 35,000 cubic metres of material) and to import, deposit and compact approximately 140,000 cubic metres of clean stone fill material, raising levels from approximately 2.4 m AOD to a minimum of 3.1 m AOD, and creating a level, durable surface for use as a site compound for the contractors constructing the AMEP quay. Works will include the installation of piped crossings across existing ditches and new sub-surface drainage that will discharge into existing surface water ditches that outfall into the Humber Estuary	Approved 21/07/2014	<p>As detailed in the Officer's Delegated Report, the proposal subject to this planning permission was for substantial preliminary works to facilitate the construction of AMEP. These works were subject to a planning application due to delays in the determination process of the AMEP DCO in order to allow the works to progress in a timely manner. These works are now complete and were identical to those approved in the DCO. On this basis, it is considered that this planning permission does not alter the characteristics of the receiving environment in this location nor does it have any consequential impacts to construction activities.</p> <p>Furthermore, it is clear that the assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more sensitive receptor than that considered in the original ES.</p>

Planning Ref.	Description of Development	Status	Commentary as of April 2021
PA/2014/0512	Planning permission to undertake enabling works in support of the AMEP project which will comprise site clearance, ground raising works, felling of a copse, creation of a footpath, removal offsite of the topsoil layer, importation spreading and compacting of approximately 275,000m3 of fill material, new drainage ditches and the construction of a new twin cell drainage culvert	Approved 18/02/2015	<p>As for PA/2013/0519, this permission merely replicates some of the construction activities permitted by the DCO. The permission has been implemented. On this basis, it is considered that this planning permission does not alter the characteristics of the receiving environment in this location nor does it have any consequential impacts to construction activities.</p> <p>Furthermore, it is clear that the assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more sensitive receptor than that considered in the original ES.</p>
PA/2016/1654	Planning permission to erect a new two-storey PDI (pre-delivery inspection) vehicle facility, with associated separate ancillary facilities including a fuel station, security cabin, driver welfare, propane tanks, staff car parking facilities and additionally culverted ditch crossing works	Approved 06/01/2017	<p>This development has been fully constructed and is operational. The buildings that have been constructed may be mothballed, re-purposed and incorporated into the AMEP development, or demolished, the remainder of the area is suitable for use as external storage which is consistent with the DCO.</p> <p>The assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more sensitive receptor than that considered in the original ES.</p>
PA/2017/27	Temporary car storage until January 2018	Approved 08/05/2017	<p>This permission had an end date of 8 January 2018 (varied to 8 January 2020 by planning permission PA/2017/1780). Therefore, the development approved by this planning permission has no impact on the development approved by the DCO nor does it have any consequential impacts to construction activities. As this permission has now expired, the assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more sensitive receptor than that considered in the original ES.</p>
PA/2017/1780	Application to vary condition 1 of PA/2017/27 dated 08/05/2017 to extend the restoration period for a further 2 years until 8th January 2020	Approved 11/05/2018	Refer to comments above for PA/2017/27.
PA/2017/265	Planning permission for foul water pumping station, autoscan building, driver welfare. Relocation of fuel station.	Approved 31/05/2017	This permission has been fully implemented.

Planning Ref.	Description of Development	Status	Commentary as of April 2021
			<p>The autoscan building is an automated building designed to scan cars prior to delivery. It therefore is not occupied by any staff. The driver welfare facility is a portacabin. The foul water pumping station is also approved via the DCO and has been constructed to accept the flows from the development approved by the DCO.</p> <p>The buildings that have been constructed may be mothballed, re-purposed and incorporated into the AMEP development, or demolished.</p> <p>Based upon the scale and use of the proposed development, it is considered that this planning permission does not alter the characteristics of the receiving environment in this location nor does it have any consequential impacts on construction activities consented by the DCO.</p>
PA/2018/1416	Planning permission to construct new railway siding parallel to existing railway including loading and unloading ramps	Approved 05/12/2018	<p>These works are consistent with Work No. 3 of the DCO, 'a passing loop on the North Killingholme Branch Line'.</p> <p>This planning permission does not alter the characteristics of the receiving environment in this location nor does it have any consequential impacts to construction activities.</p> <p>The permission has not been implemented.</p>
PA/2018/114	Planning permission to change the use of land for car storage and distribution for a temporary period, the construction and operation of an electricity substation and the construction of new access along Station Road, including a new junction with Rosper Road	Approved 04/01/2019	<p>The construction activities permitted by this consent being a new electricity substation and a new access on Station Road (modified by PA/2019/497, see below) merely replicate works that are permitted by the DCO. Both have been implemented.</p> <p>Condition 3 of this planning permission permits car storage until 4 January 2021.</p> <p>As permission for the temporary use has now expired, the assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more</p>

Planning Ref.	Description of Development	Status	Commentary as of April 2021
			sensitive receptor than that considered in the original ES.
PA/2019/497	Planning permission for change of use to car storage and distribution for a temporary period, provision of an access road, security cabin, drainage ditches and new foul drainage system	Approved 10/09/2019	<p>The construction activities permitted by this consent merely replicated works that were permitted by the DCO.</p> <p>Condition 3 of this planning permission permits car storage until 10 September 2021. This planning permission therefore does not alter or prejudice the delivery of AMEP as approved by the DCO nor does it have any consequential impacts to construction activities.</p> <p>Furthermore, it is clear that the assessment of effects in the original ES are not altered by this planning permission through either a different impact or a more sensitive receptor than that considered in the original ES.</p>

1.2.7 On the basis of the above information, whilst planning permissions have been granted on the application site since the DCO was submitted, and further development of the site has been undertaken, it is evident that:

- No planning permissions prejudice the delivery of the AMEP scheme; and
- No planning permissions have any consequential impact on the phasing of construction activities.

1.2.8 This PEIR will report on whether the assessment of effects reported in the original ES changes as a result of the material amendment, either due to a change in the baseline, a different impact or a more sensitive receptor on the site compared to 2011. If any change in the assessment is identified then the adequacy of the existing mitigation, which is incorporated by Requirements in Schedule 11 of the DCO, is reviewed.

Development of Mitigation Area B

1.2.9 At the time of the application a colony of Great Crested Newts (GCN's) was present at the site. In 2014, the Applicant obtained a Licence from Natural England to relocate the population. In 2015, the population was relocated to ponds created within the Mitigation Area B site in accordance with the mitigation proposed in the original ES at paragraphs 11.7.14 *et seq*, abstract below:

“Six new ponds will be created to replace three ponds lost to AMEP in accordance with the guidance set out in the Great Crested Newt Mitigation Guidelines (English Nature, 2001). The new ponds will be located in Area B (approximately 1 km from the existing ponds).”

1.2.10 An aerial photograph of the GCN relocation site is reproduced in Figure 1-3. Subsequent monitoring has shown that population numbers remain healthy.

Figure 1-3: Mitigation Area B, Completed 2014



Development of the Area Surrounding AMEP

- 1.2.11 With regard to planning consents in the surrounding AMEP area, EX44.1¹ and EX44.2² of the original ES detailed planning applications that had been consented but not implemented or were only partly implemented at the time of the application. The original ES considered these projects cumulatively with the impacts of AMEP.
- 1.2.12 In the intervening years since the DCO application, further major developments have been consented in the area surrounding the AMEP site, as illustrated in Figure 1-4. The relevant EIA developments are further described in Table 1-3 below. In brief, the new developments do not, or will not, introduce receptors that were not already existing at the time of the DCO application. For example, residential development has been consented next to existing residential development and new industry has been consented within an industrial setting.

Figure 1-4: Major Developments Consented in the vicinity of DCO since October 2014



¹https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001612-OS-003_TR030001_Able%20UK%20Ltd_Supplementary%20Environmental%20Information_File%202%20of%202.zip

²https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

1.2.13 The principal physical changes in the area immediately surrounding the AMEP site that have actually occurred since the DCO application are:

- Improvements to the A160-A180 trunk road by Highways England in accordance with the A160/A180 (Port of Immingham Improvement) DCO 2015;
- The demolition of the Centrica power station in 2017;
- The development of Hornsea One Onshore Substation (in accordance with the Hornsea One Offshore Wind Farm DCO 2014);
- The construction of a roundabout at the junction of Chase Hill Road and Eastfield Road pursuant to PA/2016/1254 to provide access to the consented Able Logistics Park; and
- The development of biomass storage silos at the Port of Immingham and associated rail transport infrastructure.

Table 1-3: Planning Permissions in Surrounding Area Accompanied by an ES Granted since DCO (2014)

Name	Planning Ref.	Description	Status as of April 2021
A160/180 (Port of Immingham Improvement)	DCO	Upgrade the existing single carriageway section of the A160 to dual carriageway with associated junction improvements along the length of the route, at South Killingholme to the west of the Port of Immingham.	Project now completed. AMEP was considered as a cumulative development within the ES prepared in support of the A160/180 DCO and as part of the development design for the upgrading works. As such, the potential for cumulative impacts of AMEP with this development have already been assessed and found to be acceptable.
North Killingholme Power Project	DCO	Thermal generating station that would operate either as a Combined Cycle Gas Turbine (CCGT) plant or as an Integrated Gasification Combined Cycle (IGCC) plant, with a total electrical output of up to 470MWe at North Killingholme, Lincolnshire	Approved on 11 September 2014. AMEP considered as a cumulative development within the ES prepared in support of the North Killingholme Power Project DCO. As such, cumulative impacts of AMEP with this development have already been assessed and found to be acceptable. An application for a non-material change to extend the time limits for development was submitted on 13 August 2020 and the cumulative assessment was refreshed as part of that submission.
Queens Road Estate, Immingham	DM/1027/13/OUT (North East Lincolnshire Council)	Proposed Outline development of site E1/3 in the NELC local plan for general industry (B2) storage and distribution (B8) and minor office development, research and development, light industry (B1) with associated access & landscaping.	Approved on 10 April 2014. AMEP considered as a cumulative development in Transport Technical Note date 21 February 2014 submitted in support of application ref. DM/1027/13/OUT. Therefore, cumulative impacts of AMEP with this development have already been assessed and found to be acceptable.
Kia	DM/0147/16/FUL (North East Lincolnshire Council)	Reconfiguration and extension of existing commercial buildings, clearance of existing site office and gatehouse and erection of new buildings, change of use of agricultural land to external vehicle storage (approximately 16.34 hectares) and associated resurfacing, creation of a new access onto North Moss Lane, new boundary treatments, engineering works and other associated works. Engineering works and use of land for external car parking, internal site access	Approved on 9 June 2016. Traffic flows from AMEP considered as committed development in the ES which accompanied planning application ref. DM/0147/16/FUL. Therefore, cumulative impacts of AMEP with this development have already been assessed and found to be acceptable.

Name	Planning Ref.	Description	Status as of April 2021
		works, boundary works, and other associated works. Decided - Approved Conditions and Signing of S106	
Stallingborough Interchange	DM/0105/18/FUL	Hybrid application seeking outline consent with access, landscaping and scale to be considered for the development of a 62ha Business Park comprising up to 120,176 sq.m for B1 (Business), B2 (General Industrial) and B8 (Storage and Distribution), associated infrastructure and internal highways. Full application for the creation of a new roundabout, new access roads, associated highway works, substations, pumping stations, drainage and landscaping. (Amended FRA and Drainage Strategy July 2018).	Approved on 12 October 2018. AMEP considered as a cumulative development within the ES which accompanied planning application ref. DM/0105/18/FUL. Therefore, cumulative impacts of AMEP with this development have already been assessed and found to be acceptable.
Immingham Rail Freight	DM/0628/18/FUL (North East Lincolnshire Council)	Partially demolish existing building and erect 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery, parking and external works	Approved on 20 December 2018. AMEP considered as a committed development in Chapter 6 of the ES submitted with planning application ref. DM/0628/18/FUL. Therefore, cumulative impacts of AMEP with this development have already been assessed and found to be acceptable.
South Humber Bank Energy Centre	DM/1070/18/FUL	Construction of an air cooled energy from waste facility of up to 49.9MWe gross capacity including emissions stack(s), associated infrastructure including parking areas, hard and soft landscaping, the creation of a new access to South Marsh Road, weighbridge facility, and drainage infrastructure, on land at South Humber Bank Power Station	Approved on 12 April 2019. AMEP, or any of the local authority level permissions associated therein, was not considered within the ES submitted with planning application ref. DM/1070/18/FUL. As such, it is considered that the potential for in-combination or cumulative effects with this development have been effectively 'screened out'.
South Humber Bank Energy Centre	DCO	An energy from waste power station with a gross electrical output of up to 95 MW	A DCO submission was made to the Secretary of State and subsequently accepted for Examination in May 2020. The DCO application remains undetermined at present, with Hearings held during February 2021 and the applicant submitting further information in response to queries from the Examining Authority during March 2021. In accordance with recommendations by the

Name	Planning Ref.	Description	Status as of April 2021
			Environment Agency, this development has been considered further, where appropriate, within this PEIR for wider scale impacts associated with the hydrological regime.

The Compensation Site

1.2.14 Paragraph 1.2.5 of the original ES described the Compensation site as follows:

“The Compensation Site is located on the north bank of the Humber Estuary, within East Riding of Yorkshire, opposite the AMEP site and some 4 km to the south-west of Keyingham. The site is divided into an area to be developed into intertidal habitat, and an area to be developed as wet roosting and feeding habitat. The proposed intertidal site, known as Cherry Cobb Sands, is roughly triangular in shape and currently comprises arable fields defined at their boundaries by drainage ditches, hedges and a flood defence embankment.”

1.2.15 The Compensation Site continues in use as agricultural land and lies within an extensive rural setting which, because of its low-lying nature, is not allocated for any other form of economic development. As such, the site and its surroundings are materially unchanged since 2010.

Figure 1-5: Cherry Cob Sands Compensation Site and Wet Grassland



1.2.16 The Compensation Site has been fully designed since the DCO was made and the following subsequent applications have been approved pursuant to the Requirements set out in Schedule 11 of the DCO for this particular stage of the AMEP development:

- Schedule 11 Req 3 – Stages of the Development (20th April 2017);
- Schedule 11 Req 5 – Plans approval (2nd December 2020);
- Schedule 11 Req 7 – Landscaping Scheme (9th May 2016);
- Schedule 11 Req 10, 25, 29 and 30 – Highways (5th November 2020);
- Schedule 11 Req 11 –PROW Implementation Plan (4th April 2018);
- Schedule 11 Req 16 – Contaminated Land (23rd December 2015);
- Schedule 11 Req 17 – Archaeology (17th July 2015);

- Schedule 11 Req 19 (1) – CEMPP (15th January 2016);
- Schedule 11 Req 24 – External Lighting (6th May 2016);
- Schedule 11 Req 31- Protected Species, re-survey 2020;
- Schedule 11 Req 32 – Radar impact assessment (11th July 2016);
- Schedule 11 Req 36 – Cooling Water Intakes and Outfalls (10th July 2019);
- Schedule 11 Req 38 – Sedimentation (10th July 2019);
- Schedule 11 Req 39 - A scheme for sedimentation monitoring of Stone Creek (16th November 2016);
- Schedule 11 Req 40 – Contaminated Land (23rd December 2015);
- Schedule 11 Req 41 – Contaminated Land (23rd December 2015);
- Schedule 11 Req 43 (4), an assessment of the impacts on Stone Creek etc. (18th October 2016); and
- Schedule 11 Req 44 , approval of the detailed design of hydraulic structures and channel (18th October 2016)

1.2.17 In addition, a Code of Construction Practice to discharge Requirements 22, 26, 27 and 28 of Schedule 11 of the DCO was submitted to the local planning authority for approval on 15th July 2020. The Applicant has subsequently addressed issues raised by Natural England in November and is awaiting approval.

1.2.18 A list of planning consents within and near the Compensation Site was included in Chapter 27 of the original ES and listed in Table 27.1. Since the DCO application the Applicant has obtained planning permission for the creation of wet grassland and a wet roost adjacent to the compensation site. This development is however consistent with the DCO as described in EX28.3 Part 4³ of the ES. A review of the East Riding of Yorkshire Council (ERoYC) website shows that other planning consents in the years since the DCO application are limited to development in keeping with the agricultural setting, namely agricultural buildings and minor domestic alterations.

Outstrays to Skeffling Management Realignment Scheme

1.2.19 It is understood that there is a formal agreement between the Environment Agency and Associated British Ports (ABP) to begin the next stage of work to allow construction to commence on the 'Outstrays to Skeffling Management Realignment Scheme' (OtSMRS) approximately 8km to the south-east of the Cherry Cobb Sands site.

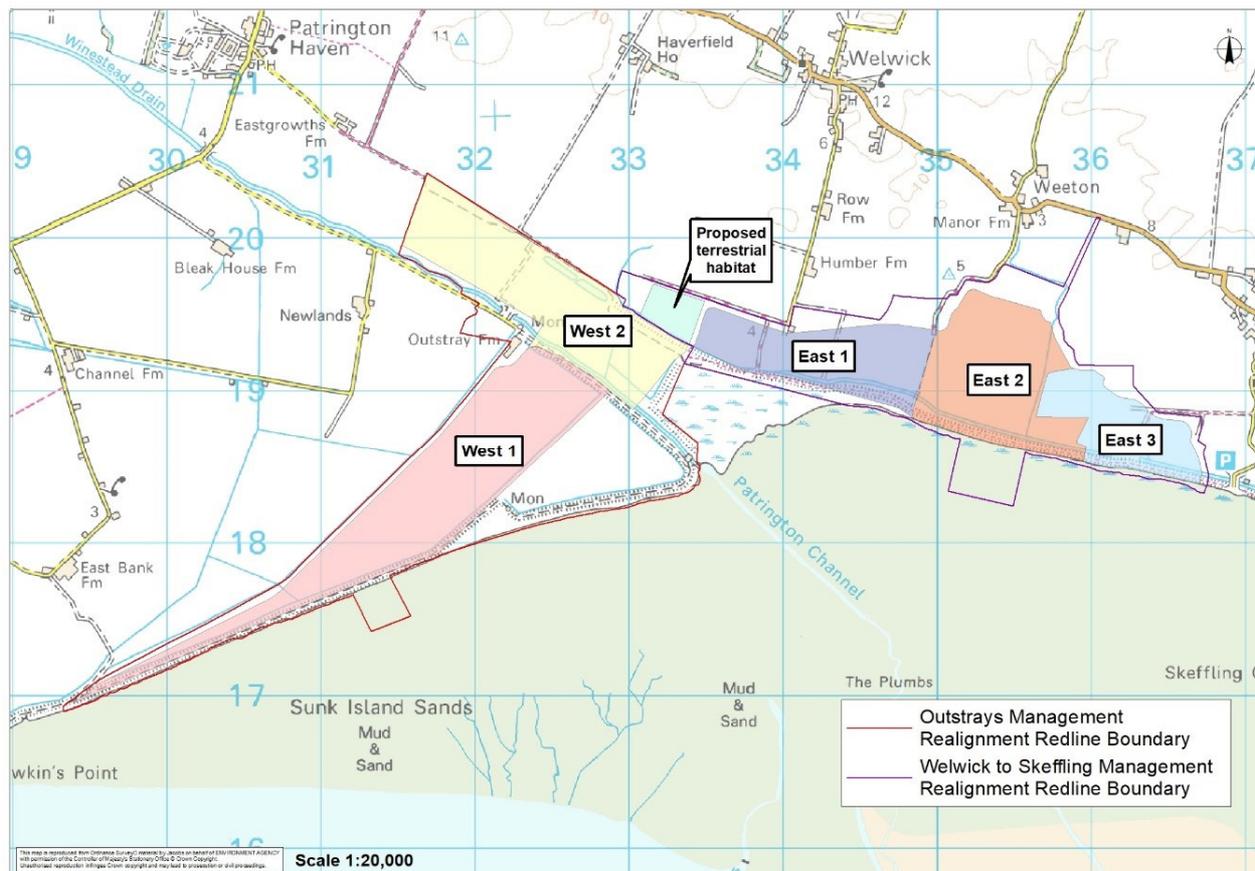
1.2.20 The scheme was granted planning consent in August 2019 (application ref. 19/00786/STPLFE and 19/00783/STPLFE), whilst construction is envisaged to commence in Spring 2021 and estimated to

³https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

be completed in 2023/2024.

1.2.21 In summary, the OtSMRS scheme seeks to create 400 hectares of new mudflats and saltmarsh on the north bank of the Humber Estuary, near Skeffling. The ‘managed realignment’ relates to the alteration of the location of the flood defences, namely moving the bank further inland to establish a new line of defence, breaching the old embankment and allowing sea water to enter to create the intertidal habitat. A plan depicting the area associated with the OtSMRS is shown within Figure 1-6 below.

Figure 1-6: OtSMRS Area Plan⁴



The Marine Site

1.2.22 The Humber Estuary is one of the largest estuaries in the UK comprising extensive wetland and coastal habitats. It is covered by four relevant nature conservation designations: Special Area of Conservation (SAC); Special Protection Area (SPA); Site of Special Scientific Interest (SSSI) and it is also a Ramsar site.

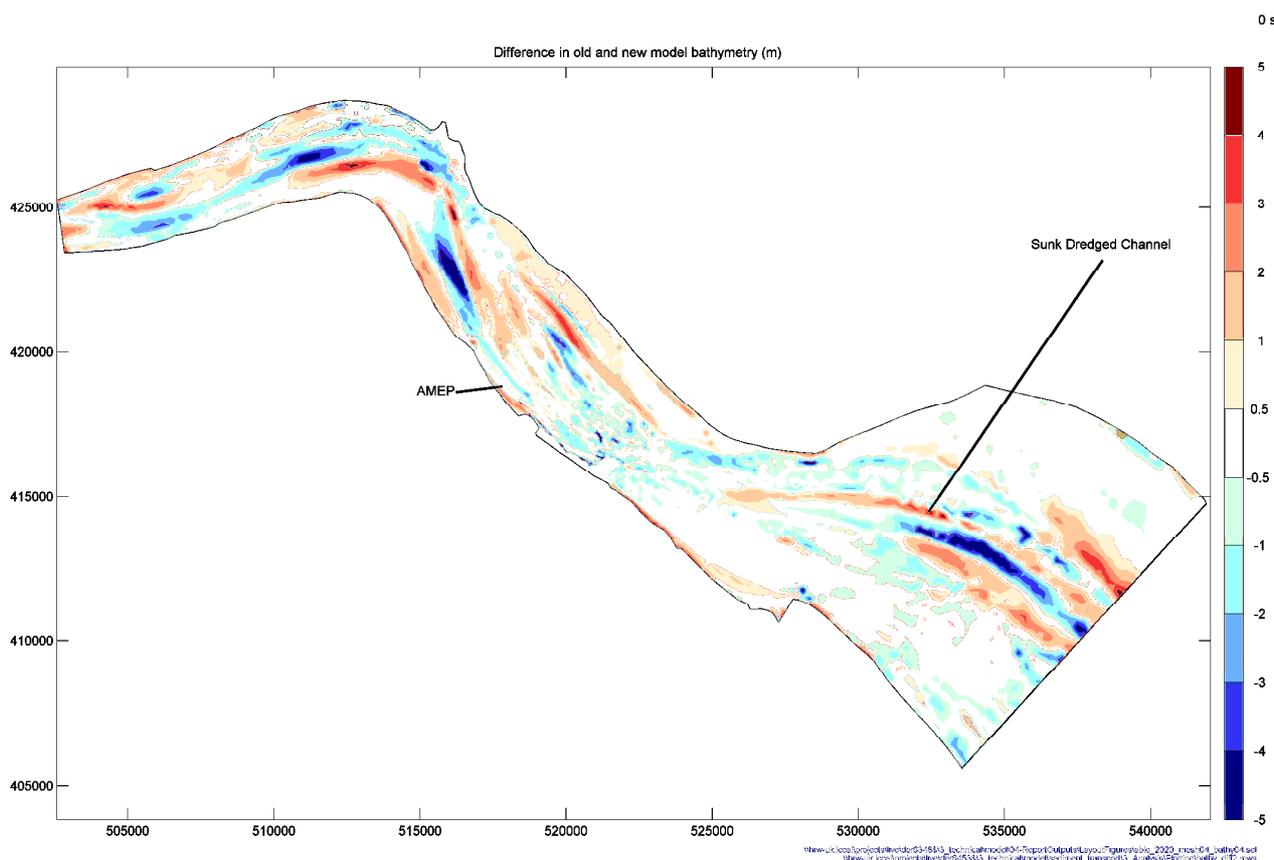
1.2.23 The qualifying interests of the Humber Estuary SAC are set out in the site Citation dated 10th December 2009, the qualifying interests of the Humber Estuary SPA are set out in the site Citation dated 31 August 2007 whilst the criteria that are relevant to the designation of the Humber Estuary Ramsar Site are set out in the Site Information Sheet dated 31 August 2007. Finally, the Humber

⁴ <https://consult.environment-agency.gov.uk/yorkshire/outstrays-to-skeffling-managed-realignment-scheme/>

Estuary SSSI citation is dated 3rd February 2004. None of these designations has therefore changed since the DCO application.

1.2.24 The estuary is nevertheless a dynamic landscape. For example, the Killingholme Marshes foreshore, which is to be reclaimed as part of the AMEP development, was known to be accreting at the time of the application (ES, EX8.9⁵) and has in fact accreted further since the application with the conversion of a fringe of mudflat to saltmarsh along the flood defences; this is further reported in Chapter 10 of this report. Recent bathymetry also shows a significant change in bed levels throughout the whole estuary since the application was submitted, refer to Figure 1-7 below.

Figure 1-7: Decadal Change in Estuary Bathymetry 2008-2018



1.2.25 Two major marine developments that were planned at the time of the DCO application have been implemented, namely: Green Port Hull at the Port of Hull and Grimsby Ro-Ro Terminal at the Port of Grimsby. Two other marine developments have lapsed, namely: Sunk Dredged Channel deepening within the estuary approaches, and Hull Riverside Bulk Terminal at the Port of Hull.

1.2.26 Relevantly also, the dynamic nature of the estuary was specifically mentioned by the Examining Authority in the 'Panel's Findings and Recommendations to the Secretary of State'⁶, (21 February

⁵ https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001613-OS-003_TR030001_Able%20UK%20Ltd_Supplementary%20Environmental%20Information_File%201%20of%202.zip

⁶ <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>

2013, 'the Panel's Report'). In brief, this recorded:

- 1. That the Humber estuary is highly dynamic, both as a result of the natural characteristics of an estuary with a high tidal range and the added consequences of rising sea levels associated with climate change.*
- 2. That the habitats affected by the proposal are found extensively throughout the estuary and that they are subject to continuous change through natural and man-induced processes of erosion, including dredging, and deposition.*
- 3. That the combined effect of rising sea level and fixed flood defences results in the estuary as a whole being subject to "coastal squeeze" with pressure particularly on salt marsh habitat.*
- 4. That as a response to coastal squeeze the Environment Agency has promoted a policy of selective managed retreat of flood defences to re-establish estuarine habitat on land reclaimed for agriculture in historical times.*
- 5. That this policy has been implemented in association with schemes of habitat compensation carried out as part of harbour works on the Humber, including ABP's works at Welwick, Chowderness and Alkborough associated with the Immingham Outer Harbour and at Green Port Hull.*
- 6. That the character of the foreshore at both the main application site and Cherry Cobb Sands has changed in living memory, that the changes are measurable and can be expected to continue to evolve.*
- 7. That conditions favourable to the formation of extensive areas of very gently sloping inter-tidal mudflat at the North Killingholme Marshes have been reinforced by the creation of the Immingham Outer Harbour but that the general pattern is that accreting shorelines will develop into salt marsh as has happened observably at Cherry Cobb Sands and in some locations on the Killingholme shore adjacent to the floodwall', (Examiner's Report, paragraph 10.79).*

1.3.0 The Submission

DCO Material Amendment Submission

1.3.1 This PEIR forms part of a suite of technical documents that are issued for consultation prior to the formal submission of the Material Amendment Application. These include (but are not limited to) the following:

- Draft DCO Amendment Order
- Draft Shadow Habitats Regulations Assessment;
- Draft Water Framework Directive Assessment;
- Revised Works Plans, Sheet No.'s 8 and 9;
- Revised Rights of Way Key Plan and Sheet No. 5; and
- Revised Draft Scheme Drawings.

1.3.2 Consequential to the proposed changes described in Chapter 4, it should be noted that the following drawings are proposed to be withdrawn as part of the Material Amendment Application:

Table 1-4: Withdrawn Plans

Drawing No.	Title	Reason
AME-02018-A	Old Little Humber Farm Compensation Site Indicative Layout	This part of the application was withdrawn during the application and is erroneously listed in Schedule 11.
AMEP_PID_D_001	Quay General Arrangement	Quay line changed
AMEP_PID_D_002	Indicative Piling Layout	Quay line changed
AMEP_PID_D_003	Quay Sections 1 of 2	Options to anchor and slab details added
AMEP_PID_D_004	Quay Sections 2 of 2	Options to anchor and slab details added. Specialist berth reclaimed.
AMEP_PID_D_005	Front Wall Elevation	Specialist berth reclaimed.
AMEP_PID_D_006	Northern Return Wall Elevation	Set back quay introduced.
AMEP_PID_D_007	Southern Return Wall Elevation	Specialist berth reclaimed.
AMEP_PID_D_009	Concrete Deck General Arrangement	Deck is to be optional
AMEP_PID_D_101	Indicative Sequence Plan View 1/3	Cross Dam added. Quay line changed. Works planned from south to north.
AMEP_PID_D_102	Indicative Sequence Plan View 2/3	Cross Dam added. Quay line changed. Works planned from south to north. Surcharge details amended.
AMEP_PID_D_103	Indicative Sequence Plan View 3/3	Cross Dam added. Quay line changed. Works planned from south to north.
AMEP_PID_D_104	Indicative Sequence Cross Section 1/2	Tie back system options added

Drawing No.	Title	Reason
AMEP_PID_D_105	Indicative Sequence Cross Section 2/2	Tie back system options added. Relieving slab optional.
AMEP_PID_D_106	Proposed Site Facilities and Access 1/2	Quay line and surcharge details amended.
AMEP_PID_D_107	Proposed Site Facilities and Access 2/2	Not required.

1.3.3 As such, the proposed Material Amendment Application would result in the following list of new, revised and retained plans forming the basis of the DCO:

Table 1-5: List of New, Revised and Retained Plans and Drawings

Drawing No.	Title	Status
AME-02006-G	Indicative Masterplan	Revised, quay line amended
AME-02007-E	Indicative Landscaping Plan	Retained, but amendment is currently being sought as a non-material change.
AME-02008-D	Building Key Plan	Retained, no amendments.
AME-02009-A	Maximum Building Dimensions	Retained, no amendments.
AME-02010-D	Footpath No. 50 Diversion Route Section Locations	Revised, Detail A amended.
AME-02011-B	Footpath No. 50 Diversion Route Indicative Sections	Revised, notes amended.
AME-02012-A	Lighting Column Details 30 m & 50 m	Retained, no amendment.
AME-02013-A	Surface Water Pumping Station Indicative Layout	Retained, no amendment.
AME-02014-A	Surface Water Pumping Station Indicative Elevation	Retained, no amendment.
AME-02016-A	Cherry Cobb Sands Compensation Site General Arrangement	Retained, no amendment.
AME-02017-A	Cherry Cobb Sands Compensation Site Detail and Section	Retained, no amendment.
AME-36-10001-B	Quay General Arrangement	New
AME-36-10002-A	Indicative Piling Layout (Showing Anchor Piles)	New
AME-36-10003-A	Quay Sections 1 of 2	New
AME-36-10004-B	Quay Sections 2 of 2	New
AME-36-10005-A	Front Wall Elevation	New
AME-36-10006-A	Northern Return Wall Elevation	New
AME-36-10007-A	Southern Return Wall Elevation	New
AME-36-10008-B	Concrete Deck General Arrangement	New
AME-36-10009-B	Indicative Sequence Plan View 1/3	New
AME-36-10010-B	Indicative Sequence Plan View 2/3	New
AME-36-10011-B	Indicative Sequence Plan View 3/3	New

Drawing No.	Title	Status
AME-36-10012-B	Indicative Sequence Cross Section 1 of 2	New
AME-36-10013-B	Indicative Sequence Cross Section 2 of 2	New

1.3.4 In the event that that the extant application with the Secretary of State to relocate Mitigation Area A is approved then the following substitute drawings will apply:

- AME-036-2001 A for AME-02006 G
- AME-036-2002 A for AME-02007 E
- AME-036-2003 A for AME-02008 D
- AME-036-2004 A for AME-02010 D

1.3.5 All drawings are provided within the preliminary environmental information documents.

Preliminary Environmental Information Report

1.3.6 This PEIR is a pre-cursor to preparing an Updated Environmental Statement (UES) in support of the Material Amendment Application. As such, this PEIR follows a similar format to that which would be utilised in preparing an UES.

1.3.7 However, it should be recognised that this PEIR includes a number of topic chapters that are included for the benefit of the consultation exercise, but which may be excluded from any subsequent UES. Whilst the PEIR will be subject to the public consultation process, best practice indicates that it is not necessary to update a topic chapter within the UES where the material amendment is considered unlikely to result in significant effects beyond those considered within the original ES to the DCO.

1.3.8 This PEIR reports the findings of the Environmental Impact Assessment (EIA) work undertaken to date (in advance of the formal submission of the Material Amendment Application) and comprises of three volumes as follows:

- **Volume 1** – Main Report;
- **Volume 2** – Technical Appendices; and
- **Volume 3** – Non-technical Summary

1.3.9 Within Volume 1, the main report will be structured as follows:

- Chapters 1 to 6 are predominantly descriptive in nature, setting out the background to the site, the EIA Process, applicable planning policy, description of changes to development, scoping and consultation undertaken and a description of committed developments:
 - Chapter 1 – Introduction (this Chapter) SLR Consulting Limited
 - Chapter 2 – Environmental Assessment Process SLR Consulting Limited

- Chapter 3 – Planning Policy and Context SLR Consulting Limited
- Chapter 4 – Description of Changes to Development SLR Consulting Limited
- Chapter 5 – Scoping and Consultation SLR Consulting Limited
- Chapter 6 – Description of Committed Developments Able UK Limited
- Chapters 7 to 28 will form the findings of the updated EIA, with each technical discipline detailing the applicable background information (including changes to legislation, policy and guidance), the applicable scope of work, assessment of the potential impacts and effects of the development proposals, considering cumulative impacts and effects, recommending mitigation where appropriate and detailing residual effects. Figures and Tables are included within the body of the Chapters where appropriate:
 - Chapter 7 – Geology, Hydrology and Ground Conditions SLR Consulting Limited
 - Chapter 8 – Hydrodynamic and Sedimentary Regime HR Wallingford
 - Chapter 9 – Water and Sediment Quality SLR Consulting Limited
 - Chapter 10 – Aquatic Ecology Cutts & Hemingway Ltd
 - Chapter 11 – Ecology and Nature Conservation Ecology Consulting
 - Chapter 12 – Commercial Fisheries Cutts & Hemingway Ltd
 - Chapter 13 – Drainage and Flood Risk SLR Consulting Limited
 - Chapter 14 – Navigation Marico Marine
 - Chapter 15 – Traffic and Transport SLR Consulting Limited
 - Chapter 16 – Noise and Vibration SLR Consulting Limited
 - Chapter 17 – Air Quality SLR Consulting Limited
 - Chapter 18 – Marine Archaeology Wessex Archaeology
 - Chapter 19 – Light SLR Consulting Limited
 - Chapter 20 – Landscape and Visual Impact SLR Consulting Limited
 - Chapter 21 – Socio-Economic SLR Consulting Limited
 - Chapter 22 – Aviation SLR Consulting Limited
 - Chapter 23 – Waste SLR Consulting Limited
 - Chapter 24 – Health SLR Consulting Limited
 - Chapter 25 – Other Environmental Issues SLR Consulting Limited

- Chapter 26 – Cumulative and In-Combination Effects SLR Consulting Limited
- Chapter 27 – Summary of Mitigation and Monitoring SLR Consulting Limited
- Chapter 28 – Conclusion SLR Consulting Limited
- Chapters 29 simply provides a list of acronyms and abbreviations.

1.3.10 In accordance with the EIA Regulations 2017, which have come into force since the AMEP DCO application was made, each Chapter will also duly consider a number of new topics which have been introduced (infrastructure, waste, population and human health, climate and carbon balance, and risks of major accidents and/or disasters). These considerations are contained within each Chapter in a Section entitled 'Other Environmental Issues', whilst a summary of these considerations is contained within Chapter 25 (as listed above).

1.3.11 The Technical Appendices to the above chapters will be provided within **Volume 2** of the PEIR and will include a range of selected technical reports, supplementary information and supporting drawings where appropriate. These Technical Appendices should be read in conjunction with the main report provided within Volume 1.

1.3.12 The Non-Technical Summary (NTS) will be provided within **Volume 3** of the PEIR. The NTS provides a brief summary of the proposed development, the technical assessments, and the likely effects on the environment in non-technical language.

Compliance with EIA Regulations

1.3.13 Regulation 14(4) of the EIA Regulations requires that '*... the environmental statement is prepared by competent experts*'. It is duly confirmed that the technical team identified above (Section 1.3.4) are all accredited professionals within their fields of expertise, with the relevant experience and competency to carry out the Technical Assessment work in support of an EIA.

1.3.14 The Technical Assessments contained herein have been prepared in accordance with best practice guidance and following extensive consultation regarding the scope of each assessment. Where appropriate, further information regarding the methodology and appropriate technical guidance is contained within each individual PEIR Chapter.

1.3.15 Finally, in terms of EIA collation and co-ordination, SLR Consulting Limited is an IEMA accredited organisation and is a member of the EIA Quality Mark.

1.4.0 Viewing the PEIR and Representations

Requesting Copies of PEIR Documents

- 1.4.1 The DCO and original ES, are available to view (free of charge) via the National Infrastructure Planning website on the following link: <https://infrastructure.planninginspectorate.gov.uk/>.
- 1.4.2 A copy of the PEIR can be requested from Able UK Limited in either electronic (CD) or hard copy. The cost of duplicating the PEIR will be charged at cost (i.e. no additional uplift) dependent on the format that the copy is requested. These costs are detailed below:
- Electronic copy via file share - free of charge;
 - Electronic copy via CD - £10 + postage; or
 - Hard copy via post - £100.
- 1.4.3 Unfortunately, given the size of the PEIR, it is not possible to disseminate copies of this document via email.
- 1.4.4 A copy of the NTS can also be requested in either electronic (email or CD) or hard copy and is available free of charge. If a hard copy is requested, please send an A4 size stamp addressed envelope to the following address: **Able UK Ltd, Able House, Billingham Reach Industrial Estate, Billingham, Teeside TS23 1PX.**
- 1.4.5 All other requests for copies of the PEIR documents can be made via email at amepmc2@ableuk.com.

Consultation & Representations

- 1.4.6 In accordance with the Planning Act 2008 and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, this PEIR will be utilised to undertake the necessary consultation in advance of any UES being submitted as part of the Material Amendment Application.
- 1.4.7 A list of consultation bodies, groups and persons which must be notified (in writing) that this PEIR is available to view has been agreed with the Secretary of State for Transport. A copy of the relevant correspondence is provided within Appendix U1-4.
- 1.4.8 Able Humber Ports has written to each of these parties to notify them of the intention to submit a Material Amendment Application and to provide details of this consultation, including details of the PEIR. A website has also been created to allow this PEIR, associated information and drawings for the material amendment consultation to be freely available; the website address is as follows: <https://www.ableuk.com/sites/port-sites/humber-port/amep/>, the documents can be found under the tab "Documents".
- 1.4.9 In addition to the above, and in accordance with the Planning Act 2008, the intention to submit the Material Amendment Application will be advertised in the local press in advance of the pre-submission consultation process commencing.
- 1.4.10 Should you wish to make representations to this consultation on the DCO material amendment,

including comments on the PEIR, these must be made within 30 days of the start date of consultation: the start date will be advertised and made publicly available. Any such representations can be submitted to Able UK Ltd at the following email or postal address:

- Email: **amepmc2@ableuk.com**
- Post: **Able UK Ltd, Able House, Billingham Reach Industrial Estate, Billingham, Teesside TS23 1PX.**

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 2: ENVIRONMENTAL ASSESSMENT PROCESS

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
Version No: FINAL
April 2021



BASIS OF REPORT

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CONTENTS

2.1.0 INTRODUCTION	2-1
2.2.0 BASIS OF THE ASSESSMENT	2-2
Applicable Regulations	2-2
Approach to PEIR.....	2-3
2.3.0 EIA METHODOLOGY	2-4
Defining the Baseline Scenario.....	2-5
Sensitivity of Receptors.....	2-5
Magnitude of Change	2-5
Significance of Effect	2-6
Mitigation & Residual Effects	2-6
2.4.0 SCOPE OF THE ASSESSMENT	2-7
Consideration of Alternatives.....	2-9
Cumulative and In-Combination Effects.....	2-9
Other Environmental Issues	2-10

DOCUMENT REFERENCES

TABLES

Table 2-1: Example Significance Matrix.....	2-6
Table 2-2: Technical Scope of PEIR.....	2-7

2.1.0 Introduction

- 2.1.1 The purpose of this chapter is to describe the broad principles of methodology that have been applied in the undertaking of the Preliminary Environmental Information Report (PEIR). In so doing, it describes the approach that has been used to identify, evaluate, and mitigate environmental effects. It also sets out the proposed temporal, spatial, and technical scope of the EIA.

2.2.0 Basis of The Assessment

Applicable Regulations

2.2.1 Environmental Impact Assessments (EIA) are a procedure required under the terms of European Union Directive 85/337/EEC, as amended, on the assessment of the effects of certain public and private projects on the environment. They were transposed into English law for nationally significant infrastructure projects (NSIPs) by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. They remain part of English Law following the UK's exit from the EU on the 31st of January 2020.

2.2.2 The primary objective of an EIA is inscribed under Article 2 of the above Directive, which states that:

“Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size of location are made subject to a requirement for development consent and an assessment with regard to their effects.”

2.2.3 Article 8 of the Directive also states that:

“The results of consultations and information gathered pursuant to [the EIA procedure] must be taken into consideration in the development consent procedure.”

2.2.4 The EIA is reported in an Environmental Statement (ES). The purpose of this Preliminary Environmental Statement is to inform consultees of the emerging significant environmental issues arising from the proposed material amendment to the approved development as contained within the AMEP DCO (Statutory Instrument 2014 No. 2935). Following completion of the consultation, the ES will be updated and submitted with the application to amend the AMEP DCO. A copy of the extant DCO is provided within Technical Appendix U1-1.

2.2.5 Consideration has also been given to the National Policy Statement for Ports¹ (NPSP, 2012), which also provides a framework within which an Examining Authority will make their recommendation. With regard to the EIA process, section 4.7 identifies that:

“All proposals for projects that are subject to the European Environmental Impact Assessment Directive must be accompanied by an Environmental Statement (ES) describing the aspects of the environment likely to be significantly affected by the project. The Directive specifically covers ‘trading ports...which can take vessels over 1,350 tonnes’ within Annex I 8(b) and ‘construction of...harbours and port installations, including fishing harbours (projects not included in Annex I)’ within Annex II 10(e). The Directive also specifically refers to effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. The Directive requires a description of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, short-, medium and long-term, permanent and temporary, positive and negative effects of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects. When considering a proposal, the decisionmaker should ensure that likely significant effects at all stages of the project

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3931/national-policy-statement-ports.pdf

have been adequately assessed and should request further information where necessary.”

- 2.2.6 The NPSP also provides guidance on the Assessment Principles for and Generic Impacts of Port developments for consideration by the Examining Authority.

Approach to PEIR

- 2.2.7 The environmental effects of the proposed development are being assessed for each relevant environmental topic (e.g., water quality, commercial fisheries, traffic, socio-economics etc.) by comparing the findings of the original EIA (as contained within the ES submitted in support of the DCO) with the findings of updated technical assessments undertaken for topics affected by the proposed material amendment. For topics not likely to experience significant effects (beyond those identified within the original ES), a compliance review has been undertaken to ensure the completeness of this PEIR and facilitate a comprehensive consultation exercise.
- 2.2.8 Further information regarding the Scoping of this PEIR is provided within Chapter 5: Scoping and Consultation.

2.3.0 EIA Methodology

- 2.3.1 This section of the Environmental Assessment Process Chapter details the general approach to the EIA methodology, detailing the approach to defining the sensitivity of receptors, magnitude of change and the significance of environmental effects. Notwithstanding, it should be noted that further topic specific EIA methodology is provided within each of the topic chapters.
- 2.3.2 The 2017 EIA Regulations require an ES to report on those environmental effects arising from a project that are considered likely to be significant. Whilst there is no statutory definition of what constitutes a significant effect, this is based on professional judgement through the undertaking of technical assessments in accordance with best practice guidance.
- 2.3.3 The primary purpose of reporting an assessment of any effect of a project is to aid the determining authority so that it is properly informed when making its decision.
- 2.3.4 For the purposes of this PEIR, a significant effect has been defined, as an effect that, either in isolation or in combination with others, that should – in the opinion of the team carrying out the EIA – be taken into account in the decision-making process.
- 2.3.5 The definition of a significant effect requires a specific framework for each environmental topic considered in the assessment in order to predict the significance of the effects that may arise. The criteria used to judge significance is explained as part of the assessment methodology for each individual environmental topic (chapter).
- 2.3.6 In identifying significant effects, the EIA takes into account their nature and duration as follows:
- Site-specific effects: Effects that result from a geographically localised impact and which are significant primarily at a neighbourhood or district level.
 - Wider effects: Effects that are individually significant at a regional level, but which may not be significant locally.
 - Positive effects: Effects that have a beneficial influence on receptors and resources.
 - Negative effects: Effects that have an adverse influence on receptors or resources.
 - Temporary effects: Effects that persist for a limited period only, due for example to particular construction activities (e.g., noise and vibration from construction plant). Where possible, the likely duration of effects is identified.
 - Permanent effects: Effects resulting from an irreversible change to the baseline environment (e.g., land take) or which persist for the foreseeable future (e.g., noise and vibration from operation).
 - Direct effects: Effects that arise from the impact of activities that form an integral part of the Project (e.g., new infrastructure).
 - Indirect effects: Effects that arise from the impact of activities not explicitly forming part of the Project.
 - Secondary effects: Effects that arise as a result of an initial effect of the scheme (e.g., reduced

amenity of a community facility as a result of construction noise and vibration).

- Cumulative effects: Those effects which arise over time due to the effect of the Project and the effect of other developments.
- In-combination effects: Those effects which occur where a number of separate effects from the Project, such as noise and air quality, affect a single receptor, for example people.

2.3.7 In general terms, there are three stages required to enable the significance of impacts to be identified, as follows:

- Identification of the baseline conditions and the sensitivity and importance of receptors.
- Identification of the magnitude of change (impacts) upon each receptor.
- Identification of the impact significance, which is the product of a combination of the above two variables.

Defining the Baseline Scenario

2.3.8 Given the purpose of this PEIR is to consider material amendment to an extant DCO, it is necessary for multiple baseline scenarios to be detailed to allow consideration of the changes in the assessment of effects between the original ES and the content of this PEIR. These scenarios include:

- Current Baseline as detailed within the original ES (i.e. prior to any development taking place);
- Future Baseline as detailed within the original ES (i.e. that established as the future scenario when the AMEP development would commence on site, if different);
- Current Baseline as at the time of this PEIR (i.e. taking into consideration alterations to the site and in the local area since the DCO came into force in 2014); and
- Future Baseline for the PEIR (i.e. a future scenario which considers any change in the local area that will occur in advance of the DCO being implemented on site). Please note that the Future Baseline for the PEIR will only be applied where appropriate.

Sensitivity of Receptors

2.3.9 Where appropriate, the topic chapters of this PEIR have identified the receptors of relevance to their assessment. The sensitivity of a receptors is determined by their 'value' and a consideration of their adaptability, tolerance and recoverability to change. On this basis, the sensitivity of the receptors are typically defined as High, Medium, Low and Negligible/Neutral.

Magnitude of Change

2.3.10 Magnitude of change is typically defined by four factors when considering an effect to a receptor; extent, duration, frequency and severity. Again, the magnitude of change are typically defined as High, Medium, Low and Negligible/Neutral.

Significance of Effect

- 2.3.11 The significance of effect is determined by combining the predicted magnitude of change with the sensitivity of a receptor. Notwithstanding, it should be recognised that there is a degree of subjectivity to the assessment process given that it is based on professional judgement regarding the effect-receptor interaction based on the evidence used to inform the EIA.
- 2.3.12 An example significance matrix is provided in Table 2-1 below. However, as stated above, each chapter will define a specific framework within their methodology in accordance with the applicable relevant standards, criteria, guidance, and statutory requirements.

Table 2-1: Example Significance Matrix

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Change	High	Substantial / Major	Substantial / Major	Moderate	Neutral / Negligible
	Medium	Substantial / Major	Moderate	Minor	Neutral / Negligible
	Low	Moderate	Minor	Minor	Neutral / Negligible
	Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible

Mitigation & Residual Effects

- 2.3.13 Schedule 4 of the 2017 EIA Regulations (as amended) requires that where significant effects are identified, 'a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment' should be included in the ES.
- 2.3.14 The proposed material amendment aim to achieve the highest environmental standards, whilst measures to avoid and/or reduce and if necessary, mitigate environmental impacts have been built into the scheme parameters. The mitigation measures identified within the original ES would remain as proposed unless alternate or additional mitigation measures have been identified within this PEIR.
- 2.3.15 For each significant adverse effect of the proposed development identified during the EIA, the specialists undertaking the assessments identified mitigation measures consistent with statutory requirements and good practice in their respective field.
- 2.3.16 Any identified residual effects (assuming mitigation options are applied) are classified as non-significant or still significant (although reduced), as appropriate. Where effects are still significant, the extent of any amelioration is reported in this PEIR.

2.4.0 Scope of the Assessment

2.4.1 The range of environmental topics addressed in this PEIR is referred to as the technical scope. This section considers how the technical scope of the PEIR for the proposed material amendment, whilst considering the content of the original ES, has been identified and is recorded.

Technical Scope

2.4.2 Potential environmental topics in relation to the proposed material amendment were evaluated, with reference to the previously undertaken Scoping exercise. Further information regarding this Scoping exercise is provided within Chapter 5: Scoping and Consultation.

2.4.3 The Scoping exercise was carried out in order to determine, amongst other things, the extent to which environmental topics should be included in the EIA, having regard to whether they are likely to give rise to significant effects.

2.4.4 On this basis, the PEIR has included the following technical scope:

Table 2-2: Technical Scope of PEIR

Topic / Technical	PEIR Chapter #	Updated Assessment/ Information	Compliance Review
Geology, Hydrogeology and Ground Conditions	7		✓
Hydrodynamic and Sedimentary Regime	8	✓	
Water and Sediment Quality	9	✓	
Aquatic Ecology	10	✓	
Ecology and Nature Conservation	11	✓	
Commercial Fisheries	12	✓	
Drainage and Flood Risk	13	✓	
Navigation	14	✓	
Traffic and Transport	15		✓
Noise and Vibration	16		✓
Air Quality	17		✓
Marine Archaeology	18	✓	
Light	19		✓
Landscape and Visual	20		✓
Socio-Economic	21		✓
Aviation	22		✓
Waste	23		✓
Health	24		✓

2.4.5 In addition to the above, updated chapters have been prepared for the following EIA assessment related topics:

- Chapter 25 – Other Environmental Issues;
- Chapter 26 – Assessment of Cumulative and In-Combination Effects;
- Chapter 27 – Summary of Mitigation and Monitoring;
- Chapter 28 – Conclusions (including Residual Effects).

Spatial Scope

2.4.6 The spatial, or geographical, scope of the assessment takes into account the following factors:

- The physical extent of the proposed works, as defined by the scheme design taking into consideration the proposed material amendment;
- The nature of the baseline environment and the manner in which the impacts are likely to be propagated; and
- The pattern of governmental administrative boundaries, which provide the planning and policy context.

2.4.7 For example, any effects on, for instance, soil contamination is likely to be confined to areas that are physically affected by construction works, whilst the effect of factors such as noise or visual intrusion could potentially be experienced at a distance from the site and the works themselves.

2.4.8 In most cases the impact is likely to affect interests for a limited area around the site. However, for some issues (such as socio-economics) the impact may affect regional level interests, or even be an impact of national or international significance.

2.4.9 Where appropriate, study areas are defined within the environmental topic chapters.

Temporal Scope

2.4.10 The temporal scope of the assessment refers to the time periods in which the effects are expected to be experienced. This is different and will be established separately for each topic individually, and where it is deemed appropriate, through discussion with the relevant statutory consultees.

2.4.11 Generally, the following terms are used regarding temporary effects:

- Short-Term – the impact is temporary and lasts for up to 12 months;
- Medium-Term – the impact occurs for up to 5 years; and
- Long-term – the impact remains for a substantial time, perhaps permanently

Construction Phase

2.4.12 Construction phase impacts may potentially arise at any stage of the construction works. As such, the assessments consider the potential for construction phase effects, including consideration of

the time of day during which such effects are likely to arise (i.e. if works are likely to be undertaken during the daytime or night-time periods). Construction works associated with the AMEP site are defined as those which have not yet taken place on site (given that areas of the site have already been commenced by way of separate local authority level planning consents).

Operational Phase

- 2.4.13 For the operational phase, the temporal scope is determined by the predicted date of works commencing operation. Notwithstanding, it should be appreciated that the Quay will be delivered in sections, with elements becoming operational prior to the full development being completed.
- 2.4.14 In order to facilitate early handover of an operational section of quay, the works are now proposed to commence at the southern end of the quay and progress northwards. On this basis, the construction sequence shown on the DCO approved drawings AMEP_P1D_D_101 to 103 is proposed to be amended, and thereby superseded, by the alternative sequence shown on the draft application drawings AME-036-10009 to 10011 which are included in the consultation material.
- 2.4.15 In addition to the above, areas of the terrestrial (non-quay) elements of the DCO have already been implemented by way of local authority planning consents for land raising and associated uses. Relevantly also, work has commenced on the construction of the surface water pumping station on the south bank and that is expected to be completed by March 2022. Work will also commence on the compensation site at Cherry Cobb Sands during the third quarter of 2021, and it will become operational in June 2023.
- 2.4.16 For certain environmental topics, where effects are dependent on longer term considerations, such as natural or planned restoration or flood risk, which can affect ecology and landscape, the operational phase is taken to commence at the proposed opening date for assessment purposes.

Decommissioning Phase

- 2.4.17 As described in Chapter 4 of the original ES, AMEP is designed to have a long-term future, adjusting to market demands over time. However, the potential for decommissioning certain elements will be given detailed consideration in the design and use of materials in the AMEP, in order to ensure that materials can be re-used safely and efficiently.

Consideration of Alternatives

- 2.4.18 The 2017 EIA Regulations (as amended) require, amongst other things, that the main alternatives to any scheme that have been reasonably considered by the applicant. Whilst the principal consideration of alternatives is contained within the original ES, an update to the consideration of alternatives with respect to the proposed material amendment is contained within Chapter 4: Description of Changes to Development & Consideration of Alternatives.

Cumulative and In-Combination Effects

- 2.4.19 This section sets out how the cumulative and in-combination effects detailed in each of the topic chapters have been identified and assessed.
- 2.4.20 Other schemes in the vicinity of the site, which have been granted permission (outline or full) but not completed, or for which an application for consent has been submitted but yet to be determined, are considered alongside the current proposals in the assessment of cumulative

impacts in the EIA. The assessment of cumulative impacts is an integral part of the EIA process and ensures that all aspects of potential impacts from the proposals have been addressed to ensure minimum impact on communities and the natural environment.

2.4.21 The EIA has considered the cumulative effects associated with the proposed development. As detailed within EIA guidance, cumulative effects can be considered as:

- The combined effect of individual effects arising as a result of the Proposed Development: i.e. a single receptor experiencing multiple **'in-combination'** effects as a result of noise, air quality, transport and daylight and sunlight; and
- The effects of the proposed development in combination with other development schemes in the locality: i.e. effects which on an individual basis are insignificant but in combination with other development scheme would lead to a significant **'cumulative'** effect. Relevantly however, where an impact has been assessed and fully mitigated there can be no cumulative effect of the mitigated impact with any other project.

2.4.22 The assessment of Cumulative and In-Combination Effects (Chapter 26) has taken into consideration any Cumulative and In-Combination Effects identified and considered within the original ES and those which will or may occur as a result of the proposed material amendment.

Cumulative Effects

2.4.23 Cumulative Effects were identified throughout the EIA process through the consideration of the impacts of the development in tandem with the various committed developments identified. A schedule of committed developments identified through the consultation can be found in Chapter 6: Description of Committed Developments.

2.4.24 This list has been developed in order to develop a clear picture of what projects are in the planning stages or have been consented.

2.4.25 It also considers other projects which already exist in the area and those which are currently being developed or are in the planning process. The cumulative impact of overlapping, temporally or spatially, of this Project and other projects has been assessed in each of the relevant topic chapters of the PEIR.

In-Combination Effects

2.4.26 Receptors which suffer from negative impacts as a result of the combination of more than one impact were identified by developing a matrix. It was based on the individual topic assessments and professional judgement as to whether the identified receptors suffer from in-combination impacts, and whether these impacts are considered not significant or significant.

Other Environmental Issues

2.4.27 As outlined above, the ES should provide 'any additional information specified in Schedule 4' of the 2017 EIA Regulations. With regard to 'Other Environmental Issues' Schedule 4(4) states that a description should be provided of the factors specified in Regulation 4(2) likely to be significantly affected by the development with regard to: *"population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for*

example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape”.

- 2.4.28 The majority of these factors are inherently considered within the various Chapters of this PEIR. However, in accordance with the scope of the original ES, a standalone chapter has been prepared for Health (Chapter 24). Furthermore, to ensure compliance with the EIA Regulations 2017, consideration of these ‘Other Environmental Issues’ are contained within Chapter 26 of this PEIR.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 3: CHANGES TO PLANNING POLICY AND LEGISLATION

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

3.1.0 INTRODUCTION	3-1
3.2.0 LEGISLATIVE FRAMEWORK	3-2
Overview	3-2
Environmental Impact Assessment	3-2
Habitats Regulations Assessment	3-2
Legislation Relevant to the Humber Estuary	3-2
Other Consents and Approvals	3-2
3.3.0 PLANNING POLICY	3-3
National Planning Policy	3-3
Local Planning Policy	3-3
3.4.0 PLANNING HISTORY	3-5

DOCUMENT REFERENCES

TABLES

Table 3-1: Local Planning Applications to The Site Since the DCO Application	3-5
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3.1.0 Introduction

- 3.1.1 This chapter of the PEIR presents an overview of the changes in planning policy and guidance of relevance to the site since the original Environmental Statement (ES).
- 3.1.2 As detailed within the original ES, the terrestrial areas of the site lie within the administrative boundaries of two local authorities, North Lincolnshire Council (NLC) and East Riding of Yorkshire Council (ERYC), and within close proximity to the boundaries of North East Lincolnshire Council (NELC), changes to local planning policy will be considered for all three areas.
- 3.1.3 The policies within the East Riding of Yorkshire Local Development Framework (LDF) only apply to the compensation site. Whilst the material amendment does not affect this element of the DCO, changes to planning policy and legislation for this administrative area have still been identified for completeness.

3.2.0 Legislative Framework

Overview

- 3.2.1 The Localism Act 2011 came into force on the 15th of November 2011 and replaced the Infrastructure Planning Commission with the Major Infrastructure Planning Unit of the Planning Inspectorate. The Major Infrastructure Planning Unit reports back to the Secretary of State who then makes decisions on planning applications. The Major Infrastructure Planning Unit are the determining body for Nationally Significant Infrastructure Projects (NSIP); such as the AMEP DCO.

Environmental Impact Assessment

- 3.2.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 came into force on the 16th May 2017 and supersede the EIA Regulations utilised to undertake the original ES and assess the DCO.
- 3.2.3 These Regulations included the introduction of a number of new 'topics' for consideration within EIA's, including Infrastructure, Waste, Population and Human Health, Climate and Carbon Balance, and Risks of Major Accidents and/or Disasters.
- 3.2.4 The assessments contained within this Preliminary Environmental Information Report (PEIR) have duly considered the requirements of the more recently adopted Regulations and duly comply with the requirements laid out therein.

Habitats Regulations Assessment

- 3.2.5 Given that the site is within close proximity to the Humber Estuary Natura 2000 site, there is the obligation to take on a further environmental assessment process. The EU Habitats Directive 2010 has since been updated to the 2017 Regulations which were then amended in 2019 to the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, following the UK's exit from the European Union on the 31st January 2020.

Legislation Relevant to the Humber Estuary

- 3.2.6 There is no further legislation relevant to the Humber Estuary beyond that outlined within the original ES.

Other Consents and Approvals

- 3.2.7 Requirements for other consents and approvals are duly considered within the individual technical chapters submitted in support of this PEIR.

3.3.0 Planning Policy

3.3.1 This section duly outlines the changes in Planning Policy which is of relevance to the DCO. It does not seek to repeat the policies verbatim but should be used as a guide to the changes of relevance to the DCO. Further information regarding specific policies is contained within the individual technical chapters of this PEIR.

National Planning Policy

3.3.2 The National Policy Statement for Ports (NPSP) was designated in January 2012.

3.3.3 Following the enactment of the Localism Act 2011, the National Planning Policy Framework (NPPF) which was published in March 2012, and has since been updated twice, replaced Planning Policy Statements (PPSs). The NPPF sets out the government's planning policies for England and how these are expected to be applied.

Local Planning Policy

3.3.4 The Localism Act 2011 decentralised local planning policy thus abolishing regional strategies. Therefore, the Yorkshire and Humber Plan (Regional Spatial Strategy) to 2026 was revoked.

3.3.5 The site is within close proximity of the South Humber Bank area that is allocated for employment, port and estuary related uses in both the North East Lincolnshire Core Strategy and the North Lincolnshire Local Plan.

North Lincolnshire Council (NLC)

3.3.6 The saved local plan policies from the North Lincolnshire Local Plan (2003) have since been replaced by the Local Development Framework (LDF) for North Lincolnshire Council. The LDF comprises:

- North Lincolnshire Core Strategy 2011;
- North Lincolnshire Housing and Employment Land Allocations DPD;
- Lincolnshire Lakes Area Action Plan; and
- A number of supplementary planning documents (SPDs)

3.3.7 The site is within close proximity to the South Humber Bank Area which is identified in *Policy CS1 (Spatial Strategy for North Lincolnshire)* of the North Lincolnshire Local Plan. 900 hectares of area surrounding the South Humber Bank is to be safeguarded for port and estuary related uses.

North East Lincolnshire Council (NELC)

3.3.8 The Local Development Framework (LDF) for North East Lincolnshire Council has now been developed and it comprises:

- North East Lincolnshire Local Plan 2013 to 2032 (adopted 2018)

3.3.9 The site is within close proximity to the South Humber Bank area which is in *Policy 9 (Habitat*

Mitigation – South Humber Bank) of the North East Lincolnshire Local Plan. The policy aims to protect the integrity of the Humber Estuary Natura 2000 site. The South Humber Bank area is also identified in *Policy 7 (Employment Allocations)* as an employment area allocated for B1 (Business), B2 (General Industrial) and B8 (Storage and Distribution) use classes.

East Riding of Yorkshire Council

- 3.3.10 As stated above, the policies within the East Riding of Yorkshire Local Development Framework (LDF) only apply to the compensation site.
- 3.3.11 The East Riding of Yorkshire Local Development Framework has since been updated to comprise:
- East Riding Local Plan (adopted April 2016);
 - The Strategy Document (2016);
 - The Allocations Document (2016); and
 - A number of additional supplementary planning documents (SPDs), neighbourhood development plans, minerals and waste plans and a policies map.

3.4.0 Planning History

3.4.1 There are a number of local planning permissions that have been granted on the site since the DCO application. They are listed in Table 3.1 below.

Table 3-1: Local Planning Applications to The Site Since the DCO Application

Planning Application Reference	Description of Development	Decision	Decision Date
PA/2013/0519	Planning permission for consent for enabling works associated with the construction of AMEP, a Nationally Significant Infrastructure Project which will include and extend beyond this application site. The proposal is to remove topsoil from three fields currently in agricultural use (amounting to approximately 35,000 cubic metres of material) and to import, deposit and compact approximately 140,000 cubic metres of clean stone fill material, raising levels from approximately 2.4 m AOD to a minimum of 3.1 m AOD, and creating a level, durable surface for use as a site compound for the contractors constructing the AMEP quay. Works will include the installation of piped crossings across existing ditches and new sub-surface drainage that will discharge into existing surface water ditches that outfall into the Humber Estuary.	Approved	27/07/2014
PA/2014/0512	Planning permission to undertake enabling works in support of the AMEP project which will comprise site clearance, ground raising works, felling of a copse, creation of a footpath, removal offsite of the topsoil layer, importation spreading and compacting of approximately 275,000m ³ of fill material, new drainage ditches and the construction of a new twin cell drainage culvert.	Approved	18/02/2015
PA/2016/1654	Planning permission to erect a new two-storey PDI (pre-delivery inspection) vehicle facility, with associated separate ancillary facilities including a fuel station, security cabin, driver welfare, propane tanks, staff car parking facilities and additionally culverted ditch crossing works.	Approved	06/01/2017
PA/2017/27	Temporary Car Storage until January 2018	Approved	08/05/2017
PA/2017/1780	Application to vary condition 1 of PA/2017/27 dated 08/05/2017 to extend the restoration period for a further 2 years until 8th January 2020	Approved	11/05/2018
PA/2017/265	Planning permission for foul water pumping station, autoscan building, driver welfare. Relocation of fuel station.	Approved	31/05/2017
PA/2018/1416	Planning permission to construct new railway siding parallel to existing railway including loading and unloading ramps	Approved	05/12/2018
PA/2018/114	Planning permission to change the use of land for car storage and distribution for a temporary period, the construction and	Approved	04/01/2019

Planning Application Reference	Description of Development	Decision	Decision Date
	operation of an electricity substation and the construction of new access along Station Road, including a new junction with Rosper Road		
PA/2019/497	Planning permission for change of use to car storage and distribution for a temporary period, provision of an access road, security cabin, drainage ditches and new foul drainage system	Approved	10/09/2019

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ABLE MARINE ENERGY PARK MATERIAL CHANGE 2

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 4: DESCRIPTION OF CHANGES TO DEVELOPMENT & ALTERNATIVES

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
Version No: FINAL
April 2021



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CONTENTS

4.1.0 INTRODUCTION	4-1
Purpose of the AMEP DCO	4-1
Concurrent Applications.....	4-1
Permitted Uses of Development.....	4-2
4.2.0 CHANGES TO THE AUTHORISED DEVELOPMENT	4-3
Changes to the NSIP: Work No.1 – the Quay	4-3
Changes to the NSIP: Work No.1 – the Reclamation	4-4
Changes to Associated Development – Capital Dredging	4-5
Changes to Public Rights of Way.....	4-6
Changes to the Construction Methodology.....	4-6
Operational Details.....	4-7
Withdrawn and Amended Plans and Drawings.....	4-8
4.3.0 CONSIDERATION OF ALTERNATIVES	4-9
Terrestrial Alternatives.....	4-9
Aquatic / Quay Alternatives	4-9

DOCUMENT REFERENCES

TABLES

Table 4-1: Comparison of Habitat Losses	4-4
Table 4-2: AMEP Operational Phase Vessel Movements	4-7

FIGURES

Figure 4-1: Consented Location of Mitigation Area A.....	4-2
Figure 4-2: Consented Quay Alignment and Proposed Changes	4-4
Figure 4-3: Revised Indicative Cross Dam Positions in light red Shading	4-5
Figure 4-4: Footpath 50 Consented Route (Main plan and top inset) and Proposed Change (Bottom Inset)	4-7

APPENDICES

Appendix U4-1: Drawings of Proposed Change
Appendix U4-2: Dredging Strategy

4.1.0 Introduction

- 4.1.1 This Chapter of the PEIR provides an overview of the remit and purpose of the AMEP DCO, a description of change to the development as proposed under Material Change 2, and details of other concurrent applications which are being considered at the time of this submission.
- 4.1.2 Furthermore, this Chapter of the PEIR also provides a consideration of the alternatives to the proposed development, again noting that this is principally related to the material amendment proposed rather than the overarching AMEP scheme given that this already benefits from an extant DCO.

Purpose of the AMEP DCO

- 4.1.3 The proposed development of AMEP is directly related to the emerging global aim to decarbonise world energy production. The need to decarbonise world energy production, and its overriding benefit to the global environment, is detailed in Chapter 5 of the original ES¹.
- 4.1.4 No change is being sought to the fundamental nature or overarching purpose of the development which is to provide a new and substantial manufacturing and installation base for the offshore marine energy sector. Currently, this market is anticipated to be dominated by offshore wind energy with this sector expected to contribute significantly to a new secure, low carbon and balanced energy mix for the UK ('The Ten Point Plan for a Green Industrial Revolution', HM Government, November 2020²).
- 4.1.5 As well as having quays to receive and export raw materials and products, the development will also provide facilities that are necessary to assemble the offshore generators, including offshore wind turbines (OWT's), in preparation for loading onto installation vessels for direct transport from their place of manufacture to the offshore development site.
- 4.1.6 The consented development is described in Chapter 4 of the original ES³, and this Chapter only describes the proposed changes to the development which are proposed. These proposed changes are of a limited nature and principally relate to Work No. 1 (the Quay) and associated dredge and disposal operations which comprise associated development. The only change proposed on land is a minor amendment to the consented diversion route of a public footpath in North Lincolnshire (Footpath 50). This particular change is proposed in order to avoid creating a new crossing point of an operational railway line. The proposed changes are illustrated in the drawings included in Technical Appendix U4-1.

Concurrent Applications

- 4.1.7 At the time of the consultation there is a concurrent non-material change (NMC) application to amend the DCO. That application is to re-site the consented location of Mitigation Area A from Killingholme Marshes to Halton Marshes, where former agricultural land has already been

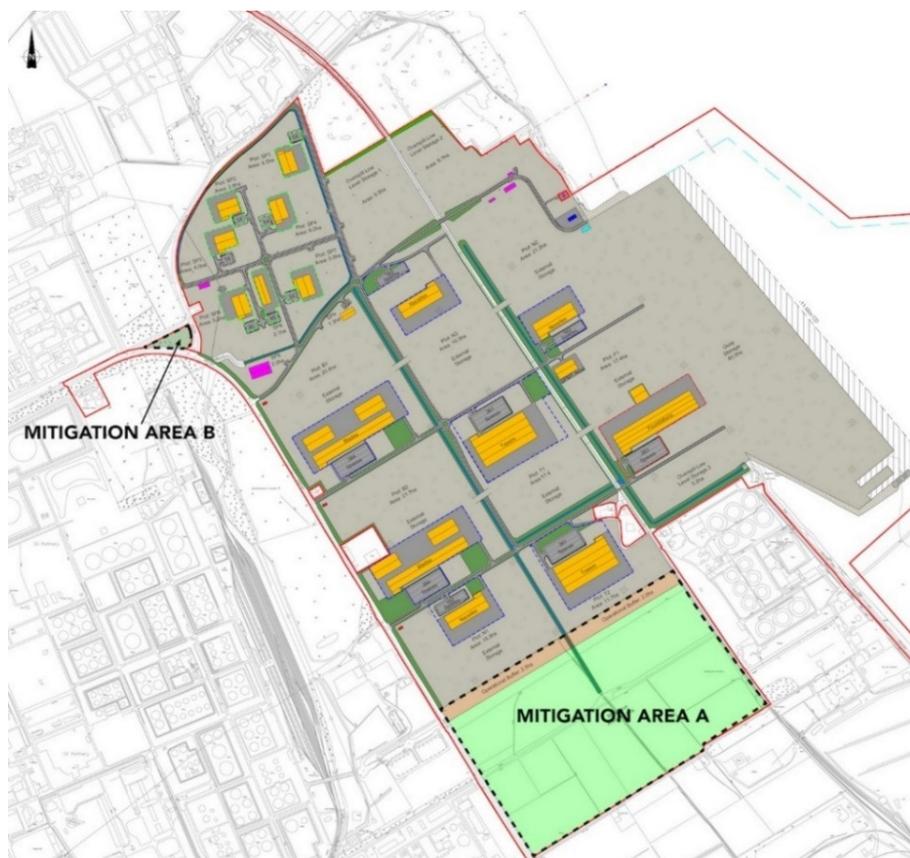
¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000310-05%20-%20Need%20for%20Development.pdf>

²https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000309-04%20-%20Description%20of%20Development.pdf>

developed as ecological mitigation for AMEP. A decision is expected during Q2/2021, and if approved, that change would also have the effect of removing the land within the curtilage of Mitigation Area A from the Order limits (refer to Figure 4-1 below). Accordingly, no alternative development of Mitigation Area A would be permitted under the DCO if the NMC were approved. The NMC application was submitted in September 2018 and the application and related correspondence are available to view on the Planning Inspectorate (PINS) website⁴.

Figure 4-1: Consented Location of Mitigation Area A⁵



Permitted Uses of Development

- 4.1.8 For the avoidance of doubt, the restrictions on cargo and development set out in Schedule 11, paragraphs 4(1) – 4(2) of the DCO are not proposed to be amended. Specifically, these restrictions limit the type of cargo that can pass over the quay to items associated with the offshore renewable energy sector and limit the provision of onshore facilities to the manufacture, storage, and assembly of offshore renewable energy infrastructure. As such, the proposed change does not alter either the use or intensity of the previously permitted AMEP DCO.

⁴<https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/able-marine-energy-park/?ipcsection=overview>

⁵ Note: Mitigation Area B has been constructed and now provides habitat for a population of Great Crested Newts that has been translocated from the AMEP site.

4.2.0 Changes to the Authorised Development

4.2.1 This section details the amendments to the authorised development. For ease of reference, these have been broken down into distinct work parcels of the overarching AMEP scheme as contained within the original ES for the DCO.

Changes to the NSIP: Work No.1 – the Quay

4.2.2 Work No. 1 occupies land owned by the Crown Estate specifically parcel No.'s 08001 and 09001 on the Land Plans⁶. At the time of the application, the land needed for the development of Work No. 1 was leased to Associated British Ports, but since the development was consented in 2014, the lease for the relevant parcel of land has been acquired by the Applicant but surrendered back to The Crown Estate. Pursuant to the start of the works, Able Humber Ports Limited (AHPL, the Company named in the DCO) now has an option to lease the land needed to construct the Quay.

4.2.3 The approved development is detailed on the drawings listed in the DCO at Schedule 11, paragraph 6 (refer to Technical Appendix U1-1 for the DCO). The following changes are proposed to Work No.1:

- a) The specialist berth at the southern end of the quay is to be reclaimed as the vessel that was to use the facility (refer to Figure 5.18 of the original ES⁷) has not been constructed and is not likely to be built;
- b) 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 and allow the potential for end load in of cargo;
- c) Alternative details are proposed for the piled relieving slab to the rear of the quay which is shown on the approved drawing AMEP_P1D_D_003⁸. Options are sought to locate this slab at the ground surface, or it could be omitted altogether subject to detailed design, refer to drawing AME-036-00003 at Appendix U4-1 which illustrates the alternatives being sought; and
- d) Alternative details are proposed for anchoring the quay wall. The option is sought to use more conventional steel anchor piles and tie bars in-lieu of flap anchors to tie back the quay piles, but the option to use flap anchors will remain refer to drawing AME-036-00003 at Appendix U4-1. Nevertheless, no changes are proposed to the compensation proposals taken into account in the Secretary of State's Habitats Regulations Assessment for the consented development⁹.

4.2.4 The net effect of changes (a) and (b) above is that marginally less land would be reclaimed from the estuary, refer to Figure 4-2. The change in habitat loss is summarised in Table 4-1 below. The changes are further detailed on drawing AME-036-00001 - 00002 at Appendix U4-1.

⁶https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001764-121026_TR030001_Able%20Land%20Plans%20-%20Revision%203.zip

⁷<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000310-05%20-%20Need%20for%20Development.pdf>

⁸<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000293-Quay%20Sections%201%20of%202.pdf>

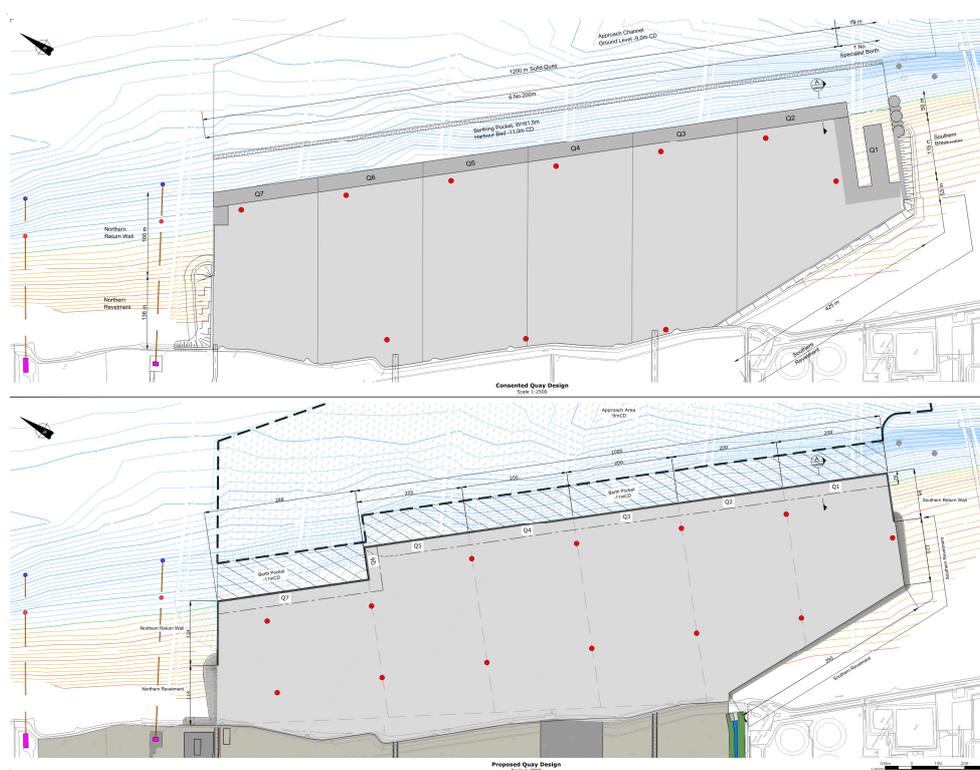
⁹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-002225-SoS%20Decision%20letter%20with%20annexes.pdf>

Table 4-1: Comparison of Habitat Losses

Habitat Type	Habitat Loss Arising from Consented Scheme Agreed with NE in 2012 ¹ (ha)	Habitat Loss with Material Change (ha) (Technical Appendix U10-3)
1130 Sub-tidal	13.5	10.4
1140 Mudflat	43.1	39
1310/1330 Saltmarsh	2	8.1

¹Refer to SoCG, Table 3.2 and paragraphs 3.5.1 -3.5.2¹⁰

Figure 4-2: Consented Quay Alignment and Proposed Changes



Changes to the NSIP: Work No.1 – the Reclamation

4.2.5 Certain details of the reclamation are prescribed in Schedule 8, paragraph 4 of the DCO (Technical Appendix U1-1). Specifically, paragraph 4(f) states that the estuary, ‘may be reclaimed using marine dredged sands and gravels by constructing two granular dams that extend from the existing flood defence wall to the area reclaimed..., so that the dams divide the remaining reclaim area into three

¹⁰<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>

obtained from North Lincolnshire Council under the Town and Country Planning Act. As it is intended to develop the remainder of the site concurrently with the quay, this opportunity for beneficial use as fill to the terrestrial areas of the AMEP site itself, is potentially lost and an alternative use or a disposal site is required. If, at the relevant time any material can be used within the AMEP site or elsewhere, such as within the reclamation site itself, then permission to deposit within the estuary would not prevent such an alternative for beneficial use being implemented in any event.

- 4.2.11 An estimate of marine construction vessel movements is set out in Chapter 14.11, paragraph 14.6.27 of the original ES. The change in the deposit location will increase the total number of vessel trips associated with disposal operations but will not introduce any additional vessels, so that the dredging programme will be prolonged with the same number of dredgers and disposal barges operating at any one time. This is further reported in Chapter 14 of this document.

Changes to Public Rights of Way

- 4.2.12 Schedule 5 of the DCO (Technical Appendix U1-1) authorises the diversion of two public footpaths; the diversion routes are shown on the approved Rights of Way Plans. A minor amendment is proposed to the diversion of Footpath 50 in the district of North Lincolnshire.
- 4.2.13 The change to the diversion is desirable in order to avoid the diversion crossing the Killingholme Branch railway where the railway is still technically operational, albeit that it is many years since any train has actually passed over the tracks at the authorised crossing point.
- 4.2.14 The authorised crossing point is shown on Rights of Way Plan Sheet No. 512 and is also shown in Figure 4-4 below together with the proposed alternative route. The proposed change is further shown on drawing AME-036-00004 included in Appendix U4-1.

Changes to the Construction Methodology

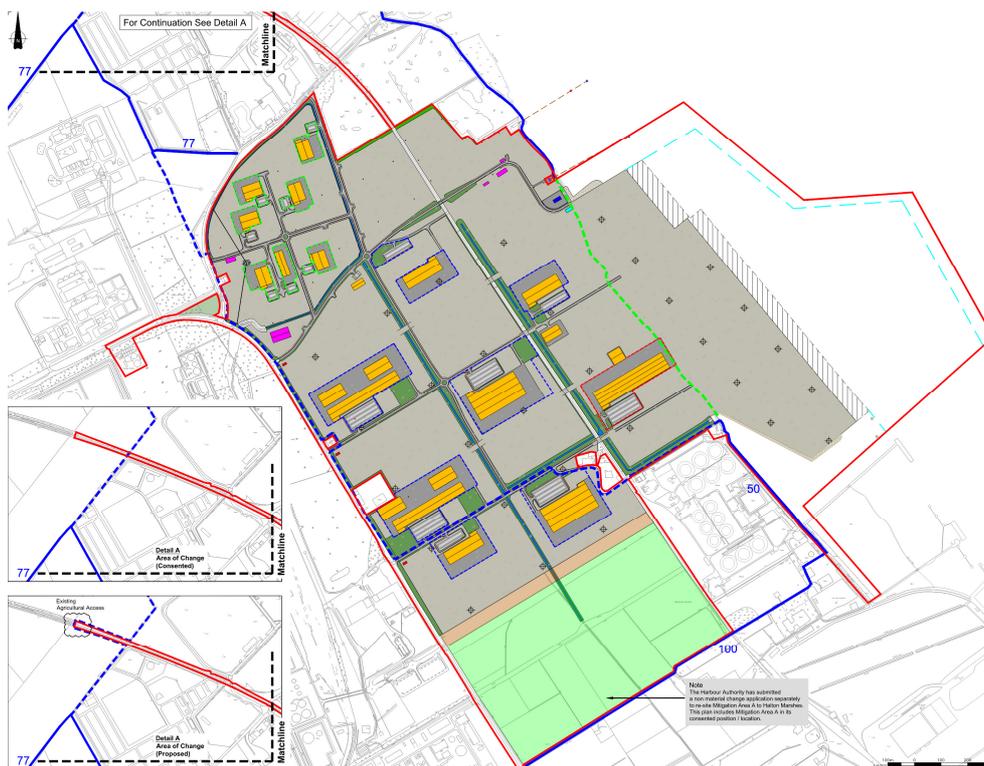
The Quay

- 4.2.15 In order to facilitate early handover of an operational section of quay, the works are now proposed to commence at the southern end of the quay and progress northwards. On this basis, the construction sequence shown on the DCO approved drawings AMEP_P1D_D_101 to 103 is proposed to be amended, and thereby superseded, by the alternative sequence shown on the draft application drawings AME-036-10009 to 10011 which are included in the consultation material.
- 4.2.16 The alternative options for anchoring of the quay wall and for the piled relieving slab, or for omitting the piled relieving slab altogether, will not give rise to any materially different construction operations to those described in paragraphs 4.4.4 *et seq* of the original ES and assessed in subsequent Chapters contained therein. Notwithstanding this, these revisions to the construction methodology / phasing have been considered within this PEIR where appropriate.

¹¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000319-14%20-%20Navigation.pdf>

¹²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000558-Rights%20of%20Way%20Plan%20Sheet%20No.%205%20of%2012.pdf>

Figure 4-4: Footpath 50 Consented Route (Main plan and top inset) and Proposed Change (Bottom Inset)



Operational Details

Vessels

- 4.2.17 As the specialist berth is to be omitted, the specialist vessel will no longer be required to berth at the facility. The new barge berth at the northern end will enable Ro-Ro vessels to berth and unload directly.
- 4.2.18 The spread of operational vessels set out in Chapter 14, Table 14.12 of the original ES¹³ will change as a consequence and the revised estimate of vessel movements associated with the operation of the AMEP Quay is shown in Table 4-2 below.

Table 4-2: AMEP Operational Phase Vessel Movements

Vessel Type	Annual Number of Trips	Annual Number of Movements
Installation Vessel	100	200
1,500 Tonne Support Vessel	100	200
6,000 – 10,000 Tonne Cargo Ship	50	100
TOTAL	250	500

¹³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000319-14%20-%20Navigation.pdf>

- 4.2.19 The overall change in annual number of trips and movements represent a very minor change from the original ES given the context of the existing number of shipping movements within the Humber Estuary, which is in the order of 25,000-30,000 per annum.

The Harbour Limits

- 4.2.20 The limits of the harbour are delineated by a boundary line defined by coordinates listed in Schedule 10 of the DCO (Technical Appendix U1-1). The change in the quay alignment necessitates a consequential change to the limits of the harbour and the proposed change is shown on drawing AME-036-00006, included in Appendix U4-1.

Withdrawn and Amended Plans and Drawings

- 4.2.21 A list of withdrawn and superseded plans and drawings (Table 1-4), along with a list of new, revised and retained plans and drawings (Table 1-5) are provided within Chapter 1 of this PEIR. The new, revised and retained drawings suitably reflect the various material amendment as outlined above. However, it should be noted that in the event that the extant application for the relocation of Mitigation Area A is approved, then a number of further substitute drawings would apply. Again, these substitute drawings are detailed within Chapter 1 (paragraph 1.3.4) of this PEIR.
- 4.2.22 The changes described above also give rise to minor changes to the Works Plans which are issued with the consultation material and to some definitions within the DCO which are addressed in the draft Amendment Order, also included in the consultation material.

4.3.0 Consideration of Alternatives

- 4.3.1 As detailed within Chapter 2: Environmental Assessment Process, the 2017 EIA Regulations (as amended) require, amongst other things, that the EIA provides a description of the main alternatives to any scheme that have been reasonably considered by the applicant.
- 4.3.2 Whilst the principal consideration of alternatives is contained within the original ES, the section below provides an update to the consideration of alternatives with respect to the proposed Material Change 2. Given the scope of the change, these considerations have been separated between 'terrestrial' and 'aquatic/quay' alternatives.

Terrestrial Alternatives

- 4.3.3 Alternatives that have been considered by the Applicant are fully reported in the original ES which supported the DCO. Given that the scheme benefits from an extant DCO, and elements have been implemented by way of local planning authority level consents, no further consideration of alternative sites has been considered as part of this PEIR.
- 4.3.4 Furthermore, with regard to alternate design solutions, those are examined within the original ES and represented by the DCO itself. Given that the material change is necessitated to resolve minor elements of the original scheme design which are no longer viable or necessary, there are no further design alternatives which have been considered by the applicant. Again, on this basis, it is not considered necessary to consider alternate design solutions further within this PEIR.

Aquatic / Quay Alternatives

- 4.3.5 With regard to the layout of the quay, the only real alternatives considered by the Applicant are examined within the original ES and represented by the DCO itself.
- 4.3.6 As outlined within Section 4.3.0 above, the proposed material change is desirable for the AMEP scheme to be implemented at pace and to resolve issues that have emerged subsequent to the DCO coming into force.
- 4.3.7 On this basis, the changes between the extant DCO and the material change are the only true alternatives considered as part of this PEIR.
- 4.3.8 Notwithstanding the above, were the material change not to be brought forward/consented, the extant DCO would remain implementable and constitute the 'fall back' position upon which Able would rely.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 5: SCOPING AND CONSULTATION

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
Version No: FINAL
April 2021



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CONTENTS

5.1.0 INTRODUCTION	5-1
5.2.0 EIA SCOPING	5-2
Scoping Request	5-2
Scoping Opinion	5-3
5.3.0 ADDITIONAL CONSULTATION	5-12
5.4.0 PEIR CONSULTATION & REPRESENTATIONS	5-14
Newspaper Advertisement.....	5-14
Notified Parties.....	5-14

DOCUMENT REFERENCES

APPENDICES

- Appendix U5-1: EIA Scoping Report prepared by Fairhurst – January 2021 (Report ref. 138434/504)
- Appendix U5-2: EIA Scoping Opinion (PINS Case Reference TR030006)
- Appendix U5-3: Newspaper Advert

5.1.0 Introduction

- 5.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) provides details of the Scoping exercise undertaken with the Planning Inspectorate (the Inspectorate) on behalf of the Secretary of State in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).
- 5.1.2 This chapter also provides a brief summary of other consultation which has been undertaken to date, whilst further information of such 'additional consultation' is provided within each of the technical chapters to which the consultation relates.
- 5.1.3 Finally, this chapter also details the necessary consultation process for the consideration of the material amendment to the Development Consent Order (DCO) to ensure compliance with the Regulations.

5.2.0 EIA Scoping

Scoping Request

- 5.2.1 In accordance with Regulation 10(2) and 10(4) of the EIA Regulations, a person who proposes to make a subsequent application may ask the relevant authority (the Secretary of State in this instance) to state in writing its opinion *“as to the scope, and level of detail of the further information to be provided in the updated environmental statement”*.
- 5.2.2 In this regard, an EIA Scoping Report was prepared by Fairhurst on behalf of Able Humber Ports Limited (‘the Applicant’) and submitted to the Planning Inspectorate (PINS) in January 2021 (report ref. 138434/504). The EIA Scoping Report was supported by a range of drawings describing the current baseline and the proposed material amendment.
- 5.2.3 The Scoping Report related to a *“...material change application for the proposed changes to the scheme consented under The Able Marine Energy Park Development Consent Order in 2014 (Statutory Instrument 2014 No. 2935), (‘the DCO’)*”. A more detailed description of the proposed material amendment is provided within Chapter 4 (Description of Changes to Development) of this PEIR.
- 5.2.4 The Scoping Report, which is provided with the Appendix U5-1, focused on the following areas, which are to be assessed as part of this PEIR and any subsequent Updated Environmental Statement (ES) (topics proposed to be ‘scoped in’):
- Geology, Hydrogeology and Ground Conditions;
 - Hydrodynamic and Sedimentary Regime;
 - Water and Sediment Quality;
 - Aquatic Ecology;
 - Terrestrial Ecology and Birds (Nature Conservation);
 - Commercial and Recreational Navigation;
 - Traffic and Transport (footpath diversion only);
 - Waste; and
 - Cumulative and In-Combination Effects.
- 5.2.5 The Scoping Report also identified that the following areas of the original ES for the DCO were considered unlikely to be affected by the proposed material amendment (topics proposed to be ‘scoped out’):
- Commercial Fisheries;
 - Drainage and Flood Risk;
 - Noise and Vibration;

- Air Quality;
- Historic Environment;
- Light;
- Landscape and Visual;
- Socio-Economic;
- Aviation; and
- Health.

5.2.6 With regard to topics introduced into the Regulations since the original ES was undertaken (the 2017 Regulations), the Scoping Report also sought to ‘scope out’ consideration of both ‘Climate Change’ and ‘Risks of Major Accidents and/or Disasters’ on the basis that they had been inherently considered as part of the original ES.

Scoping Opinion

5.2.7 A formal Scoping Opinion was adopted by PINS on behalf of the Secretary of State in March 2021 (PINS Case Reference TR030006). A copy of the Scoping Opinion, as adopted, is provided with Appendix U5-2.

5.2.8 It should be noted that a formatting error has occurred within the published Scoping Opinion, whereby the paragraph numbering has ‘reset’ after each sub-heading. On this basis, it is not easy to cross reference specific elements of the Scoping Opinion as necessary within this Chapter of the PEIR. Nevertheless, best effort to cross reference has been made herein.

5.2.9 It is identified within paragraph 1.2.1 (page 2) that *‘In accordance with Regulation 10(6) of the EIA Regulations the Inspectorate has consulted the consultation bodies before adopting a scoping opinion’*, whilst a copy of any associated response has been provided within the Scoping Opinion document (Appendix 2). These consultation comments, along with the content of the Scoping Opinion itself, have been duly considered in the undertaking of this PEIR (and will inform the forthcoming Updated ES).

5.2.10 The sections below provide a brief overview of the Scoping Opinion adopted by PINS with regard to each of the technical disciplines / topics identified above. More detailed commentary regarding the Scoping Opinion, including any assessment requirements and how these have been accommodated, is provided within the individual chapters of this PEIR (please see ‘Scoping’ section and associated table within each individual topic chapter).

5.2.11 Notwithstanding, it is duly noted that the Scoping Opinion identifies that *‘The Inspectorate will not be precluded from requiring additional information if it is considered necessary in connection with the updated ES submitted with the application for a Development Consent Order (DCO)’* (paragraph 1.1.8 – page 1). On this basis, the Applicant is aware that further detailed information and or assessments may be necessary following either this PEIR or the submission of any Updated ES.

General Approach

5.2.12 Paragraph 3.3.1 (page 10) of the Scoping Opinion outlines general recommendations by PINS in undertaking the EIA to assist in the decision-making process, namely:

- how the assessment has taken account of the Scoping Opinion;
- identify and collate the residual effects after mitigation for each of the aspect chapters, including the relevant interrelationships and cumulative effects;
- set out the proposed mitigation and/ or monitoring measures including cross-reference to the means of securing such measures;
- describe any remedial measures that are identified as being necessary following monitoring; and
- identify where details are contained in the Habitats Regulations Assessment (HRA report) (where relevant), such as descriptions of National Site Network Sites and their locations, together with any mitigation or compensation measures.

5.2.13 These matters have been duly incorporated into this PEIR and will be brought forward within any subsequent Updated ES.

5.2.14 The Scoping Opinion also details a range of general considerations with regard to:

- Consideration of Alternatives;
- Flexibility of the DCO;
- Establishing the Baseline Scenario;
- Forecasting Methods or Evidence;
- Residues and Emissions;
- Mitigation and Monitoring;
- Risks of Major Accidents and/or Disasters;
- Climate and Climate Change;
- Transboundary Effects; and
- A Reference List

5.2.15 Again, these matters have been duly incorporated into this PEIR and will be brought forward within any subsequent Updated ES. Further requirements of the Scoping Opinion with regard to the above are also outlined within the 'Other Matters' sub-section below.

Geology, Hydrogeology and Ground Conditions

5.2.16 The Scoping Opinion confirms that the proposed material change is unlikely to change the

characteristics of the impacts associated with terrestrial works. On this basis, the Inspectorate agrees that the assessment of effects for these matters presented in the original ES is unlikely to change and can be 'scoped out'.

5.2.17 The Scoping Opinion does, however, identify that the following elements should be clearly detailed within any forthcoming submission:

- Changes in legislation, policy and guidance;
- Further sampling data of dredged material to determine the levels of contaminants to inform the decision regarding sea disposal;
- Confirmation of material used for land raising operations;
- Agreement of piling works in consultation with the Marine Management Organisation and Environment Agency; and
- Consideration of alternatives for the beneficial re-use of materials obtained from the dredging activities.

5.2.18 These matters have been considered and suitably dealt with in Chapter 7 of this PEIR.

Hydrodynamic and Sedimentary Regime

5.2.19 The Scoping Opinion states that the Humber Estuary is a dynamic environment, with complex hydrodynamic processes, and as such small changes may result in substantial change to the impact characteristics. It further states that *'the applicant should make effort to agree the approach to wave modelling with relevant consultation bodies including the need for further wave modelling to account for proposed changes'* (paragraph 4.2.1 – page 17).

5.2.20 On this basis, the Scoping Opinion confirms that consideration of the Hydrodynamic and Sedimentary Regime should be 'scoped in' to any forthcoming Updated ES. In addition, the following additional comments are raised:

- Agreement of any suitable updated modelling techniques with relevant consultation bodies;
- Updating of the assessment on the basis of relevant information contained within UKCP18 guidance and agreement with the Environment Agency. Vulnerability to climate change should be explained;
- Use of updated baseline assessment for estuary morphology and, where appropriate, further sampling obtained to inform the assessment;
- Agreement regarding not assigning 'significance levels' but that the assessment should be utilised to inform 'likely significant effects' on sensitive receptors which are sensitive to process change (i.e. ecological habitats); and
- Characterisation of disposed material and its intended disposal location to inform a detailed assessment of the likely significant effects. This approach to the characterisation and assessment should be agreed in consultation with relevant bodies, including the Marine Management Organisation.

5.2.21 These matters have been considered and suitably dealt with in Chapter 8 of this PEIR, whilst the findings of Chapter 8 have also been utilised to inform the potential for significant effects within other chapters (i.e. aquatic and terrestrial ecology).

Water and Sediment Quality

5.2.22 The Scoping Opinion duly confirms that, given that new and significant effects are unlikely, the following matters can be 'scoped out' of the Updated ES:

- Site run-off and storm drainage (Construction Phase);
- Sewage and trade effluent, accidental spills or litter (Operational Phase); and
- Power plant intakes / thermal re-circulation (Operational Phase) subject to confirmation that Centrica outfall is no longer operational.

5.2.23 However, the Scoping Opinion identifies that the following matters should be 'scoped in' contrary to the submitted Scoping Report:

- Risks for indirect impacts on water quality (Construction Phase) given the potential for indirect impacts on designated sites and features.

5.2.24 The matters proposed to be 'scoped in', as well as the consideration of risks for indirect impacts on water quality (construction phase) have been considered and suitably dealt with in Chapter 9 of this PEIR.

Aquatic Ecology

5.2.25 The Scoping Opinion duly confirms that, given that new and significant effects are unlikely, the following matters can be 'scoped out' of the Updated ES:

- Impacts to aquatic ecological receptors resulting from construction run-off; and
- Operational impacts on aquatic ecology from vessels during operation.

5.2.26 The Scoping Opinion identifies that the following matters should be 'scoped in' contrary to the submitted Scoping Report:

- Disturbance to fish from construction activity noise and vibration due to dredging;
- Disturbance to fish from habitat loss and construction activity noise and vibration;
- Disturbance to marine mammals from construction activity noise and vibration;
- Disturbance to marine mammals from reduced prey availability;

5.2.27 The matters proposed to be 'scoped in' have been considered and suitably dealt with in Chapter 10 of this PEIR.

Terrestrial Ecology and Birds

5.2.28 The Scoping Opinion notes that the baseline position for terrestrial habitats and species may have

changed from the position in the original ES and as the updated terrestrial works include a footpath diversion. On this basis, the Scoping Opinion states that consideration of Terrestrial Habitat and Species should be 'scoped in' and the Updated ES should include information to support the findings of the original ES.

- 5.2.29 The Scoping Opinion identifies that noise and vibration impacts upon receptors of ecology and nature conservation interest should be 'scoped in' to the Updated ES. Specific reference is made with regard to the proximity of any alternate piling activities to such sensitive receptors.
- 5.2.30 The Scoping Opinion identifies that the ES should include an assessment of impacts to ornithological features resultant from these changes where significance effects are likely to occur.
- 5.2.31 With regard to Cherry Cobb Sands, the Inspectorate states that as the impact of the quay may be affected by natural changes, and it has the potential to affect habitats and bird distribution, the updated ES should assess whether the effects on designated site features, to assess whether they would introduce new or different significant effects. Given that there is no proposed change to the compensation provision the Scoping Opinion states that *"the updated assessment should therefore consider whether the original impacts of the proposed development to qualifying features are likely to change and confirm if the compensation proposed remains appropriate in these circumstances"* (paragraph 4.5.4 – page 28).
- 5.2.32 These matters have been considered and suitably dealt with in Chapter 11 of this PEIR and in Technical Appendix U11-2.

Commercial Fisheries

- 5.2.33 The Scoping Opinion suggests that the updated ES should include updated baseline information to show that there has been no material change in the importance of the location for commercial fisheries and if there has, the updated ES should assess any of the new significant effects.
- 5.2.34 This matter has been considered and suitably dealt with in Chapter 12 of this PEIR.

Drainage and Flood Risk

- 5.2.35 The Scoping Opinion agrees that the proposed changes are unlikely to alter the characteristics of the impacts of the disposal of surface and foul water and can therefore be 'scoped out' of the Updated ES.
- 5.2.36 However, the Scoping Opinion identifies that the risks of flooding from waves and overtopping should be 'scoped in' to the Updated ES. Furthermore, the assessment should utilise the higher 'Upper End' predictions for sea level rise and the Humber extreme water levels should be utilised to inform the assessment.
- 5.2.37 These matters have been considered and suitably dealt with in Chapter 13 of this PEIR.

Navigation

- 5.2.38 The Scoping Opinion agrees with the content of the Scoping Report and that all matters associated with Navigation should be 'scoped in' to the Updated ES.
- 5.2.39 Notwithstanding, the Scoping Opinion identifies that the assessment methodology for Commercial

and Recreational Navigation should be updated in line with guidance from the Maritime and Coastguard Agency (MCA).

5.2.40 These matters have been considered and suitably dealt with in Chapter 14 of this PEIR.

Traffic and Transport Assessment

5.2.41 The Scoping Opinion agrees that these matters do not need to be assessed in the updated ES since new or different significant effects are unlikely to occur. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 15 of this PEIR has included consideration of Traffic and Transport to inform the consultation process.

Noise and Vibration

5.2.42 The Scoping Opinion agrees that the proposed changes are unlikely to impact road traffic noise impacts during operation and thus, the Inspectorate is content these matters be 'scoped out' of the Updated ES.

5.2.43 As outlined above, the Scoping Opinion identifies that noise and vibration impacts upon receptors of ecology and nature conservation interest should be 'scoped in' to the Updated ES. Specific reference is made with regard to the proximity of any alternate piling activities to sensitive terrestrial and marine receptors.

5.2.44 These matters have been considered and suitably dealt with in Chapter 16 of this PEIR, whilst noise and vibration impact upon sensitive receptors of ecology and nature conservation interest are also considered within Chapters 10 (Aquatic Ecology) and 11 (Ecology and Nature Conservation).

Air Quality

5.2.45 The Scoping Opinion does not agree that an updated air quality assessment can be scoped out from the updated ES. As such, any significant effects on air quality associated with the increase of vessel movements should be assessed and 'scoped in' to the Updated ES.

5.2.46 These matters have been considered and suitably dealt with in Chapter 17 of this PEIR.

Historic Environment

5.2.47 The Scoping Opinion does not agree that impacts to the historic environment can be scoped out of the Updated ES. The Scoping Opinion identifies that an updated assessment should be undertaken to assess the impacts of the altered quay alignment upon such heritage receptors. Furthermore, the assessment should be informed by the updated assessment of the impacts to the hydrodynamic and sedimentary regime.

5.2.48 These matters have been considered and suitably dealt with in Chapter 18 of this PEIR.

Light

5.2.49 The Inspectorate is content that this aspect can be 'scoped out' of the Updated ES. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 19 of this PEIR has included consideration of Light to inform the consultation process.

Landscape and Visual

- 5.2.50 The Inspectorate agrees that the proposed changes are unlikely to alter the characteristics of these impacts and as such, this aspect can be scoped out of the updated assessment. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 20 of this PEIR has included consideration of Landscape and Visual to inform the consultation process.

Socio-Economic

- 5.2.51 The Inspectorate is content that this aspect can be scoped out of the updated assessment. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 21 of this PEIR has included consideration of Socio-Economic to inform the consultation process.

Aviation

- 5.2.52 The Inspectorate is content that this aspect can be scoped out of the updated assessment. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 22 of this PEIR has included consideration of Aviation to inform the consultation process.

Waste

- 5.2.53 The Scoping Opinion identifies that no matters were proposed to be scoped out of the assessment within the Scoping Report.
- 5.2.54 The Scoping Opinion does identify that the Updated ES should also include consideration of clay arisings and the reasons for the chosen options for disposal.

Health

- 5.2.55 The Inspectorate is content that this aspect can be scoped out of the updated assessment. Notwithstanding, whilst to be 'scoped out' of the Updated ES, Chapter 24 of this PEIR has included consideration of Health to inform the consultation process.

Other Matters

- 5.2.56 The following other matters of note are raised within the Scoping Opinion issued by PINS and have been duly considered in the preparation of this PEIR.

Alternatives

- 5.2.57 Paragraph 2.3.2 (page 7) of the Scoping Opinion identifies that *'The Inspectorate would expect to see a discrete section in the updated ES that provides details of the reasonable alternatives studied in relation to the Proposed Development and the reasons for selecting the chosen option(s), including comparison of the environmental effects'*.
- 5.2.58 A suitable consideration of Alternatives has been provided within Chapter 4: Description of Changes to Development. It should be highlighted that the Regulations requires that the EIA provides a description of the main alternatives to any scheme that have been reasonably considered by the applicant.
- 5.2.59 On this basis, it is not necessary to detail hypothetical alternatives which have not been considered

through the development design process. Indeed, given that the scheme is already subject to an extant DCO, this severely limits potential alternatives and also negates the consideration of a 'no development' scenario.

Flexibility

5.2.60 Paragraphs 2.3.1 to 2.3.3 (page 7) draws attention to the Inspectorate's Advice Note Nine 'Using the Rochdale Envelope' in terms of the recommended approach to incorporating flexibility into a draft DCO.

5.2.61 Paragraph 2.3.2 (page 7) stipulates that *'The Applicant should make every attempt to narrow the range of options and explain clearly in the updated ES which elements of the Proposed Development have yet to be finalised and provide reasons... The description of the Proposed Development in the updated ES must not be so wide that it is insufficiently certain to comply with the requirements of Regulation 14 of the EIA Regulations'*.

5.2.62 The requirements for flexibility have been considered and are limited as much as feasibly possible within the material amendment proposed. Indeed, the Chapters of this PEIR have duly detailed where flexibility is required when considering the material amendment to the extant DCO.

Cumulative and In-Combination Effects

5.2.63 The Scoping Opinion states that the South Humber Bank Energy Centre, which is stated in the Scoping Report as too remote to be assessed, has the potential for wider effects through the hydrological regime. Therefore, the updated assessment should include an assessment of likely cumulative effects with the South Humber Bank Energy Centre.

5.2.64 The Scoping Opinion also suggests that:

- The Centrica outfall should be included within the list of receptors being assessed for cumulative impacts, unless confirmation can be provided that it is no longer of relevance;
- Cumulative effects with major development proposed in the middle estuary should be assessed in the update assessment as per the comments received from Hull City Council; and
- The Outstrays to Skeffling Managed Realignment Scheme, as well as any other planning consents identified by Hull City Council, should be considered with regard to the suitability of the compensation site at Cherry Cobb Sands.

5.2.65 With regard to In-Combination Effects, it is noted that the Environment Agency has highlighted the need for the Water Framework Directive assessment to include other activities which impact the same receptor. However, the Inspectorate has confirmed this should be included within the EIA process and contained within the Updated ES.

Risk of Major Accidents and/or Disasters

5.2.66 The Scoping Opinion identifies that the five major accident hazard sites and one major hazard pipeline within the application boundary identified by the Health and Safety Executive should also be included in the updated risk assessment.

Climate and Climate Change

- 5.2.67 The Scoping Opinion considers the effects of climate change to have been appropriately considered in the original ES, and that the proposed change will not impact the finds of the original assessments.
- 5.2.68 Due to the fact that the assessment of carbon footprint in Appendix 13.1 of the original ES considers vessel type, and vessel utilisation in its final conclusions and the proposed changes to the quay design would allow for different vessel and loading/unloading practices, it is predicted that there would be a 10% increase in annual vessel movements. As such, the Inspectorate suggests that the impacts from changes in vessel type and utilisation should be updates where they are likely to result in any new or different significant effects.

Transboundary Effects

- 5.2.69 The Scoping Opinion identifies that the Updated ES should identify whether the Proposed Development has the potential for significant transboundary impacts and, if so, what these are and which EAA states would be affected (Paragraph 3.3.2 – Page 12).

5.3.0 Additional Consultation

5.3.1 In addition to the Scoping exercise outlined within Section 5.2.0 above, a range of additional consultation has been undertaken with statutory consultees and determining authorities where appropriate. These additional consultations have been undertaken on an ad-hoc basis by the teams responsible for preparing the various technical assessments and chapters of this PEIR.

5.3.2 Rather than provide exhaustive detail of such ad-hoc consultations within this Chapter of the PEIR, each individual technical chapter has provided details of any additional consultation undertaken and included pertinent correspondence within a supporting Technical Appendix. Nevertheless, for the purposes of this chapter, a brief summary of the consultation undertaken is provided below.

- **Geology, Hydrogeology and Ground Conditions** – no additional consultation undertaken at this stage;
- **Hydrodynamics and Sedimentary Regime** – no additional consultation undertaken at this stage;
- **Water and Sediment Quality** – no additional consultation undertaken at this stage;
- **Aquatic Ecology** – consultation has been undertaken with the Marine Management Organisation, Environment Agency and Natural England on 25th March 2021;
- **Ecology and Nature Conservation** – no additional consultation undertaken at this stage;
- **Commercial Fisheries** – consultation has been undertaken with the Environment Agency;
- **Flood Risk and Drainage** – a virtual consultation meeting with officers from the Environment Agency was undertaken on the 25th March 2021;
- **Commercial and Recreational Navigation** – preliminary consultation was undertaken with stakeholders with regards to commercial and recreational navigation with the ABP Humber;
- **Traffic and Transport** – consultation with North Lincolnshire Council regarding major highways works and effect of material amendment on network;
- **Noise and Vibration** – no additional consultation undertaken at this stage;
- **Air Quality** – additional consultation with the NLC Environmental Protection Team undertaken but no response received to date;
- **Marine Archaeology** – no additional consultation undertaken at this stage;
- **Light** – no additional consultation undertaken at this stage;
- **Landscape and Visual** – no additional consultation undertaken at this stage;
- **Socio-Economic** – additional consultation was undertaken between the developer, AMEP and Network Rail in August 2020;
- **Aviation** – no additional consultation undertaken at this stage;

- **Waste** – no additional consultation undertaken at this stage; and
- **Health** – no additional consultation undertaken at this stage;

5.3.3 On this basis, please refer to the individual Chapters of this PEIR for detailed information of the additional consultation undertaken to date. Any further additional consultation undertaken subsequent to the publication of this PEIR will be clearly detailed within any subsequent Updated ES.

5.4.0 PEIR Consultation & Representations

- 5.4.1 In accordance with the Planning Act 2008 and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, this PEIR will be utilised to undertake the necessary consultation in advance of any Updated ES being submitted as part of the Material Amendment Application.

Newspaper Advertisement

- 5.4.2 Regulation 14 of the Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011 (SI 2011/2055) ('the 2011 Regulations') necessitates that the intention to submit an Updated ES and a Material Amendment Application for the DCO must be publicised.
- 5.4.3 The intention to submit the Material Amendment Application has been advertised in the local press in advance of the pre-submission consultation process commencing. A newspaper advert was published on 8th April 2021 within both the Grimsby Telegraph and Scunthorpe Telegraph publications. A copy of this newspaper advert is provided within Appendix U5-3.

Notified Parties

- 5.4.4 In accordance with Regulation 10 of the Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011 (SI 2011/2055) ('the 2011 Regulations'), the applicant must consult specified persons and authorities about the Material Amendment Application.
- 5.4.5 Regulation 19 of the 2011 Regulations requires Able UK Limited to give notice of a material change application to specified persons and authorities and under Regulations 10(2) and 19(3), the Secretary of State may give consent for specified parties not to be consulted and/or notified.
- 5.4.6 The Secretary of State has given written consent under regulations 10(2) and 19(3) of the 2011 Regulations to reduce the list of parties required to be consulted and notified of the application. The Secretary of State also gave a recommendation on who else should be added to the list of parties to be consulted.
- 5.4.7 A list of consultation bodies, groups and persons which must be notified (in writing) that this PEIR is available to view has been agreed with the Secretary of State for Transport. A copy of the relevant correspondence is provided within Appendix U1-4.
- 5.4.8 Able Humber Ports has written to each of these parties to notify them of the intention to submit a Material Amendment Application and to provide details of this consultation, including details of the PEIR. A website has also been created to allow this PEIR, associated information and drawings for the material amendment consultation to be freely available; the website address is as follows: <https://www.ableuk.com/sites/port-sites/humber-port/amep/>, the documents can be found under the tab "Documents".

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 6: DESCRIPTION OF COMMITTED DEVELOPMENTS

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

6.1.0 INTRODUCTION	6-1
6.2.0 COMMITTED DEVELOPMENTS	6-2
6.3.0 DESCRIPTION OF COMMITTED DEVELOPMENTS	6-4
Able Logistics Park.....	6-4
North Killingholme Generating Station	6-4
Hornsea Offshore Wind Farm (Zone 4) Project 2.....	6-4
Yorkshire Energy Park.....	6-4
6.4.0 PROJECTS EXCLUDED FROM CUMULATIVE ASSESSMENT / IN- COMBINATION EFFECTS	6-5

DOCUMENT REFERENCES

TABLES

Table 6-1: Committed Developments	6-2
Table 6-2: Projects Excluded from Cumulative Assessment and In-Combination Effects	6-5

APPENDICES

Appendix U6-1: Committed Developments Location Plan	
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6.1.0 Introduction

- 6.1.1 In accordance with the 2017 EIA Regulations (as amended), the EIA will include an assessment of any direct and indirect cumulative effects arising from the development when considered alongside any other developments in the area surrounding the site. The objective is to identify any combined effects from the development of effects from several developments; and if, whilst individually the effects may be insignificant, could, when considered together, cause a further significant or indirect impact requiring mitigation.
- 6.1.2 To understand the likely significant cumulative effects and to confirm the scope of the Environmental Statement, AHPL has undertaken formal Scoping with the Planning Inspectorate. This provided appropriate evidence for excluding some developments from the cumulative assessment on the basis that, as a committed project, AMEP was already considered as a cumulative development within Environmental Statements for other developments which concluded that there were no likely significant cumulative effects. Furthermore, as the changes sought through this Material Change application are limited to changes in the quay design and consequential amendments (with no changes to any terrestrial components of the scheme), the likelihood of cumulative impacts which have not been previously assessed is very limited. Details of the schemes excluded from this cumulative assessment are detailed in Table 6.2.
- 6.1.3 Implementation of terrestrial works within the DCO site itself which have already been undertaken (as detailed in Chapter 1) are also excluded from the cumulative assessment on the basis that they were consented as part of the DCO and the Material Change application does not propose any changes to terrestrial elements of the scheme.
- 6.1.4 In relation to other development, best practice dictates that cumulative assessments of this nature should have regard to those schemes which are 'reasonably foreseeable' (i.e., usually those under construction or with planning permission). The assessment is only capable of being carried out based on the information available at the time of assessment.
- 6.1.5 This Chapter provides a factual account of the surrounding developments in the local area that will form part of the wider cumulative assessment reported in Chapter 26. Reference should also be made to Table 1-3 of the PEIR which provides details of schemes which were scoped out of the cumulative assessment via the Scoping Report.

6.2.0 Committed Developments

6.2.1 Supplementary Report EX 44.1 ‘Cumulative and In-Combination Effects’¹ was submitted as part of the original Environmental Statement (ES) for the DCO (‘the original ES’). EX44.2 ‘Addendum to EX44.1’², was also subsequently issued and also forms part of the original ES; this updated the cumulative and in combination assessment in relation to aquatic ecology.

6.2.2 EX44.1 and EX44.2 detailed the plans and projects which, in-combination with the proposed development, could have given rise to likely significant effects. EX44.1 was prepared in June 2012 and EX44.2 was issued in October 2012, whilst the DCO came into force on 29 October 2014. As a result, many of the plans and projects detailed in the Supplementary Reports have either lapsed or are now operational. If operational, then such developments are included in the up-to-date baseline of 2021. Therefore, this Chapter focusses on the projects which are approved but not yet built or are otherwise reasonably foreseeable as of 2021. The list of such projects is set out in Table 6-1 below and their location is detailed in Appendix U6-1.

Table 6-1: Committed Developments

Application Allocation Ref. /	Site Address	Summary / Description of Development	Distance to AMEP DCO
Able Logistics Park – PA/2015/1264 – North Lincolnshire Council	Land off Skitter Road, East Halton	Erect buildings and use land for purposes within Use Classes A3, C1, B1, B2 and B8 for port-related storage and associated service facilities together with amenity landscaping and habitat creation, including flood defences, new railway siding, estate roads, sewage and drainage facilities, floodlighting, waste processing facility, hydrogen pipeline spur and two 20 metre telecommunication masts.	~1.5km
North Killingholme Generating Station (DCO Application)	South bank of the Humber Estuary near North Killingholme, North Lincolnshire.	The development is Thermal generating station that would operate either as a Combined Cycle Gas Turbine (CCGT) plant or as an Integrated Gasification Combined Cycle (IGCC) plant, with a total electrical output of up to 470MWe in North Killingholme, Lincolnshire.	~500m
Hornsea Offshore Wind Farm (Zone 4) Project 2 (DCO Application)	The windfarm itself is 89km east of East Riding of Yorkshire coast. However, cables arrive onshore approximately	Up to 360 wind turbine generators and associated infrastructure, such as electrical export cables and substations, up to the point of connection with the National Grid	The windfarm itself is 89km east of East Riding of Yorkshire coast. However, cables arrive onshore approximately

¹https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001612-OS-003_TR030001_Able%20UK%20Ltd_Supplementary%20Environmental%20Information_File%20%20of%202.zip

²https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

Application Allocation Ref. /	Site Address	Summary / Description of Development	Distance to AMEP DCO
	30km from AMEP DCO and eventually arrive at a National Grid substation approximately 400m from the AMEP DCO site.	network via the Killingholme Substation, an existing 400 kilovolt (kV) substation located in the Humber region.	30km from AMEP DCO and eventually arrive at a National Grid substation approximately 400m from the AMEP DCO site.
Yorkshire Energy Park (17/01673/STOUTE – East Riding of Yorkshire Council)	Land North West Of Kingstown Hotel Hull Road Hedon East Riding Of Yorkshire	Outline planning application for a mixed use comprising a business park (B1a, B1b, B1c, B2, B8) and an education, training and research campus (incorporating outdoor building materials testing facility) and associated residential accommodation (B1a, B1b, D1 and Sui Generis); on-site energy infrastructure (providing energy to on-site users) (Sui Generis), offsite energy infrastructure (generating energy to export into the grid) (Sui Generis), with generation from on-site energy infrastructure and off-site energy infrastructure totalling less than 50MW), and a primary substation (Sui Generis); data centre (600 racks) and associated disaster recovery suite (B1a and Sui Generis); relocated sports facilities (D2); landscaping and open space.	7.8km

6.3.0 Description of Committed Developments

Able Logistics Park

- 6.3.1 Erect buildings and use land for purposes within Use Classes A3, C1, B1, B2 and B8 for port-related storage and associated service facilities together with amenity landscaping and habitat creation, including flood defences, new railway siding, estate roads, sewage and drainage facilities, floodlighting, waste processing facility, hydrogen pipeline spur and two 20 metre telecommunication masts. Planning permission was granted by North Lincolnshire Council in February 2016 and the permission has been implemented by the creation of a wetland mitigation site and the construction of the site access.

North Killingholme Generating Station

- 6.3.2 The development is an electricity generating station that would operate either as a Combined Cycle Gas Turbine (CCGT) plant or as an Integrated Gasification Combined Cycle (IGCC) plant, with a total electrical output of up to 470MWe in North Killingholme, Lincolnshire. It was granted a Development Consent Order in October 2014 and that is due to lapse in October 2021. The developer is currently seeking a non-material change to extend the implementation period until October 2026.

Hornsea Offshore Wind Farm (Zone 4) Project 2

- 6.3.3 This project involves the construction of up to 360 wind turbine generators and associated infrastructure such as electrical export cables and substations, up to the point of connection with the National Grid Network via the Killingholme Substation, an existing 400 kilovolt (kV) substation located in the Humber Region. The Project was granted a Development Consent Order in September 2016 and this includes for routing an onshore cable from Horseshoe Point to North Killingholme 900m from the AMEP boundary. The Converter station has already been constructed.

Yorkshire Energy Park

- 6.3.4 Outline planning application for development of the site for mixed use comprising a business park (B1a, B1b, B1c, B2, B8) and an education, training and research campus (incorporating outdoor building materials testing facility) and associated residential accommodation (B1a, B1b, D1 and Sui Generis); on-site energy infrastructure (providing energy to on-site users) (Sui Generis), offsite energy infrastructure (generating energy to export into the grid) (Sui Generis), with generation from on-site energy infrastructure and off-site energy infrastructure totalling less than 50MW), and a primary substation (Sui Generis); data centre (600 racks) and associated disaster recovery suite (B1a and Sui Generis); relocated sports facilities (D2); landscaping and open space.

6.4.0 Projects Excluded from Cumulative Assessment / In-Combination Effects

6.4.1 As detailed in Paragraph 6.1.2 above, this Chapter focusses on the potential for cumulative impacts associated with the Material Change application. This is because any other cumulative impacts associated with the terrestrial components of the development have already been assessed; have been found to be acceptable; and can be undertaken without the need for any further development consent. Nevertheless, in order to demonstrate due consideration for potential in-combination effects, other projects and their reason for exclusion from the cumulative and in-combination assessment are described below and their location is detailed in Appendix U6-1.

Table 6-2: Projects Excluded from Cumulative Assessment and In-Combination Effects

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
Paull LDO – Application Ref: 12/04951/LDOC East Riding of Yorkshire Council	Land West of Paull Road Paull East Riding Of Yorkshire	Local Development Order granting outline planning permission for the erection of buildings and/or the use of land for Class B2 (General Industrial) Uses of the Town and Country Planning (Use Classes) Order 1987 (and its subsequent amendments), specifically uses associated with port related renewable and low carbon industries on 80 hectares of agricultural land between Saltend and Paull (Local Development Order is accompanied by an Environmental Impact Assessment)	This planning permission has now expired.
Hornsea Offshore Wind Farm (Zone 4) Project One	Approximately 40km offshore from Humberside.	The DCO for Project One authorises the construction and operation of up to 332 wind turbines, up to two offshore accommodation platforms, up to five offshore HVAC collector substations, up to two offshore HVDC converter stations, an offshore HVAC reactive compensation substation, subsea inter-array electrical circuits, a marine connection to the shore approximately 150 km in length, a foreshore connection and from the proposed landfall point at Horseshoe Point, onshore cables which will connect the offshore wind	Construction completed. Therefore, this development forms part of the current baseline.

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
		farms to the onshore electrical transmission station and the connection from there to National Grid's existing substation at North Killingholme, a distance of approximately 40 km.	
Port of Hull Local development Order (17/00173/LDO – Hull City Council)	Port of Hull, Hedon Road.	LDO granting outline planning permission for the erection of buildings and/or the use of land for Class B2 use, specifically uses associated with renewable and low carbon industries, on land at Alexandra Dock and Queen Elizabeth Dock. Permission covers access and uses falling both: 1. within B2 (General Industrial uses) of the Town and Country Planning (Use Classes) Order 1987 (and its subsequent amendments), (excluding incineration purposes, heat treatment of waste, energy generation, chemical treatment or landfill or hazardous waste), and including office, research and development, light industry, and storage uses ancillary to the main industrial use (see Definitions below); and 2. being uses associated with renewable and low carbon industries.	No cumulative impacts predicted due to distance between developments and absence of marine based works in this development.
Green Port Hull Development of land at Alexandra Dock for manufacture etc of Wind Turbine Component (11/01177/OUT)	Port of Hull, Hedon Road.	TBC once website is active again.	This planning permission has now lapsed.
Hedon Haven Local Development Order (18/04071/STPLFE – East Riding of Yorkshire Council)	Land South West Of Hedon Bypass Hedon East Riding Of Yorkshire HU12 8AA	Hybrid planning application for the development of land at Hedon Haven comprising: 1. An application for full planning permission for the construction of a new estate road between Hull Road (A1033) and Paull Road, together with associated	No likely cumulative effects predicted. AMEP was excluded from the cumulative assessment which accompanied this planning application.

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
		infrastructure and works; and2. An application for outline planning permission for the construction of up to 394,839sqm of employment floorspace (Class B2 (Industrial) / Class B8 (Storage & Distribution)), including ancillary office (Class B1) floorspace, and up to 5,111sqm of flexible commercial floorspace, to include Classes A1-5 (Retail), B1 (Business), C1 (Hotel), D1 (Non-Residential Institutions), D2 (Assembly and Leisure) and other ancillary sui generis uses, and associated landscaping and infrastructure	
Grimsby Gas Engines - replacement of power generators (DM/0104/16/FUL – North East Lincolnshire Council)	Grimsby Gas Engines Moody Lane Grimsby North East Lincolnshire DN31 2SY	Replacement of existing obsolete power generation equipment with new, containerised, gas-engine generators, to act as a reserve generation site. The site will comprise up to 14 containerised generators, with a combined electrical export capacity of 20MW - the same as the existing plant. The new plant will utilise the existing electrical grid connection infrastructure and gas supply.	Due to the relatively small nature of the proposed development, no cumulative effects are predicted.
River Humber Replacement Gas Pipeline Project (DCO Application)	Approximately 2 miles north east of Goxhill, North Lincolnshire, terminating approximately 1 mile south east of Paull, East Riding of Yorkshire	The replacement of a 42 natural gas transmission pipeline, housed within a tunnel beneath the Humber Estuary	This development is now complete.
Welwick to Skeffling Managed Realignment Scheme (19/00786/SPTLFE – East Riding of Yorkshire Council)	Land West And South West Of Long Lane Skeffling East Riding Of Yorkshire HU12 0UX	Managed realignment at Welwick to Skeffling comprising new earth embankments habitat creation and mitigation area with associated works including new car park, viewing platforms or bird hides, fencing, footpath and footbridge improvement, gravity fall drain and ramp over	No cumulative impact predicted. AMEP excluded from cumulative assessment which accompanied this planning application.

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
		new flood embankment to enable machinery access	
Outstrays Managed Realignment Scheme (19/00783/SPTLFE – East Riding of Yorkshire Council)	Land South West Of Welwick Bank Bridge Humber Side Lane Welwick East Riding Of Yorkshire HU12 0QT	Outstrays Managed Realignment Scheme comprising new earth embankments, habitat creation and mitigation area with associated works including pilling, new viewing platforms or bird hides, reinstatement of bird hide at Haverfield Quarry, creation of new passive access from Outstrays Farm to western end of West 1, creation of public access route around the edge of West 2, improvement of other footpaths and bridges, access ramps, provision of fencing, french drain and vegetation clearance including woodland at western end of West 1	No cumulative impact predicted. AMEP excluded from cumulative assessment which accompanied this planning application.
Humber Hull Frontages (18/01058/FULL – Hull City Council)	Land Adjacent To Humber Estuary, Including St Andrews Quay, St Andrews Dock, William Wright Dock, Albert Dock, Island Wharf, Humber Dock Basin, Victoria Pier, Victoria Dock Village And West	Hybrid Application (part outline, part full) for the construction of a Flood Defence scheme including associated structures, access, landscaping and construction works.	Work due to be complete in March 2021. Therefore, any impact of this scheme would be included in the baseline.
Winteringham Ings to South Ferriby Flood Alleviation Scheme (PA/2018/2324 – North Lincolnshire Council)	Land in the vicinity of Ferriby Sluice, Sluice Road, South Ferriby (also within Winteringham and Winterton Parishes)	Planning permission for the construction of a Flood Alleviation Scheme between the CEMEX Plant and South Ferriby (approximate length of 3km); permanent works comprise new embankments, raising and increasing the footprint of an existing flood embankment, raising and replacing existing flood defence walls, new flood defence walls and installation of fixings for demountable flood defences; temporary works include soil stockpiling, site compounds, access points from the A1077 and footpath	No cumulative impact predicted. AMEP excluded from cumulative assessment which accompanied this planning application.

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
		diversions	
South Humber Bank Energy Centre (DM/1070/18/FUL – North East Lincolnshire Council) South Humber Bank Energy Centre (DCO Application)	Land Rear Of Power Station Hobson Way Stallingborough North East Lincolnshire	Construction of an energy from waste facility of up to 49.9MWe gross capacity including emissions stack(s), associated infrastructure including parking areas, hard and soft landscaping, the creation of a new access to South Marsh Road, weighbridge facility, and drainage infrastructure The construction and operation of an energy from waste plant of up to 95 megawatts gross capacity and associated development including an electrical connection, landscaping and access.	No cumulative impact predicted. AMEP excluded from cumulative assessment which accompanied this planning application and DCO submission.
Queens Road Estate, Immingham – DM/1027/13/OUT – North East Lincolnshire Council.	Queens Road Estate, Immingham	Proposed Outline development of site E1/3 in the NELC local plan for general industry (B2) storage and distribution (B8) and minor office development, research and development, light industry (B1) with associated access & landscaping.	The ES which accompanied this planning application considered that the only likely cumulative impact with AMEP was associated with vehicular movements. Such impacts were found to be acceptable. As the Material Change application does not alter vehicular movements, it is not proposed to undertake a cumulative assessment with this application.
Centrica Outfall	Area bounded by co-ordinates (53°39.670'N, 00°13.696'W), (53°39.713'N, 00°13.570'W), (53°39.666'N, 00°13.523'W) and (53°39.623'N, 00°13.647'W)	Power plant intakes/thermal re-circulation. (Operation Phase)	Please see Appendix A which confirms that the Centrica Killingholme Power Station permit, ref SP3133LY, was subject to the closure and decommissioning requirement outline below. A site closure plan was submitted to the Environment Agency and the Permit surrendered on 18 September 2017. As there is no longer any valid permit for the operation of this intake/outfall we are in agreement that there is no need to undertake any modelling with respect to this and it can be scoped out of your assessment.

Application / Allocation Ref.	Site Address	Summary / Description of Development	Reason for exclusion from in-combination assessment
Allocations in North East Lincolnshire Local Plan (2018), North Lincolnshire Local Plan (2003), East Riding of Yorkshire Local Plan (April 2016), and Hull City Council Local Plan (2017)	Administrative areas of North East Lincolnshire, North Lincolnshire, East Riding of Yorkshire, and Hull City Council	Local Plan development allocations	A review of development allocations within the respective Local Plans has been undertaken with no development allocations identified as having a likely cumulative impact with the proposed development.
Hull Flood Risk Management Strategy (March 2008) (copy provided by Environment Agency on 1 April 2021)	Humber Estuary	Environment Agency Plans for future Habitat Creation	It was confirmed by the Environment Agency that the only project with planning permission is the Skefling Realignment Scheme referenced above. Whilst there are other projects envisaged to be developed 2030 onwards there is insufficient information on these schemes to undertake any meaningful in-combination or cumulative assessment.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 7: GEOLOGY, HYDROGEOLOGY AND GROUND CONDITIONS

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

7.1.0 INTRODUCTION	7-1
Development Consent Order Context	7-1
Consideration of Material Amendment	7-1
Purpose and Structure of Chapter	7-1
7.2.0 METHODOLOGY	7-3
Changes in Legislation, Guidance and Planning Policy	7-3
Scoping Opinion	7-5
Additional Consultation	7-5
Assessment Methodology	7-6
Effects Not Requiring Further Assessment	7-6
7.3.0 CHANGES IN BASELINE CONDITIONS	7-7
DCO Baseline	7-7
DCO Future Baseline	7-7
Current Baseline	7-7
Changes in Baseline	7-7
7.4.0 ASSESSMENT OF EFFECTS	7-9
Additional Construction Phase Effects	7-9
Additional Operational Phase Effects	7-9
Additional Cumulative Effects	7-9
Consideration of DCO	7-9
7.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	7-10
DCO Mitigation	7-10
Alternate or Additional Mitigation	7-10
7.6.0 RESIDUAL EFFECTS	7-11
Construction Phase	7-11
Operational Phase	7-11
Consideration of DCO	7-11
7.7.0 OTHER ENVIRONMENTAL ISSUES	7-12
Other Environmental Issues of Relevance	7-12

7.8.0 SUMMARY OF EFFECTS	7-13
7.9.0 CONCLUSIONS.....	7-14

DOCUMENT REFERENCES

TABLES

Table 7-1: Scoping Opinion.....	7-5
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APPENDICES

- Appendix U7-1: Environmental Permit EPR/FB3104MM and Variation Notice (V003)
- Appendix U7-2: Sediment Testing Data and Action Level Comparison 2011, 2017 and 2021

7.1.0 Introduction

Development Consent Order Context

- 7.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 7.1.2 The associated development for the above proposals includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 7.1.3 Chapter 7 of the Environmental Statement (ES)¹ prepared in support of the DCO ('the original ES') discussed the geology, ground conditions, potential for contaminated land and hydrogeology at the AMEP site and details the approach to assessing the impacts of AMEP. The chapter also considered risks to groundwater as a result of the works and the subsequent operation of the site.
- 7.1.4 The chapter also addressed the specific environmental impacts related to dredging through a review the site investigation information available within the Humber Estuary and the soil types likely to be dredged. The proposed dredge methodology was described, and potential disposal sites were identified.

Consideration of Material Amendment

- 7.1.5 There are no changes to the approved terrestrial works which would affect the geology, hydrogeology (groundwater), ground conditions or gas assessments presented in the original ES. The original ES did include an assessment of sediments in the marine environment and whilst the area to be dredged is slightly altered by the proposed changes, it is within the footprint of the originally proposed quay layout and therefore within the area that has previously been characterised by sampling and analysis. Sampling of marine sediment has also been undertaken twice since the DCO came into force, once in 2017 and again in 2020.

Purpose and Structure of Chapter

- 7.1.6 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed material amendment on the planning policy and context of the area.

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000316-07%20-%20Geology%20Hydrogeology%20and%20Ground%20Conditions.pdf>

7.1.7 This Chapter of the PEIR includes the following:

- a summary of any changes to legislation, Guidance and Planning Policy relevant to the geology, hydrogeology and ground conditions;
- a review of the methodology used in the assessment and confirmation that no substantial revision / changes are required;
- a review of baseline conditions;
- a review of the assessment of effects;
- a review of mitigation measures proposed in the original ES chapter and presentation of additional mitigation measures, if required; and
- a summary of any other environmental effects which have been introduced into EIA requirements through the EIA Regulations 2017.

7.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

7.2.1 Changes to Legislation, Guidance and Planning Policy relevant to the geology, hydrogeology and ground conditions on the site and the proposed development are as follows:

Environmental Permitting Regulations 2016

7.2.2 The Environmental Permitting Regulations 2016, consolidate and replace the Environmental Permitting Regulations 2010, which had been updated 15 times prior to the 2016 Regulations being published.

Groundwater (England and Wales) Regulations 2009

7.2.3 The Groundwater (England and Wales) Regulations 2009 implemented the EC Groundwater Directive (2006/118/EC) into UK legislation and superseded the 1998 Groundwater Regulations. These have been subsequently superseded by the Environmental Permitting Regulations 2010, which have themselves been superseded by the Environmental Permitting Regulations described above.

National Planning Policy Framework

7.2.4 The revised National Planning Policy Framework (NPPF) was updated on 19 February 2019 and sets out the government's planning policies for England and how these are expected to be applied. The principal paragraphs that relate to this chapter are:

- Paragraph 170:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;

d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”

- Paragraph 178:

“Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.”

- Paragraph 180:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

- Paragraph 183:

“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

Planning Practice Guidance (2016)

- 7.2.5 Following the publishing of the NPPF Planning Policy Statements PPS9 and PPS23 were revoked and replaced with the Planning Practice Guidance (2016). This provides guidance on the protection of biodiversity and geological conservation, along with policy relating to pollution control, air quality, water quality and land contamination.

Scoping Opinion

7.2.6 Table 7-1 summarises the key aspects of the scoping opinion as relevant to geotechnical, hydrogeology and ground conditions.

Table 7-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 15, Paragraph 4.1.1	Impacts to Geology, hydrogeology, Ground Conditions, Ground Gas from terrestrial works unlikely to change	Agreed	Scoped Out	7.2.15
Page 15, Paragraph 4.1.2	The updated assessment should be informed by reference to the most recent relevant legislation, policy and guidance	Changes to legislation, policy and guidance applicable to this Chapter are highlighted and taken into account in this assessment	Changes to legislation have been reviewed and do not pose any significant change to the requirements or outcomes of this chapter of the ES	7.2.1-7.2.5
Page 15, Paragraph 4.1.3	Assessment of impact of dredged material to be carried out in accordance with Clearing the Waters for All guidance.	An updated WFD assessment has been carried out as part of the Water and Sediment Quality assessment, Chapter 9 of the ES.	Updated WFD Assessment, Technical Appendix U9-2	Not applicable
Page 16, Paragraph 4.1.4	Confirm only uncontaminated material used in land raising activities.	Land raising activities have been carried out with quarried chalk or in accordance with Environmental Permit EPR/FB3104MM and associated variation (V003).	Land raising activities carried out as stated in the original ES	7.3.3-7.3.5
Page 16, Paragraph 4.1.5	Explain what options for beneficial use of dredged materials have been considered and the reasons for the chosen option	Alternative options for the beneficial use of dredge materials (specifically dredge clay from the berthing pocket) will be investigated; however, an alternative disposal site is required if no such use is identified at the material time.	Alternative options for beneficial use of dredge materials have been, and will continue to, considered.	7.4.3-7.4.5

Additional Consultation

7.2.7 No Additional consultation outside the standard EIA scoping exercise has been carried out as part of this aspect of the EIA.

Assessment Methodology

- 7.2.8 Chapter 7 of the original ES for the DCO set out the Assessment Methodology and Criteria used in the assessment of geology, hydrogeology and ground conditions impacts. The assessment methodology considered contaminated land, hydrogeology, dredging and gas. No changes to the assessment methodology are proposed and as such reference should be made to Chapter 7 of the original ES for further detail on this.

Study Area

- 7.2.9 As described in paragraph 7.2.8, no changes to the assessment methodology relating to geology, hydrogeology and ground conditions, as set out in Chapter 7 of the original ES for the DCO, are proposed.

Sensitivity Criteria

- 7.2.10 As described in Paragraph 7.2.8, no changes to the assessment methodology relating to geology, hydrogeology and ground conditions, as set out in Chapter 7 of the original ES for the DCO, are proposed.

Magnitude of Change (Impact)

- 7.2.11 As described in Paragraph 7.2.8, no changes to the assessment methodology relating to geology, hydrogeology and ground conditions, as set out in Chapter 7 of the original ES for the DCO, are proposed.

Significance of Effect

- 7.2.12 As described in Paragraph 7.2.8, no changes to the assessment methodology relating to geology, hydrogeology and ground conditions, as set out in Chapter 7 of the original ES for the DCO, are proposed.

Mitigation Hierarchy

- 7.2.13 As described in Paragraph 7.2.8, no changes to the assessment methodology relating to geology, hydrogeology and ground conditions, as set out in Chapter 7 of the original ES for the DCO, are proposed.

Effects Not Requiring Further Assessment

- 7.2.14 Further areas of land raising will be carried out with material which is either uncontaminated, as stated in the original ES, or material which meets the applicable criteria as defined within the waste permit. Therefore, no further assessment of this effect is required.
- 7.2.15 The proposed changes to the development do not result in any buildings being constructed within the landfill buffer; therefore, no further assessment of the effect of hazardous gas is required.
- 7.2.16 No substantial change to the construction or operation phases of the development, as a result of changes to contamination sources, receptors (workers, visitors and ecology) and pathways compared to the baseline will occur associated with the proposed changes to the development. Therefore, these effects do not require further assessment.

7.3.0 Changes in Baseline Conditions

DCO Baseline

- 7.3.1 Details on the baseline conditions for the original assessment of geology, hydrogeology and ground conditions are detailed in chapter 7 of the original ES prepared for the DCO and are not repeated in detail here.
- 7.3.2 Baseline details include information on the site history, geology and hydrogeology designations and information from site investigations, including sediment surveys and terrestrial and estuarine site investigations. Additional sediment sampling has been carried out since the submission of the original ES for the DCO. This is described in more detail below.

DCO Future Baseline

- 7.3.3 The development will result in changes to the ground conditions baseline for the site, principally as a result of import of material to achieve the proposed formation levels in terrestrial areas (approx. 2 million m³) and within the footprint of the quay (approx. 3.6 million m³). across the site. The impact of the material imported to site needs to be considered. As stated in the original ES, only uncontaminated material will be used in the project, with any waste soils being imported under Environmental Permit EPR/FB3104MM and subsequent variations (attached as Technical Appendix U7-1).

Current Baseline

- 7.3.4 Since the original ES agricultural land within the site boundary has been developed to hardstanding, in accordance with the DCO application and other planning permissions granted on the development site. The principal effect of these activities on the geotechnical, hydrogeology, and ground conditions baseline is the import of additional material to achieve formation levels.
- 7.3.5 Materials used in land raising activities to date comprise quarried chalk and uncontaminated soils, imported under Environmental Permit EPR/FB3104MM and subsequent variations (attached as Appendix U7-1). Materials are uncontaminated and meet the requirements of the Permit.

Changes in Baseline

- 7.3.6 Parts of the site have been raised by import of engineered fill material. As stated in 7.3.5, above, material has been imported is either virgin material (quarried chalk) or is in accordance with the site's Environmental Permit which requires materials are uncontaminated and meet the conditions detailed within Schedule 2 of the permit and subsequent variation.
- 7.3.7 Sediment sampling is required under the Deemed Marine Licence in Schedule 8 of the DCO to provide up to date information on the level of contaminants in the dredging material generated by the development. Sediment dredging and disposal would then take place in a manner appropriate to the level of contaminants present in the dredging material, to ensure no significant effects arise.
- 7.3.8 The original ES baseline was based on sediment sampling undertaken in 2011. Subsequent sampling was carried out in 2017 and testing recorded trace metal quantities in excess of the CeFAS Action Level 1 (AL1) for arsenic, chromium, nickel, lead and zinc in a majority of the samples tested and in

excess of the AL1 level for copper in a single sample. None of the samples recorded values at or in excess of the AL2 levels.

- 7.3.9 Analysis of hydrocarbons show elevated levels (in excess of AL1) for the majority of determinands, with some Total Hydrocarbon (TCH) results being ten times their AL1 value. There is no AL2 value for hydrocarbons; therefore, the suitability of material for disposal is assessed based on the known background levels in the area surrounding the disposal site.
- 7.3.10 Further sediment sampling was approved by the Marine Management Organisation to be undertaken in December 2020 and reported in February 2021. The results of this testing are presented as Technical Appendix U7-2.
- 7.3.11 No contaminants record results above the CEFAS AL2 in the 2021 results. All metals were present above the AL1 level apart from Mercury which was below the AL1 value. All organotins were below the limit of detection in the 2020 results.
- 7.3.12 All the results for Poly Aromatic Hydrocarbons (PAHs) were above the AL1 in the 2021 results. As stated above, there is no AL2 level for hydrocarbons and suitability of material for disposal is assessed based on the known background levels for the surrounding disposal site.
- 7.3.13 The highest readings for PCBs CB110, CB118, CB138, CB153, CB180 and CB187 were above AL1 in the 2021 results with all other results being below the AL1 level. As with hydrocarbons, no AL2 level exists for PCBs and suitability for disposal is based on the known background levels for the surrounding disposal site.
- 7.3.14 Final approval for sediment disposal from the MMO is still to be provided; however, based on the test data provided to date, no barriers to this approval remain.

7.4.0 Assessment of Effects

- 7.4.1 Additional sediment sampling and subsequent testing has highlighted that, whilst some tests have returned trace metal results in excess of their AL1 threshold, no results have exceeded their AL2 threshold and therefore the material remains suitable for disposal in the Humber. Where hydrocarbon and PCB test results exceed their AL1 threshold and there is no stated AL2 limit, further assessment of disposal method by the MMO will be required.
- 7.4.2 It is noted that the Humber is known to be an environment where high hydrocarbon background levels are known to exist; therefore, there is not considered to be any barrier to disposal of dredging material within the Humber. In addition, the existing Marine License for the Projects permits disposal at sea on the basis of the 2011 sampling results.

Additional Construction Phase Effects

- 7.4.3 Dredging works are proposed to be changed to permit all mechanically dredged clay arisings from the berthing pocket to be deposited at marine deposit sites in the Humber Estuary instead of some having to be deposited on terrestrial areas landward of the existing Killingholme Marshes flood defence wall. An alternative disposal solution is now required as the land raising activities in terrestrial areas have commenced and the remaining undeveloped part of the site is likely to be developed concurrently with the reclamation works and before the dredging works are undertaken.
- 7.4.4 Given this anticipated sequence, it is now unlikely that there will be anywhere to deposit the clay material within the AMEP site by the time the arisings are actually available. The applicant will still seek options for beneficial use of the clay elsewhere, including within the reclamation site, but needs to ensure that an alternative disposal site is available if no such use is identified at the material time.
- 7.4.5 Alternative beneficial use options that will be investigated will include similar land raise projects within the local vicinity of the site where sustainable transport of material can be achieved. It should be noted that the majority of the remaining dredge material (beyond the clay arisings from the berthing pocket and some sand/gravel lenses) are not suitable for reuse without additional treatment.

Additional Operational Phase Effects

- 7.4.6 No additional operational phase effects have been identified as a result of the material amendment.

Additional Cumulative Effects

- 7.4.7 No additional cumulative effects have been identified as a result of the material amendment.

Consideration of DCO

- 7.4.8 The only change from the effects identified in the original ES for the DCO is associated with additional sediment sampling and testing, required under the Deemed Marine Licence.

7.5.0 Requirement for Additional Mitigation

- 7.5.1 No additional mitigation measures, beyond those outlined within the original ES for the DCO, are currently proposed based on this updated assessment.

DCO Mitigation

- 7.5.2 The original ES for the DCO details mitigation associated with piling works, the proximity of buildings to the Lindsey Oil refinery and those proposed within the dredging strategy.

Alternate or Additional Mitigation

- 7.5.3 No alternate or additional mitigation is required following the revised assessment carried out to inform this PEIR. Notwithstanding this, confirmation from the MMO is required that elevated contaminant concentrations in the dredged material are not be sufficiently high to prevent disposal of the dredging material in the Humber.

7.6.0 Residual Effects

- 7.6.1 The changes proposed as part of this material amendment do not result in any additional residual effects, beyond those identified in the original ES for the DCO.

Construction Phase

- 7.6.2 The changes proposed as part of this material amendment do not result in any additional residual construction phase effects, beyond those identified in the original ES for the DCO.

Operational Phase

- 7.6.3 The changes proposed as part of this material amendment do not result in any additional residual operational phase effects, beyond those identified in the original ES for the DCO.

Consideration of DCO

- 7.6.4 This assessment demonstrates there no changes to the Residual Effects previously identified as part of the DCO.

7.7.0 Other Environmental Issues

- 7.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 7.7.2 Please see Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

- 7.7.3 There are no effects associated with the additional topics introduced into EIA requirements that relate to geology, hydrogeology and ground conditions. No further assessment is considered necessary.

7.8.0 Summary of Effects

- 7.8.1 The only additional effect beyond those identified in the original ES for the DCO is related to additional sediment sampling and testing returning elevated trace metal and hydrocarbon concentrations; however, levels remain within acceptable limits to allow the previously proposed disposal of dredging material at identified locations within the Humber. Confirmation of this is required from the MMO; however, it is anticipated that no barriers to this approval remain.
- 7.8.2 The effect of additional dredging arisings being deposited in the Humber have also been considered; however, this is only required as a contingency if no alternative beneficial use for clay arisings from the berthing pocket can be found.
- 7.8.3 All other effects identified in chapter 7 of the original ES for the DCO remain relevant to the material amendment.

7.9.0 Conclusions

- 7.9.1 A review of chapter 7 of the original ES to the DCO for the harbour development has been carried out. The only change from the baseline, effects and mitigation assessed in the original chapter is related to additional sediment sampling and testing required under the Deemed Marine Licence in Schedule 8 of the DCO.
- 7.9.2 Additional testing has identified trace element and TCH levels in excess of the AL1 level; however, all levels either remain below their respective AL2 level, or consistent with background concentrations typical for the River Humber. Based on this no additional mitigation is considered necessary.
- 7.9.3 Approval for the disposal of dredged sediments in the Humber is still to be provided; however, it is anticipated that this will be provided and no barriers to approval remain.

REFERENCES

None

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 8: HYDRODYNAMICS AND SEDIMENT REGIME

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

8.1.0 INTRODUCTION	8-1
Development Consent Order Context.....	8-1
Consideration of Material Amendment	8-2
Purpose and Structure of Chapter	8-2
8.2.0 METHODOLOGY	8-4
Legislation, Guidance and Planning Policy	8-4
Scoping Opinion	8-5
Additional Consultation.....	8-8
Assessment Methodology	8-8
8.3.0 BASELINE CONDITIONS	8-12
DCO Baseline	8-12
DCO Future Baseline.....	8-14
Current Baseline	8-14
8.4.0 ASSESSMENT OF EFFECTS	8-18
Construction Phase Effects.....	8-18
Operational Phase Effects	8-22
Summary of Effects	8-48
8.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	8-50
DCO Mitigation	8-50
Alternate or Additional Mitigation.....	8-50
8.6.0 RESIDUAL EFFECTS	8-51
Operational Phase	8-51
Consideration of DCO	8-51
8.7.0 OTHER ENVIRONMENTAL ISSUES	8-52
Other Environmental Issues of Relevance	8-52
8.8.0 SUMMARY OF EFFECTS	8-53
8.9.0 CONCLUSIONS	8-54

DOCUMENT REFERENCES

TABLES

Table 8-1: Scoping Opinion	8-6
Table 8-2: Annualised changes to deposition and erosion for AMEP Amended Quay compared with updated baseline derived from the 3D mud and 2D sand transport modelling	8-45
Table 8-3: Annualised changes to deposition and erosion for AMEP Amended Quay layout compared with updated consented Quay, from the 3D mud and 2D sand transport modelling	8-46

FIGURES

Figure 8-1: Comparison of AMEP Amended Quay layout with the consented Option 4 layout	8-9
Figure 8-2: Location of bed mounted ADCP instruments	8-15
Figure 8-3: Predicted water levels and depth-averaged current speeds and directions at ADCP1 location	8-16
Figure 8-4: Predicted water levels and depth-averaged current speeds and directions at ADCP2 location	8-17
Figure 8-5: Changes to predicted peak ebb flow velocity with disposal of clay at HU082.....	8-19
Figure 8-6: Changes to predicted peak flood flow velocity with disposal of clay at HU082	8-20
Figure 8-7: Changes to predicted peak ebb bed shear stress with disposal of clay at HU082.....	8-21
Figure 8-8: Changes to predicted peak flood bed shear stress with disposal of clay at HU082.....	8-22
Figure 8-9: Modelled changes to High Water levels (AMEP Amended Quay minus updated Baseline – negative shows a predicted reduction in High Water level).....	8-23
Figure 8-10: Modelled changes to High Water levels for consented layout (AMEP layout minus baseline – negative shows a predicted reduction in water High Water level). From EX 8.7A (JBA, 2012).	8-24
Figure 8-11: Modelled changes to High Water levels (AMEP Amended Quay minus updated Baseline – negative shows a reduction in water High Water level).	8-25
Figure 8-12: Modelled changes to High Water levels for the consented layout (AMEP minus baseline – negative shows a reduction in water High Water level). From EX8.7A (JBA, 2012).	8-26
Figure 8-13: Modelled changes to peak mean spring tide flood flows (AMEP Amended Quay layout minus updated baseline).....	8-27
Figure 8-14: Modelled changes to peak mean spring tide flood flows for consented layout (AMEP minus baseline). From EX 8.7A (JBA, 2012).....	8-28
Figure 8-15: Modelled changes to peak mean spring tide ebb flows (AMEP Amended Quay layout minus updated baseline).....	8-29
Figure 8-16: Modelled changes to peak mean spring tide ebb flows (AMEP minus baseline). From EX8.7A (JBA, 2012).Impacts on Bed Shear Stress (due to changes in tidal flows).....	8-30
Figure 8-17: Modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP Amended Quay minus updated baseline).....	8-31
Figure 8-18: Updated modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP minus baseline). From EX8.7A (JBA, 2012).	8-32

Figure 8-19: Wider Estuary modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP Amended Quay minus updated baseline).....	8-33
Figure 8-20: Wider Estuary modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP minus baseline). From EX8.7A (JBA, 2012).....	8-34
Figure 8-21: Modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP Amended Quay layout minus updated baseline).....	8-35
Figure 8-22: Updated modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP minus baseline). From EX8.7A (JBA, 2012)	8-36
Figure 8-23: Wider estuary modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP Amended Quay layout minus updated baseline).....	8-37
Figure 8-24: Wider estuary modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP minus baseline). From EX8.7A (JBA, 2012).....	8-38
Figure 8-25: Modelled increase in wave heights for a 1:200-year water level/wave height event in 2033 for waves from the east (Final AMEP Layout minus future 2033 'baseline'). From EX8.7A (JBA, 2011)	8-39
Figure 8-26: Modelled increase in wave heights for a 1:200-year water level/wave height event in 2033 for waves from the north (Final AMEP Layout minus future 2033 'baseline'). From EX8.7A (JBA, 2012)	8-40
Figure 8-27: Predicted increases to deposition or erosion of muddy sediments after a spring-neap cycle (AMEP Amended Quay layout minus updated baseline).....	8-41
Figure 8-28: Predicted increases to deposition or erosion of muddy sediments after a spring-neap cycle (AMEP minus baseline [consented]). From Annex 8.3 (HR Wallingford, 2011)	8-42
Figure 8-29: Predicted increases to potential deposition or potential erosion of sandy sediments after a spring-neap cycle (AMEP Amended Quay layout minus updated baseline).....	8-43
Figure 8-30: Predicted increases to potential deposition or potential erosion of sandy sediments after a spring-neap cycle (AMEP minus baseline). From (EX8.7A, JBA, 2012).....	8-44
Figure 8-31: Recent changes to local bathymetry and intertidal levels (difference shown in metres with positive or red showing accretion).....	8-48

APPENDICES

Appendix 8-1: Sediment Plume Dispersion from Dredging

Appendix 8-2: Erosion of Placed Clay

8.1.0 Introduction

Development Consent Order Context

- 8.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 8.1.2 The associated development also consented through the DCO includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 8.1.3 The assessment of impacts upon the Hydrodynamic and Sedimentary Regime associated with the consented scheme was initially reported in Chapter 8¹ of the Environmental Statement (ES) and in four supporting appendices that accompanied the DCO application ('the original ES'). The supporting appendices were:
- 8.1 - AMEP Estuary Modelling Studies Report (JBA);
 - 8.2 - Review of Geomorphological Dynamics of the Humber Estuary (JBA);
 - 8.3 - Assessment of the Effects of a Proposed Development on the South Bank of the Humber Estuary on Fine Sediments (HR Wallingford); and
 - 8.4 - Able Marine Energy Park Dredging Plume Dispersion Arisings from Capital Works (HR Wallingford).
- 8.1.4 The following supplementary environmental information was issued during the examination of the project, Chapter 8 was re-issued as EX8.16: Chapter 8 Signposting Document².
- EX 8.5 - Validation of 3D Flow and Sediment Models used for Assessment of Impacts of AMEP on Fine Sediment Transport;
 - EX 8.6 - Maintenance Dredge Variability;
 - EX 8.7A - Modelling of Final Quay Design (Supplement to Annex 8.1 of the ES);

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000312-08%20-%20Hydrodynamic%20and%20Sedimentary%20Regime.pdf>

²https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

- EX 8.8 - Update to Longer Term Morphology Predictions in the Region of the Centrica and E.ON intakes and outfalls;
- EX 8.9 - Historical Review of Morphological Change North of HIT (2001–2010);
- EX 8.10 - Long-term Morphological Change at Embayment South of Quay;
- EX 8.14 - Hydraulic & Sediment Regime – Piled Structures;
- EX 8.15 - Effect of Moored Vessels on Flows; and
- EX 8.16 - Chapter 8 Signposting Document³.

Consideration of Material Amendment

- 8.1.5 The proposed change to the quay and dredged depths (the ‘AMEP Amended Quay’) are described in Chapter 4 (Description of Changes to Development) of this Preliminary Environmental Information Report (PEIR).
- 8.1.6 These changes require a review of the predicted impacts of the proposed material amendment on tide levels, flow speeds, shear stresses, waves, deposition and erosion of sediments. This review is undertaken through modelling and desk-based assessment reported in this chapter, highlighting any changes to those impacts previously predicted for the consented scheme.

Purpose and Structure of Chapter

- 8.1.7 This chapter of the PEIR examines the likely changes to the Hydrodynamic and Sedimentary Regime of the Humber Estuary in relation to the AMEP scheme based on the differences between the consented layout and the proposed material amendment. This principally relates to consideration of the amended quay layout.
- 8.1.8 The development of AMEP will cause an alteration of the local estuary shoreline and bathymetry, which may lead to changes to existing estuarine processes both in close proximity to AMEP and potentially further afield. This chapter of the PEIR evaluates the potential effects of the proposed amended quay design in terms of physical processes (for example changes to hydrodynamics, sediment transport, waves and geomorphology), compared to the consented layout, and these findings have been used to inform the impact assessment that is reported in other chapters of the PEIR.
- 8.1.9 The Humber Estuary is a dynamic estuarine environment with complex hydrodynamic processes controlling local and wider scale sediment transport processes. The nature of these hydrodynamic processes is determined by a range of factors including the local and general estuary morphology, wave climate, tidal range and freshwater inputs. Additionally, the Humber Estuary contains numerous man-made structures that change the flow and sediment patterns. The components of the consented scheme comprise a solid reclamation and quay that will protrude from the existing flood defence wall into the intertidal and sub-tidal area, and dredging of the surrounding bathymetry for shipping access. The development will therefore result in an alteration of the local

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001645-120924%20TR030001%20Able%20UK%20Ltd.pdf>

estuary morphology at Killingholme.

8.1.10 In summary, the material amendment comprises an alteration to the reclamation shape and a consequential change to the berth pocket. In addition, the assessment of the amended quay is undertaken against a Humber Estuary local channel and flats bathymetry that has evolved naturally since the previous assessment.

8.1.11 This Chapter of the PEIR includes consideration of the following:

- Updated hydrodynamic modelling based upon the present day bathymetry and the proposed amended quay.
- Sediment modelling to inform on changes to potential sand and mud transport for the proposed amended quay; and
- A qualitative description of changes to wave impacts as a result of the “amended quay”.

Notwithstanding, further work is ongoing which will inform any subsequent Updated Environmental Statement in support of the material amendment to the DCO as follows:

- An updated assessment of the sediment plume dispersion from the construction dredging activities at the amended AMEP (see Technical Appendix U8-1).
- Assessment of erosion rates for the amended inerodible clay volumes proposed to be placed at the HU082 disposal site (see Technical Appendix U8-2).

8.2.0 Methodology

Legislation, Guidance and Planning Policy

- 8.2.1 There are no specific Directives or legislation governing solely the areas of hydrodynamics or the sedimentary regime. Legislation, guidance and policy documents are generally directed towards either the ecological, chemical or human environment.
- 8.2.2 Changes to the hydrodynamic and sedimentary regime have the potential to impact on these other receptors, and these effects are addressed in other chapters in this report, for example Chapter 10 on Aquatic Ecology and Chapter 14 on Commercial and Recreational Navigation. However, the Water Framework Directive recognises the link between hydromorphological characteristics and ecological quality by defining a series of hydromorphological quality elements that support the biological quality elements. These hydromorphological quality elements include parameters reflecting morphological conditions and tidal regime and, to comply with the Water Framework Directive, it is necessary for each parameter to achieve good status.
- 8.2.3 Further information on the requirements of the Water Framework Directive can be found in Chapter 9 on Water and Sediment Quality and in the supporting Draft Water Framework Directive Assessment issued for consultation as part of the preliminary environmental information.

National Planning Policy Framework

- 8.2.4 National Planning Policy Framework (NPPF) (June 2019) sets out the Government's economic, environmental and social planning policies for England. In relation to marine and coastal processes, paragraph 166 notes that in coastal areas, planning policies and decisions should take account of the UK Marine Policy Statement and marine plans.

Marine Policy Statement

- 8.2.5 UK Marine Policy Statement (MPS) (September 2011) provides the framework for preparing Marine Plans and for the decision-making by marine planning authorities. The MPS notes in Section 2.6.1.3 that as a general principle, development should aim to avoid harm to geological conservation interests (including geological and morphological features), including through location, mitigation and consideration of reasonable alternatives.
- 8.2.6 The MPS further notes in Section 2.6.8.6 that Marine plan authorities should seek to minimise and mitigate any geomorphological changes that an activity or development will have on coastal processes, including sediment movement.

East Inshore Marine Plan

- 8.2.7 AMEP lies within the area covered by the East Inshore Marine Plan (2014). Relevant policies include:
- SE-CC-3 - Proposals in the south east marine plan area and adjacent marine plan areas that are likely to have significant adverse impacts on coastal change should not be supported.
 - SE-MPA-4 - Proposals must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate significant adverse impacts on designated geodiversity.

Guidance

- 8.2.8 There are a number of plans and guidance documents that are of some relevance to the hydrodynamic and sedimentary regime; these are detailed below, and where appropriate are taken into account in this chapter.
- 8.2.9 The Humber Estuary Management Scheme Annex D (Environment Agency, 2004) provides guidance on the noted effects of dredging and their significance in the estuary.
- 8.2.10 The Humber Maintenance Dredging Baseline Documents (ABP Humber Estuary Services, 2008 and 2014) provide information on the maintenance dredging regime including quantities and locations of disposed material in the estuary.
- 8.2.11 The Humber Estuary Coastal Habitat Management Plan (CHaMP) (Environment Agency, 2005) provides mechanisms for delivering flood and coastal defence schemes which comply with the requirements of the Habitats Directive.
- 8.2.12 The Humber Flood Risk Management Strategy: Planning for the Rising Tides (Environment Agency, 2008) set out the Environment Agency's strategy for managing the flood defences of the Humber Estuary over the next 100 years. An emerging policy, Humber 2100+, is being developed in response to new technical information.
- 8.2.13 The Humber Estuary Coastal Authorities Group Flamborough Head to Gibraltar Point Shoreline Management Plan (Scott Wilson, 2010) provides a plan for managing flood and erosion risk for the area of coastline encompassing the outer Humber Estuary. This plan details the development of a sustainable management approach and looks at the short, medium and long term.
- 8.2.14 The East Riding of Yorkshire Biodiversity Action Plan, the Lincolnshire Biodiversity Action Plan and the Hull Biodiversity Action Plan all aim to actively conserve priority habitats and species locally.
- 8.2.15 Guidance and best practice for the calibration and validation of hydrodynamic models used to simulate estuarine processes is provided by the Environment Agency technical report, Quality Control Manual for Computational Estuarine Modelling (Bartlett, 1998).
- 8.2.16 Guidance and best practice for predicting morphological change in estuaries is provided in the EA / Defra / Natural England report, A Guide to the Prediction of Morphological Change within Estuarine Systems (Emphasys Consortium, 2000).

Scoping Opinion

- 8.2.17 The Planning Inspectorate's comments relating to hydrodynamics and sediment are listed in Table 8-1 below.

Table 8-1: Scoping Opinion

ID	Ref	Issue	Inspectorate's comments (<i>and response</i>)
4.2.1	Para 6.10	Wave Modelling	<p><u>Comment</u> The Scoping Report proposes to conduct desk study assessment of changes to wave dynamics rather than conducting further wave modelling. The Scoping Report argues that the proposed changes represent a likely minor change in impact characteristics. The Inspectorate notes that the Humber Estuary is a dynamic environment, with complex hydrodynamic processes, as such small changes of this sort may result in substantial change to impact characteristics. The Applicant should make effort to agree the approach to wave modelling with relevant consultation bodies including the need for further wave modelling to account for the proposed changes.</p> <p><u>Response</u> <i>Further wave modelling is to be undertaken with respect to disposal site HU082 to inform the updated ES.</i></p>
4.2.2	Para 6.6	Assessment Methodology	<p><u>Comment</u> The Inspectorate welcomes the commitments made in the Scoping Report to update the assessment with relevant information and making use of available computer modelling to aid the assessment. The Inspectorate notes that the models proposed to inform the assessment are generally those that were used for the original ES and are now several years old. The Applicant should make effort to agree the suitable modelling techniques with relevant consultation bodies.</p> <p><u>Response</u> <i>Latest versions of modelling software have been used along with updated bathymetry.</i></p>
4.2.3	Para 6.8	UKCP18 and sea level rise	<p><u>Comment</u> The Inspectorate notes the commitment to updating the assessment of effects based on relevant information set out in UKCP18 guidance particularly in relation to sea level rise and Representative Concentration Pathways (RCPs). The Inspectorate is aware that the application of latest guidance may alter the findings of the original assessment. The Applicant should make effort to ensure that the approach to the assessment is agreed with relevant consultation bodies including the EA. The relationship between this assessment and the assessment of the Proposed Development's vulnerability to climate change should be explained.</p> <p><u>Response</u> <i>New overtopping calculations have been undertaken using the EA's Humber Extreme Water Levels (2020) V2, 18th February 2021.</i></p>
4.2.4	Para 6.9	Baseline assessment	<p><u>Comment</u> The Scoping Report explains that updated information is available to inform the updated baseline assessment for estuary morphology. The Scoping Report does not explicitly state that this will be carried out. For the avoidance of doubt the Inspectorate considers that the baseline assessment should be updated and informed by the most relevant and up to date information available. The Applicant should make effort to agree</p>

ID	Ref	Issue	Inspectorate's comments (<i>and response</i>)
			<p>the need for further sampling, if required, to inform the assessment with relevant consultation bodies including the MMO.</p> <p><u>Response</u> <i>Latest versions of modelling software have been used along with updated bathymetry.</i></p>
4.2.5	Para 6.12	Assessment of significance	<p><u>Comment</u> The Scoping Report explains that the updated ES will focus on impacts to processes and not receptors therefore it is inappropriate to assign significance levels. The Inspectorate generally accepts this conclusion but points out that the EIA Regulations require an assessment of the 'likely significant effects'. The Applicant should ensure that impacts to processes likely to result in consequential effects for relevant receptors should be assessed. This would include consequential impacts to receptors reliant on habitats affected by process change e.g. intertidal mudflat and saltmarsh.</p> <p><u>Response</u> <i>Likely significant effects are assessed in other sections of the PEIR and within the updated ES.</i></p>
4.2.6	Table 7	Disposal site	<p><u>Comment</u> The Inspectorate notes the proposal in the Scoping Report to dispose of significant quantities of dredged material at the relevant disposal location (HU082). The Inspectorate considers that the updated ES should include information to adequately characterise the disposed material and its intended disposal location in order to inform a detailed assessment of the likely significant effects. The Applicant should make effort to agree the approach to the characterisation and assessment with relevant consultation bodies including the MMO.</p> <p><u>Response</u> <i>See Technical Appendices U4-2 and U8-2.</i></p>
4.3.7	Paras 6.16-17	Modelled impacts	<p><u>Comment</u> The Inspectorate notes the intention in the Scoping Report to update the assessment in accordance with the approach undertaken in Chapter 8 of the original ES. The Applicant should make effort to agree this approach with relevant consultation bodies and if necessary, update the approach to modelling in order to be consistent with up to date methods of assessment.</p> <p><u>Response</u> <i>Latest versions of modelling software have been used along with updated bathymetry.</i></p>
Cumulative effects			
4.19.1	Table 6	South Humber Bank Energy Centre	<p><u>Comment</u> The Scoping Report suggests that the South Humber Bank Energy Centre located approximately 7km from the Proposed Development is too remote for it to be assessed cumulatively with the Proposed Development. The Inspectorate does not agree and notes the comments received from the EA in particular the potential for wider scale impacts through the hydrological regime. The updated assessment of cumulative effects should include an assessment of likely significant effects</p>

ID	Ref	Issue	Inspectorate's comments (<i>and response</i>)
			with South Humber Bank Energy Centre. The Application should make effort to agree the approach to the assessment with relevant consultation bodies. <u>Response</u> <i>No hydrodynamic and sediment regime effects are predicted to impact the South Humber Bank Energy Centre.</i>
4.19.3	n/a	Middle Estuary developments	<u>Comment</u> The Inspectorate agrees with comments received from Hull City Council that cumulative effects with major development proposed in the middle estuary should be assessed in the updated assessment. The Applicant should make effort to agree the list of other developments located within the middle estuary that should be included in the updated assessment with relevant consultation bodies. <u>Response</u> <i>There are no cumulative projects to be considered relevant to this topic.</i>
In combination			
4.20.2	n/a	n/a	<u>Comment</u> The EA have highlighted the need for the Water Framework Directive assessment to include other activities that impact the same receptor. The Inspectorate considers that in-combination effect assessment is more typically associated with the Habitats Regulations assessment process. However, assessing inter-related impacts to receptors is within the EIA process and should be assessed in the updated ES where significant effects are likely to occur. The Applicant may wish to address inter-related impacts within relevant aspect chapters to avoid a separate chapter of this sort in the updated ES. <u>Response</u> <i>There are no in-combination projects to be considered relevant to this topic.</i>

Additional Consultation

- 8.2.18 No additional consultation has been undertaken with regards to hydrodynamics and sediment at this point in time. However, further consultation with key stakeholders is being arranged to take place in April and May 2021 and will be referenced within the final Updated ES.

Assessment Methodology

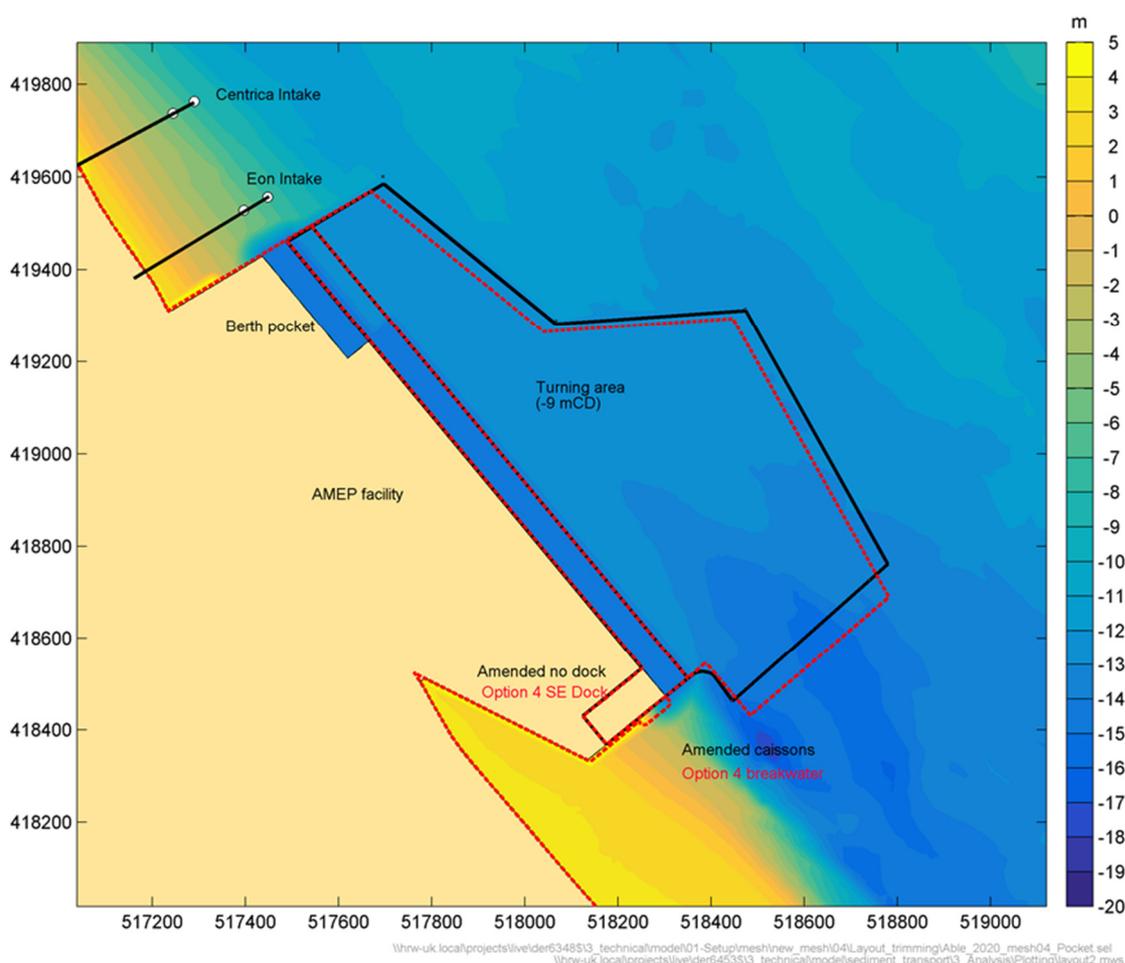
- 8.2.19 An assessment of the effects of the AMEP Amended Quay on hydrodynamic and sedimentary processes has been carried out using appropriate numerical modelling tools. This section provides an overview of the modelling techniques utilised, which include hydrodynamic modelling, sediment transport modelling, sediment plume modelling and nearshore wave transformation modelling. The modelling has been used to simulate the baseline conditions in hydrodynamic and sedimentary processes in the Humber Estuary, and subsequently to determine and quantify the predicted effects of the AMEP Amended Quay on these baseline conditions. Detailed descriptions of the development of the original models are provided in JBA Consulting (2011a & b) and HR Wallingford (2011a & b),

respectively Annexes 8.1, 8.2, 8.3 and 8.4 of the original ES. Updated models used in the present hydrodynamics and sediment studies are described below.

Study Area

8.2.20 As was used for the consented layout, the study area included in the model domain extends from Spurn Head to Trent Falls. The layout at the AMEP Amended Quay and associated dredging is shown in Figure 8-1, using up to date bathymetry data from Defra⁴. Also overlain on Figure 8-1 is the original model for the AMEP Quay (Option 4) for comparison.

Figure 8-1: Comparison of AMEP Amended Quay layout with the consented Option 4 layout



Hydrodynamic Modelling

8.2.21 An investigation of the impacts of the AMEP on hydrodynamic processes within the Humber Estuary, and the changes arising from the amended quay design, has been carried out using computer modelling techniques.

8.2.22 A three dimensional (3D) hydrodynamic numerical flow model was constructed, calibrated and validated in order to simulate baseline flows within the estuary. The model grid extends from Spurn Head to Trent Falls.

⁴<https://environment.data.gov.uk/DefraDataDownload/?Mode=survey>

- 8.2.23 The same model domain was used for assessment of the amended quay layout as for the consented layout (DCO model layout). Bathymetry was updated to reflect the present day.
- 8.2.24 Alterations to the model grid were made to incorporate the changes represented by the AMEP (amended quay). Comparisons between the results of model simulations using this grid with those of the updated baseline model reveal the predicted effects of the scheme on estuarine hydrodynamic processes.
- 8.2.25 Figure 8-1 shows the proposed AMEP amended quay layout as compared with the modelled DCO layout (Option 4). The overall reclamation is slightly smaller with the amended quay than for the consented layout (3% reduction in reclamation area). The assessment of the AMEP amended quay layout used the TELEMAC modelling system and updated model bathymetry, to assess impacts to flows, water levels, cohesive and non-cohesive sediments.

Sediment Transport Modelling

- 8.2.26 The assessment of the AMEP amended quay used an up-to-date release version (V8P1R1) of the same TELEMAC modelling system previously used for the mud transport modelling and for the tidal flows for navigation assessment in the original ES, to assess the changes reported below.
- 8.2.27 For sand transport, which is dominated by bedload transport, the two-dimensional depth-averaged version of the TELEMAC hydrodynamic model (TELEMAC-2D) was used. For mud transport, the three-dimensional version of the TELEMAC code was used (TELEMAC-3D). The cohesiveness of mud, which is transported in suspension, means that additional processes are required in the model such as flocculation which leads to variable settling velocity of the suspended mud in both time and space. This leads to more complexity in the vertical profile of suspended concentration which cannot be modelled simply by assuming a Rouse profile (such as for sand transport) and hence a 3D model is required to model mud transport accurately.
- 8.2.28 It should be noted that all sediment transport models involve a high level of uncertainty, particularly when used for the purposes of estimating morphological change. Relevantly, at the conclusion of the Examination of the AMEP application in 2012, the Examining Authority observed in the '*Panel's Findings and Recommendations to the Secretary of State*'⁵:

'10.198 The problem that emerged very clearly for the Panel was not just the complexity of the proposals but the complexity of the environment itself. The River Humber is manifestly a very complex and highly dynamic ecosystem.'

10.199 At an early stage in the examination the applicant noted –

'The prediction of geomorphological impacts (which occur over decadal timescales) is not a precise science. When the Environment Agency commissioned an assessment of geomorphological change due to sea level rise in order to inform the Coastal Habitat Management Plan for the Humber Estuary, they obtained results from three separate numerical models; all provided different results with a significant range of impacts predicted.' [REP008, para 22.142].

⁵ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-002249-The%20Able%20Marine%20Energy%20Park%20Order%20201X%20Panel's%20Findings%20and%20Recommendations%20with%20Appendices.zip>

10.200 We can be sure that the River Humber eco-system will change, with or without human intervention. Predicting the nature and extent of that change with any degree of precision, however, seems to the Panel, to be a more-than-human skill' (paragraphs 10.198 -10.200, underline added).

Significance of Effect

- 8.2.29 This chapter defines the predicted changes to the hydrodynamic and sedimentary regime of the Humber Estuary resulting from the AMEP. As these are changes to processes rather than impacts on receptors it is not appropriate to assign significance levels. The approach adopted in this chapter is to describe and, where possible, quantify any predicted changes. The implications of the predicted changes to the hydrodynamic and sedimentary regime are assessed in terms of the significance of the potential impacts on various environmental parameters (e.g. aquatic ecology, water quality, commercial fisheries, etc.) in the relevant chapters of this PEIR. Similarly, any measures that may be required in order to mitigate a potential impact on a receptor arising from a predicted effect on the hydrodynamic and sedimentary regime of the estuary are described in the relevant chapters.

Sensitive Receptors

- 8.2.30 There are a number of receptors that may be affected by changes to the hydrodynamic and sedimentary regime. These include sensitive environmental receptors such as intertidal mudflat and saltmarsh habitats, and operational receptors including vessels navigating in the vicinity of AMEP, nearby port facilities (C.Ro Port Killingholme (the former Humber Sea Terminal), Humber Work Boats, South Killingholme Oil Jetty, Immingham Gas Jetty, Humber International Terminal, Immingham Outer Harbour (IOH), Immingham Bulk Terminal, Immingham Docks), and Uniper intake and outfall.

8.3.0 Baseline Conditions

DCO Baseline

Hydrodynamic Regime

Water levels

- 8.3.1 The Humber Estuary is a macro-tidal estuary with a spring tidal range of 6.0 - 7.0m at the site of the AMEP. High water levels increase further upstream as tidal flows are constricted by the narrowing estuary. Mean High Water Spring levels at Goole are 1.3m above levels at the estuary mouth at Spurn Head. The Environment Agency's February 2021 guidance (Humber Extreme Water Levels (2020)) on relative sea level rise at AMEP was used for updated overtopping calculations for the Flood Risk Assessment (both for Higher Central and Upper Bound scenarios).

Currents

- 8.3.2 Currents within the estuary are dominated by the tide. Upstream, the monthly average freshwater flow rate at Trent Falls of 250 m³/s has been estimated from Environment Agency data, with a variability of ±110 m³/s (Townend and Whitehead, 2003). Observations of currents near to Killingholme used to calibrate the hydrodynamic model show that magnitudes can reach approximately 1.5 m/s offshore and 1.1 m/s in the nearshore zone during a modest spring tide (15th May 2010). Predictions of currents provided by the United Kingdom Hydrographic Office Admiralty TotalTide software, suggest ebb-flow dominance of current magnitudes throughout the middle estuary. Peak flows occur within the deeper channels of the estuary, with the greatest flow speeds of over 2.0 m/s occurring in Halton Middle, upstream of Killingholme between Halton Flats and Paull's Sand.

Waves

- 8.3.3 The wave climate at South Killingholme is dictated by the local fetch lengths over which the wave-generating force of wind stress can act. Fetch lengths across the estuary to the north bank are the shortest, with longer lengths upstream and downstream, leading to larger waves from these directions.
- 8.3.4 A still water level/wave height joint probability analysis study provides details of the prevailing wave climate at South Killingholme (ABPmer, 2007). An analysis of wave heights over a multi-year period highlighted the dominance of south-easterly waves, followed by waves propagating from the north-west in the direction of Hull.
- 8.3.5 Wave overtopping calculations were performed using values for water level, wave height and wave period specified in ABPmer (2007). Calculations were carried out for the consented scheme for a range of return periods (1:2-year, 1:5-year, 1:10-year and 1:200-year) joint probability events, with 100 years of projected climate change added (i.e. 100 years of sea level rise and increased wave heights) in accordance with PPS25. This assessment has been updated and is reported in Chapter 13 of this document, using the most recent Environment Agency data.

Bed shear stresses

- 8.3.6 The shear stresses experienced on the bed of the Humber Estuary determine the evolution of the

morphology. Bed shear stresses are a result of both wave and current forcing, primarily through the friction they exert on the bed. The total bed shear stress consists of skin friction, form drag and the effects of sediment transport (via momentum transfer between grains). The stresses due to wave action are irregular and determined mainly by wind variability but also locally by ship wake. However the tidal currents within the estuary are far more predictable and regular. The large magnitudes of the currents in the deep channels of the estuary mean that their contribution to the bed shear stress dominates here. Wave-related bed shear stress is more significant in the shallower sub-tidal and inter-tidal areas.

Estuary Morphology

- 8.3.7 The sub-tidal bed of the Humber Estuary consists of silt, sand, gravel, boulder clay and chalk at different locations. In shallow subtidal and intertidal areas along the banks of the estuary the bed consists mostly of silt and fine sand. Particle size analysis of intertidal and sub-tidal bed material around the AMEP site has generally revealed surface sediments to comprise: muds on the upper intertidal areas; sandy muds on the lower intertidal areas, and; sandy muds, muddy sands or slightly gravelly muddy sands on the subtidal areas (IECS, 2010a)⁶.
- 8.3.8 A site investigation involved the collection of multiple vibrocore samples from the site of the proposed scheme (Buro Happold, 2010)⁷. These showed a surface alluvium layer consisting of varied grain sizes, with median values equally distributed in the range 0.01mm to 0.3mm. A thin layer of sand and gravels was intermittently observed below this, with a thicker layer of stiff glacial till underneath, though this structure shows significant variation with location.
- 8.3.9 Further recent grab sample surveys (Allen, 2020, Technical Appendix U10-4) in the location of the AMEP showed sand content in nearshore subtidal samples being typically 30% and mud content typically 70% or more.
- 8.3.10 For the most part, the sub-tidal areas of the Outer Estuary (generally considered as the Estuary downstream of Grimsby) are predominantly sand. Further upstream more mixed sediments are typically found, often consisting of silty sand. On the lower intertidal the sediments generally consist of sandy silt, fining to silt at the higher levels.

Sedimentary regime

- 8.3.11 The water within the Humber Estuary contains very high concentrations of fine suspended sediment. On a given tide up to 1.2×10^6 T of sediment may be in the water column (Townend and Whitehead, 2003). Fluvial input amounts, on average, to 335 T of sediment per tide compared to the average tidal exchange of 1.2×10^5 T per tide at the mouth. Around 430 T per tide is deposited in the estuary with a net marine import of around 100 T per tide.
- 8.3.12 The sedimentation patterns are therefore dominated by tidal flow, with approximately only 3 percent of sediment entering the estuary originating from upstream. Much of the sediment entering the estuary from the mouth is returned to the sea on the ebb tide. However, a considerable amount is deposited across intertidal areas or shifted around sub tidally. An annual rate of infilling of

⁶<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000366-7.2%20-%20Water%20and%20Sediment%20Quality.pdf>

⁷<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000368-7.4%20-%20Ground%20Engineering%20Interpretative%20Rpt.pdf>

between 2.6 and $6.6 \times 10^5 \text{ m}^3$ has been estimated (ABP Research, 1999).

- 8.3.13 There is a large degree of variability in the suspended sediment concentration (SSC) throughout the estuary. The position of the turbidity maximum varies seasonally between Hull and Selby depending on the balance of freshwater/tidal water flows (Uncles et al, 1998) and the availability of sediment is governed by the hydrodynamic and sediment transport processes, including wave dynamics, tidal asymmetry and salinity-induced circulation. British Transport Docks Board measurements (BTDB, 1970) report a range within the middle and outer estuary between 300 mg/l and 1,900 mg/l. Further upstream in the Upper Estuary concentrations regularly reach 5,000 mg/l (Uncles et al., 1998). At times concentrations of up to 20,000 mg/l have been recorded in the system (ABPHES, 2008).
- 8.3.14 Maintenance dredge volumes in the Humber Estuary vary considerably from year to year. Between 1985 and 2007 the total mass of material dredged from and disposed into the estuary was in the range 9 to 17 million wet tonnes per annum (ABPHES, 2008). The Sunk Deep Channel (SDC) was originally dredged to allow deep-draught vessels to use deep-water terminals at Immingham. It experiences significant annual variation in accumulated sediment, requiring an annual maintenance dredging ranging from none to 9 million tonnes per annum between 1985 and 2007.
- 8.3.15 Maintenance dredge material at the `Humber 3A` disposal site (also known as `M` `HU060`) was mainly from material arising from dredging of Immingham Docks, jetties and terminals. Records showed significant variation here also, with disposals in the range 1-7 million tonnes from 1985 to 2007. The Humber Maintenance Dredging Baseline Document (ABP Humber Estuary Services, 2008) stated that there is no apparent trend in dredge volumes at Immingham. More recent maintenance dredging figures for years up to 2011 were also provided and analysed for the consented development. An update to the maintenance dredging figures (ABPHES, 2014) includes those updated figures plus figures for two further years (2012 and 2013).

DCO Future Baseline

Waves

- 8.3.16 For the consented scheme, the future wave scenario modelled a 1:200-year wave event based on the joint probability of wave height and water levels in 2033. This included a 0.21 m sea-level rise from 1991 levels based on the PPS25 guidance.

Hydrodynamics and sediment transport

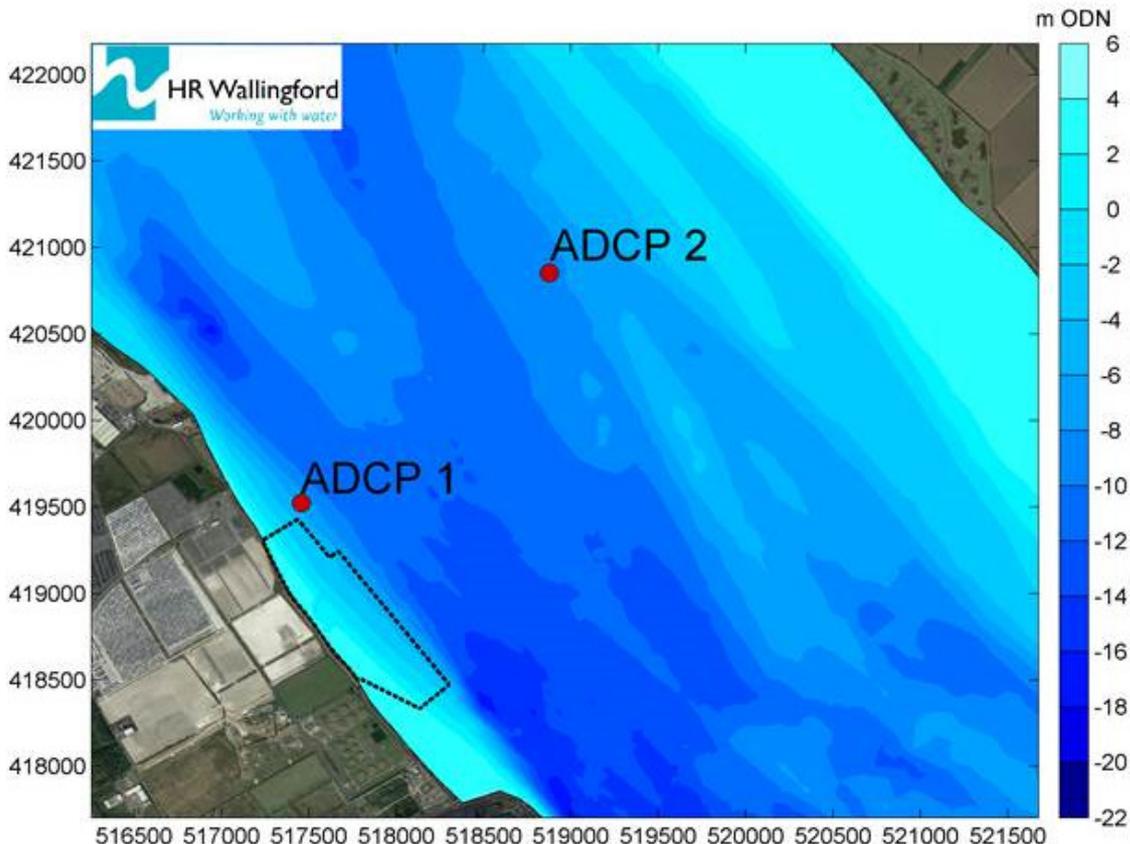
- 8.3.17 The future hydrodynamics and sediment transport was based on a typical spring-neap tidal cycle. Allowances for sea-level rise and future bathymetry changes were not used. Morphological change and changes to dredging requirements at sensitive receptors were calculated based on extrapolating the sediment transport results for a spring neap cycle up to a year.

Current Baseline

- 8.3.18 The assessment of the proposed material amendment used the TELEMAC modelling system and updated model bathymetry, to assess impacts to flows, water levels, cohesive and non-cohesive sediments. This is referred to as the updated baseline.
- 8.3.19 The existing TELEMAC-3D model was previously validated against the JBA model (EX8.7). The JBA model was validated against two bed mounted ADCP instruments (ADCP1 and ADCP2). These instruments were deployed concurrently (between 13 May and 2 June 2010) at two locations within

the lower estuary, one near to the northern limit of the AMEP development (close to the Uniper Power Station intake and outfall) and the other on the opposite side of the estuary main channel (Figure 8-2).

Figure 8-2: Location of bed mounted ADCP instruments



8.3.20 Following the update of the TELEMAC-3D model to include the latest “2018” bathymetry (a composite of the most up to date bathymetry and LiDAR tiles available on the EA/Defra Portal, mainly 2018 with some 2017), a comparison of the updated baseline model and the model with the pre-2009 bathymetry was carried out. The comparison of the predicted water levels, depth-averaged current speed and direction at the ADCPs is shown on Figure 8-3 and Figure 8-4. The results from the calibrated JBA model are also shown on the plots. The predicted water levels from the updated baseline model are similar to the results with the pre-2009 bathymetry. The peak current speeds from the updated baseline model are higher by approx. 0.2 m/s at both the previous measurement positions. This is likely to be due to the changes in bathymetry (Figure 8-31) since the measurements were taken.

Figure 8-3: Predicted water levels and depth-averaged current speeds and directions at ADCP1 location

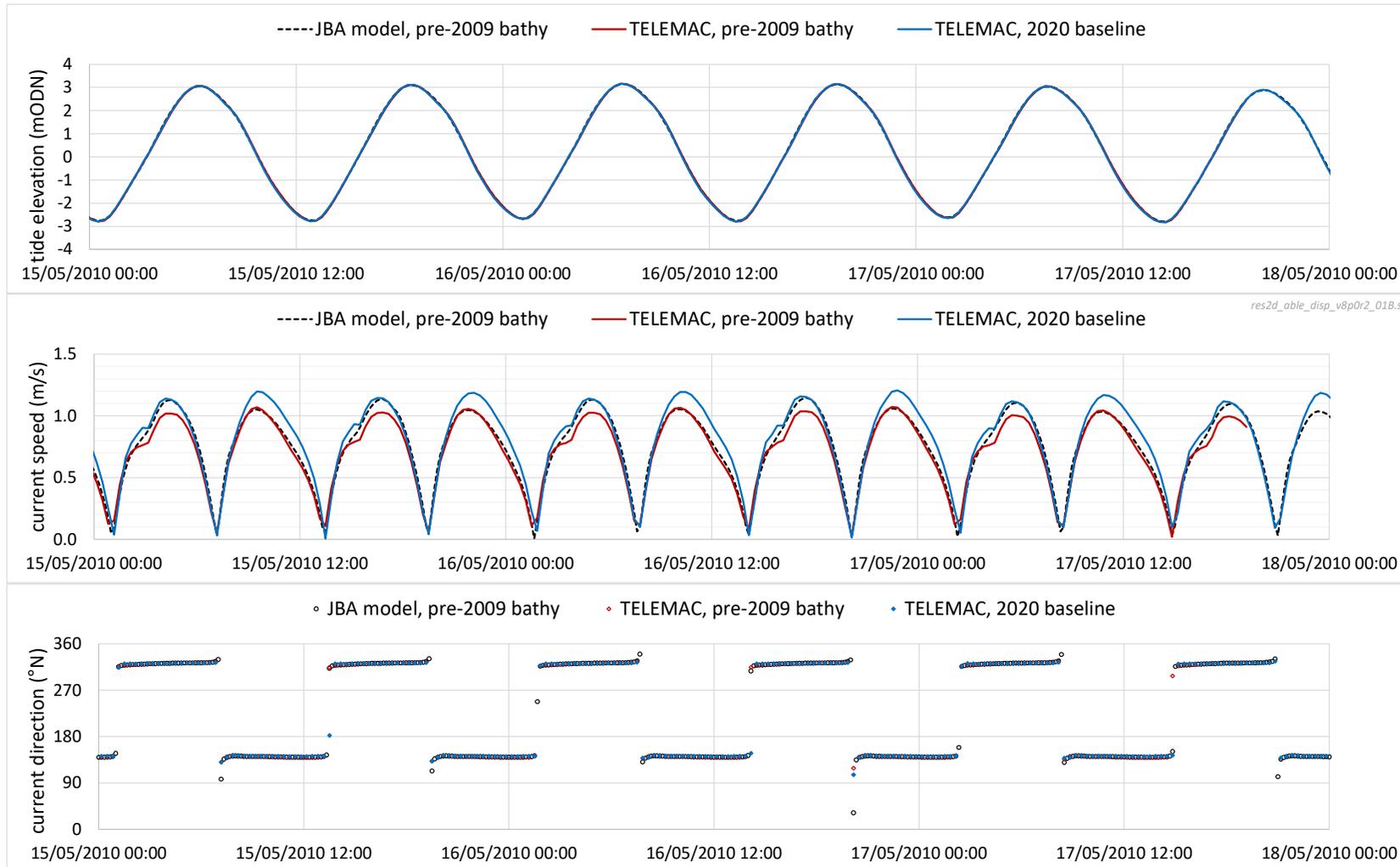
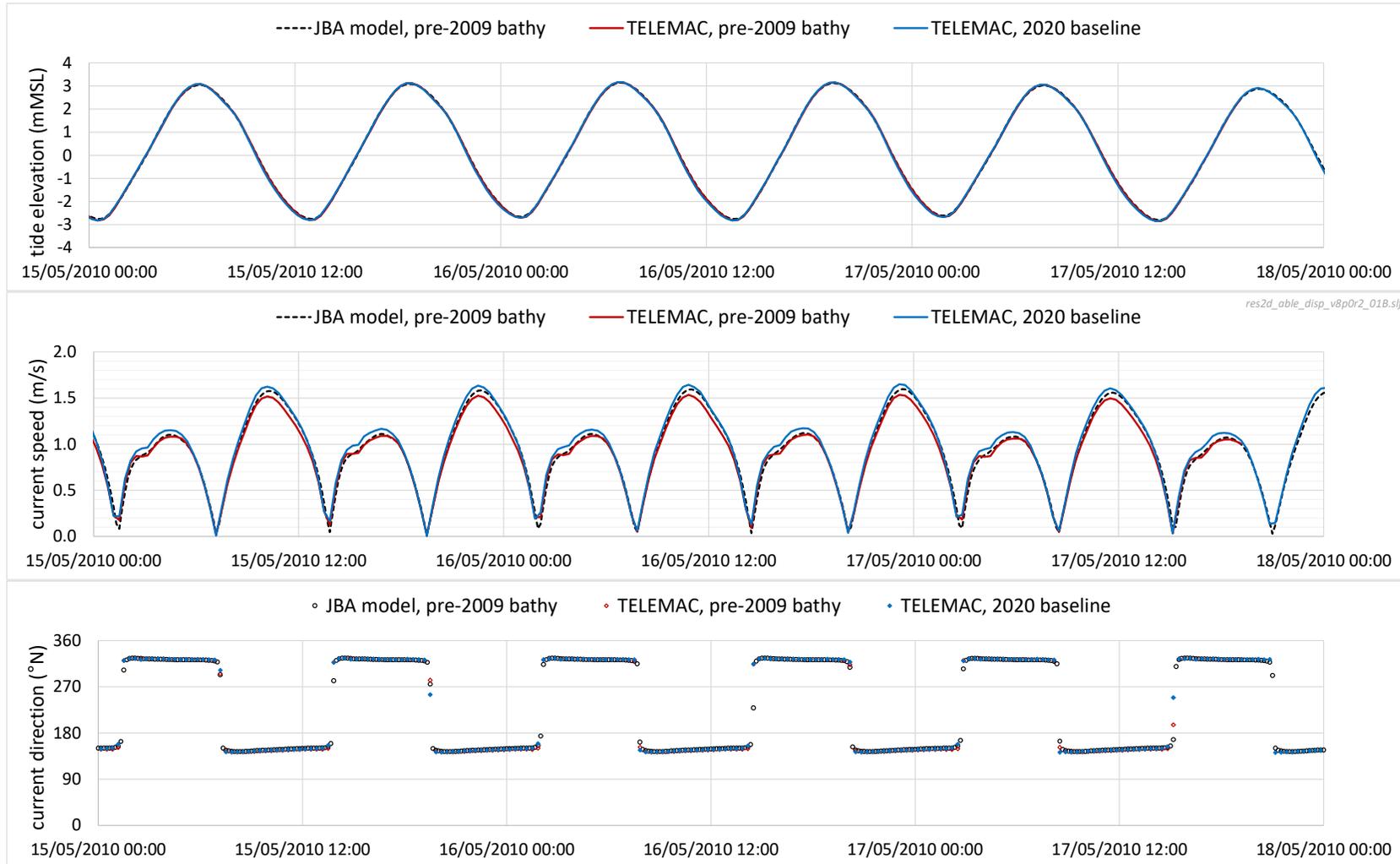


Figure 8-4: Predicted water levels and depth-averaged current speeds and directions at ADCP2 location



8.4.0 Assessment of Effects

Construction Phase Effects

Impact of capital dredge disposal

- 8.4.1 The construction of the AMEP requires dredging and disposal of approximately 4.3M Tonnes of materials including a proportion of firm/stiff clay. Schedule 8⁸ of the extant DCO provides for up to 1M Tonnes of clay to be deposited at HU082, a consented disposal site within the Humber Estuary and for 1.1M tonnes of clay to be deposited on land to be used as fill within the terrestrial areas of the AMEP site. As the proposed beneficial use of the clay as fill may no longer be an option, it is proposed that all the firm/stiff clay to be dredged by Backhoe dredger (BHD) will now be disposed of at HU082 within the Humber Estuary. At the deposit site bed levels will be raised locally to a minimum depth of -5.3 m CD. The impact of the bed changes associated with a scenario of complete filling of the site to a level of -5.3m CD has been examined using the TELEMAC 3D flow model to predict the changes in peak flows and shear stresses resulting from this disposal.
- 8.4.2 The difference in flow speed predicted as a result of the bed changes caused by disposal of clay at HU082 are shown in Figure 8-5 and Figure 8-6. The contours are in ODN so the -5m contour is at about -1m CD. Over the disposal site, where the water depth is shallower following the deposition, flow velocities increase on both ebb and flood tides. For ebb flows, the maximum increase was predicted to be 0.1 m/s at the western edge of the site. Smaller increases in flow velocity (less than 0.1 m/s) were predicted north and south of the disposal site. Decreases were predicted immediately up and down stream. A similar pattern was predicted for peak flood tides, however overall, the differences were smaller. The blue line represents the water's edge at the time in the simulation for which the results are extracted. The sinusoidal image in the top left of the figure shows the tide curve through the simulation and the time at which the results from the model have been output. The changes in current speeds are not predicted to impact the flows over the intertidal area.
- 8.4.3 Changes to bed shear stress are shown in Figure 8-7 and Figure 8-8 for ebb and flood flows respectively. For ebb flows increases in shear stress of up to 0.8 N/m² were predicted at the western edge of the disposal site. As with flow speeds, smaller changes were predicted for flood tides.

⁸ <https://www.gov.uk/government/publications/amep-marine-energy-park-variation-2>

Figure 8-5: Changes to predicted peak ebb flow velocity with disposal of clay at HU082

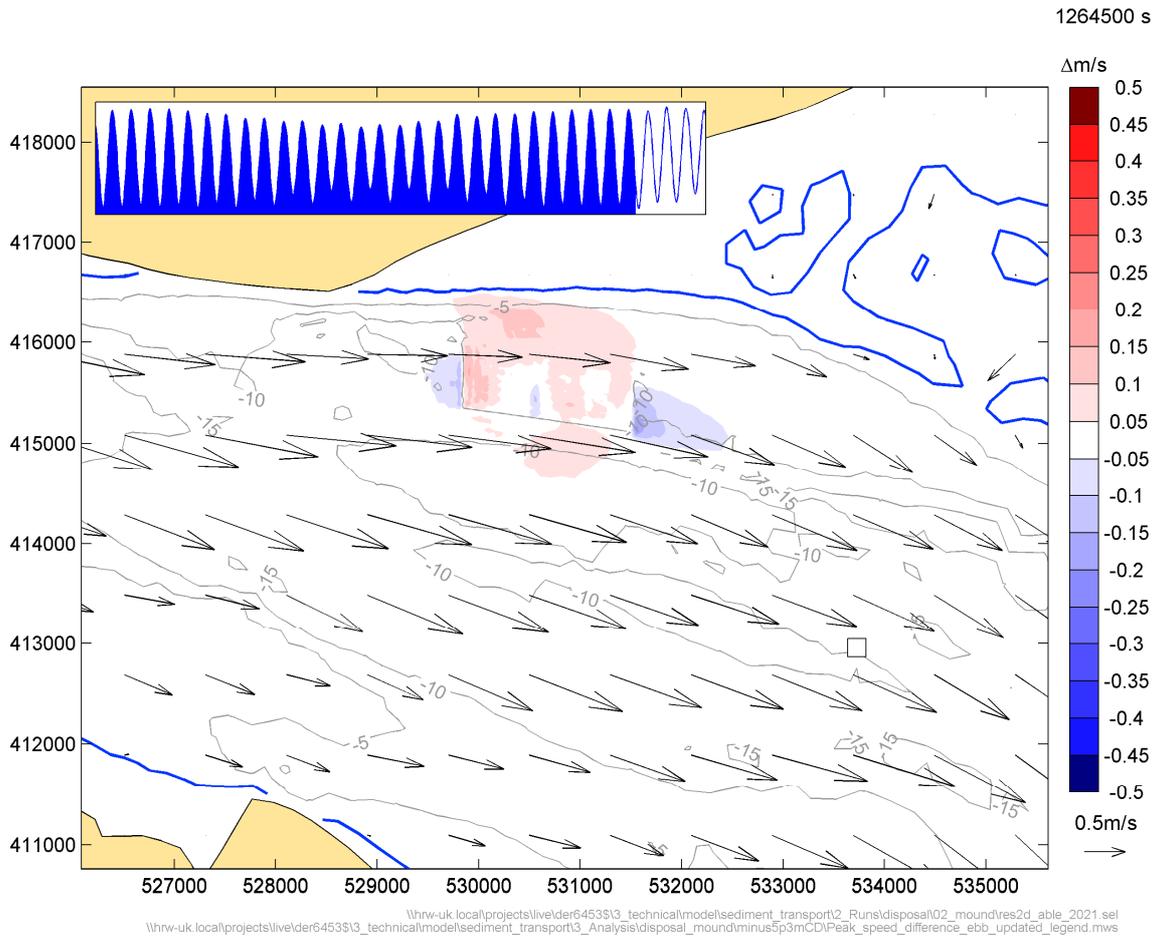


Figure 8-6: Changes to predicted peak flood flow velocity with disposal of clay at HU082

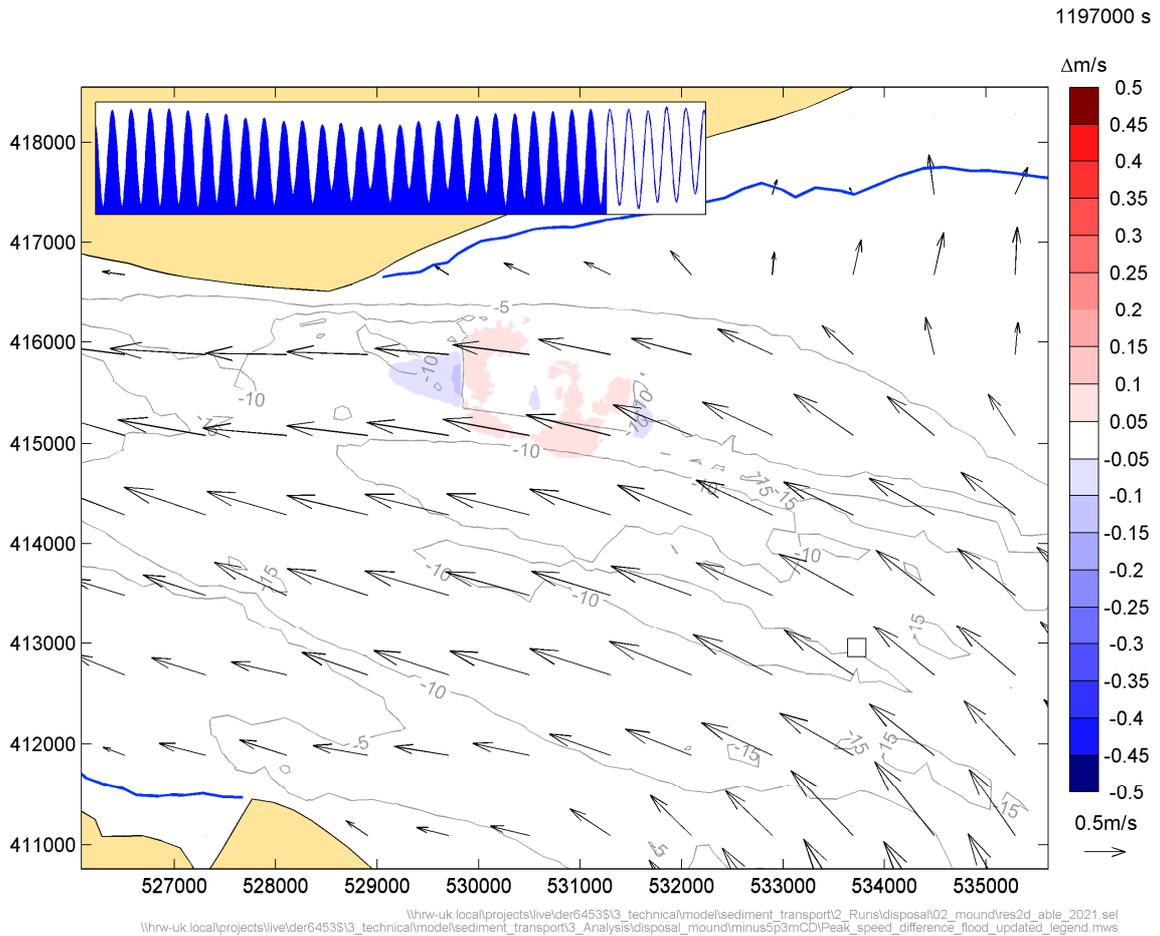


Figure 8-7: Changes to predicted peak ebb bed shear stress with disposal of clay at HU082

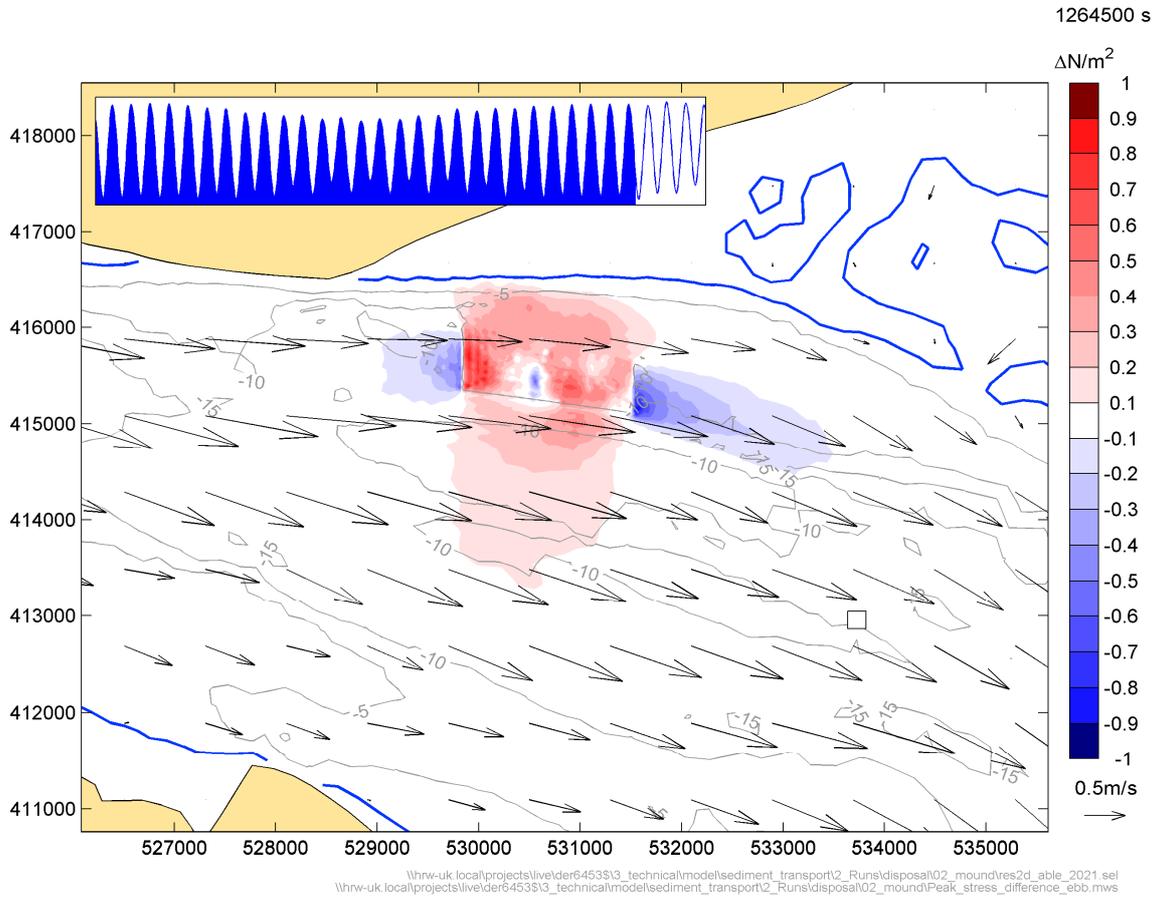
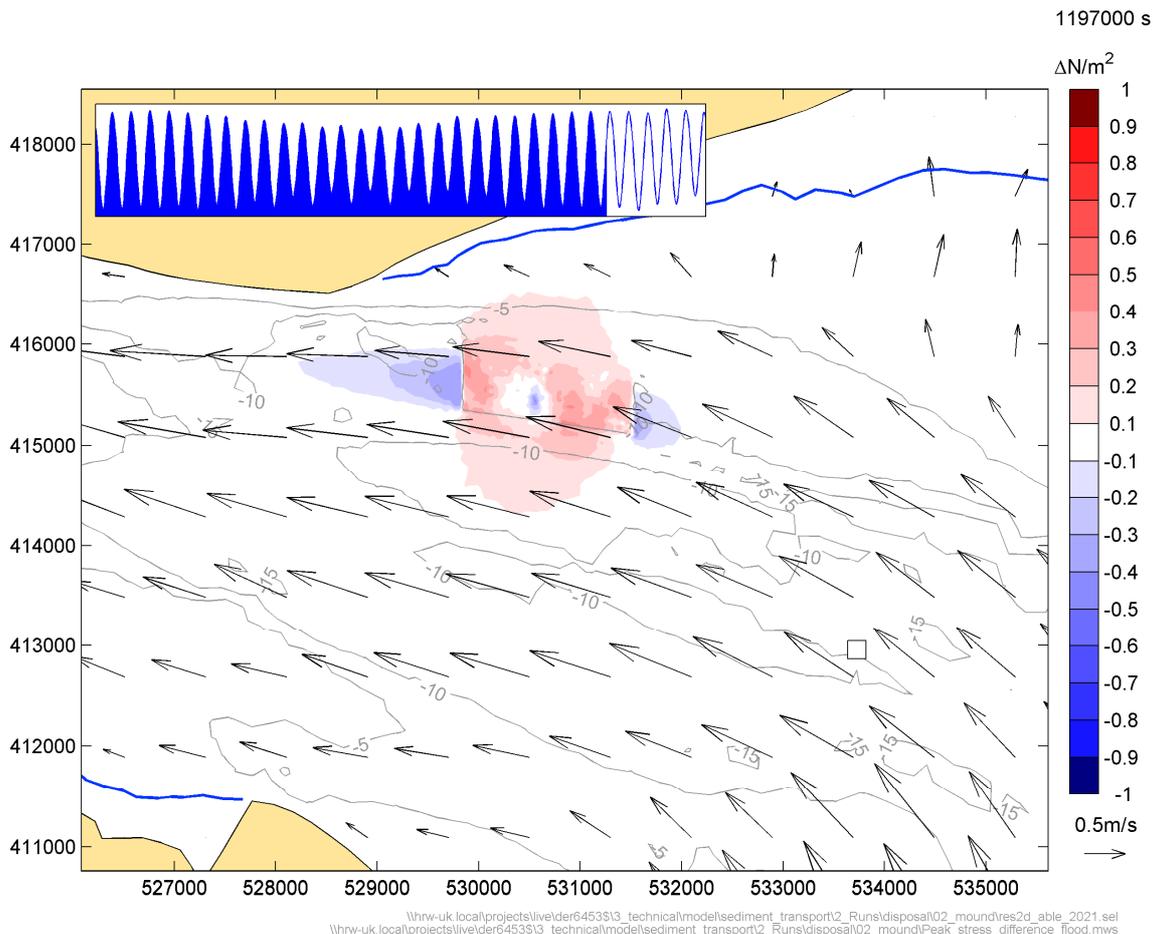


Figure 8-8: Changes to predicted peak flood bed shear stress with disposal of clay at HU082



8.4.4 The volume of clay proposed to be deposited to HU082 is under review.

8.4.5 An assessment of the likely behaviour and erosion rate of the clay placed at HU082 has been made (see Technical Appendix U9-2). This shows that stiff glacial till placed at the site will gradually breakdown and disperse from the site. Sands and gravels arising from this break down of the till will be temporarily retained in the low points between the individual mounds arising from the placement of till at the site. The dispersion of this coarser material will act to slow the overall abrasion and dispersion of the till by tidal currents and wave action. Erosion of the material placed at HU082 will occur more quickly in the southern parts of the site where the currents are higher.

8.4.6 A modelling assessment of changes to waves will be made as a result of the clay placement at HU082 and an assessment of the likely effect of the changes on nearby sensitive receptors, e.g. Hawkins Point, will be made and reported in the Updated ES.

Operational Phase Effects

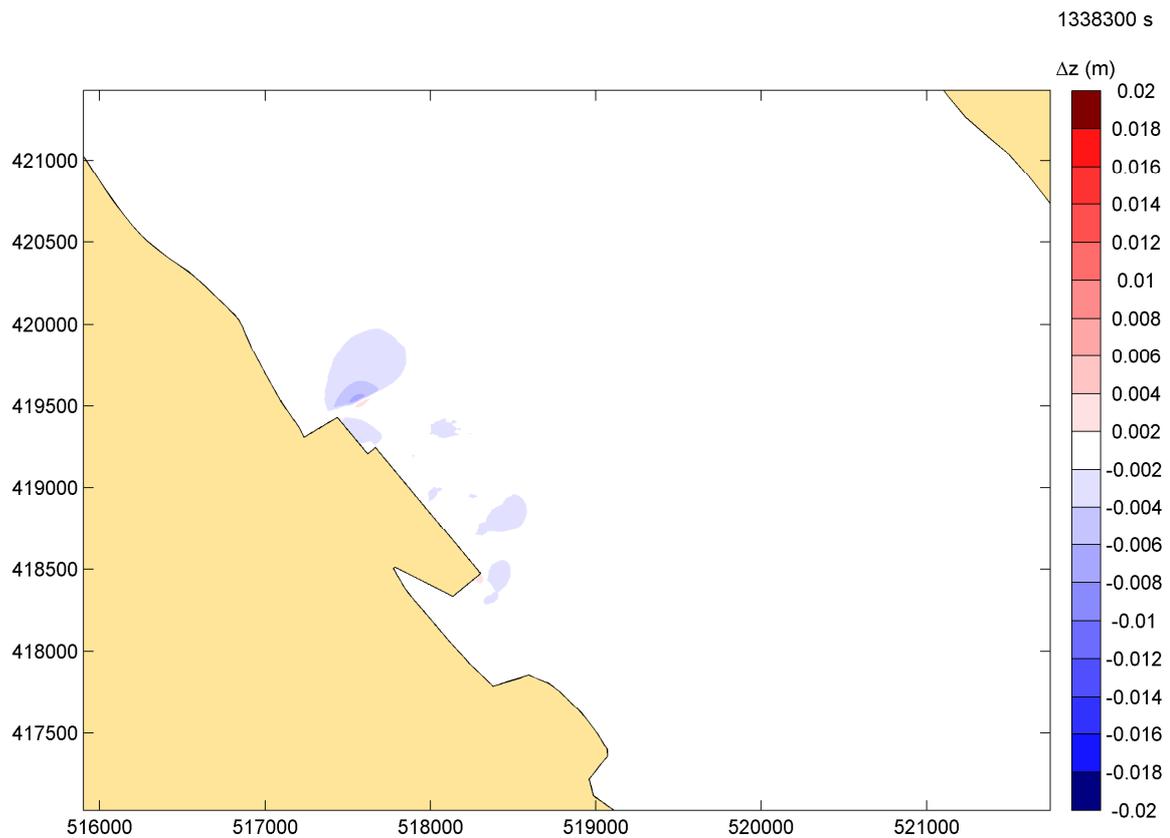
Hydrodynamic Impacts – Impacts on tidal levels

8.4.7 Figure 8-8 and Figure 8-11 show the modelled impacts on high water levels arising from the AMEP Amended Quay layout when compared with the updated baseline. The effect of the AMEP Amended Quay is slightly reduced compared with the changes predicted for the consented scheme (Figure 8-

10 and Figure 8-12) The already small changes to High Water levels are made smaller by the change in design at the upstream end of the AMEP Amended Quay, in particular the set-back nature of the upstream end of the AMEP Quay. Changes are less than 4 mm everywhere except for immediately north of AMEP where a reduction of up to 10 mm is predicted. Further away from AMEP no change is predicted.

8.4.8 A small change (mainly decreases, and all <5 mm) is predicted to low water levels in the AMEP berthing / turning area with no significant changes further away from the development.

Figure 8-9: Modelled changes to High Water levels (AMEP Amended Quay minus updated Baseline – negative shows a predicted reduction in High Water level)



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Figure 8-10: Modelled changes to High Water levels for consented layout (AMEP layout minus baseline – negative shows a predicted reduction in water High Water level). From EX 8.7A (JBA, 2012).

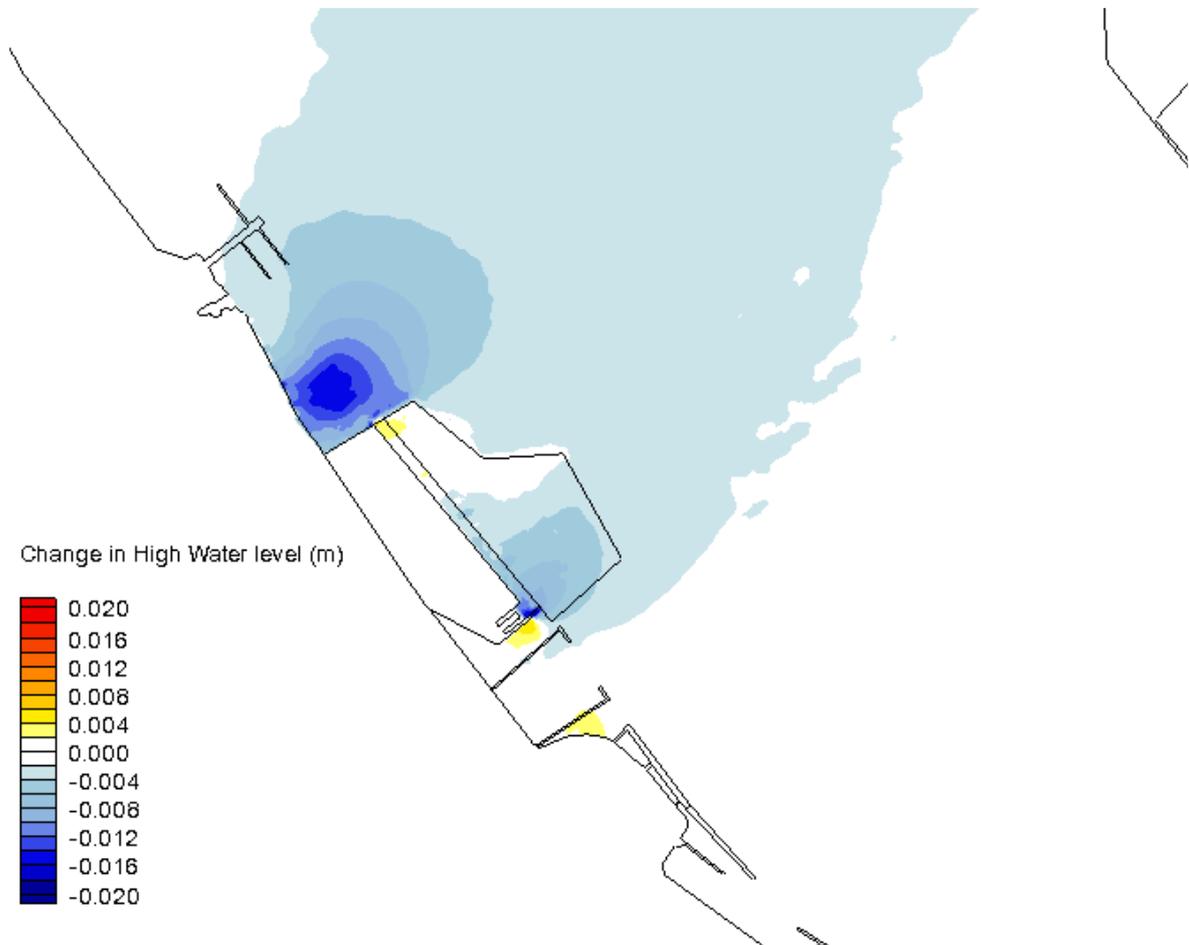
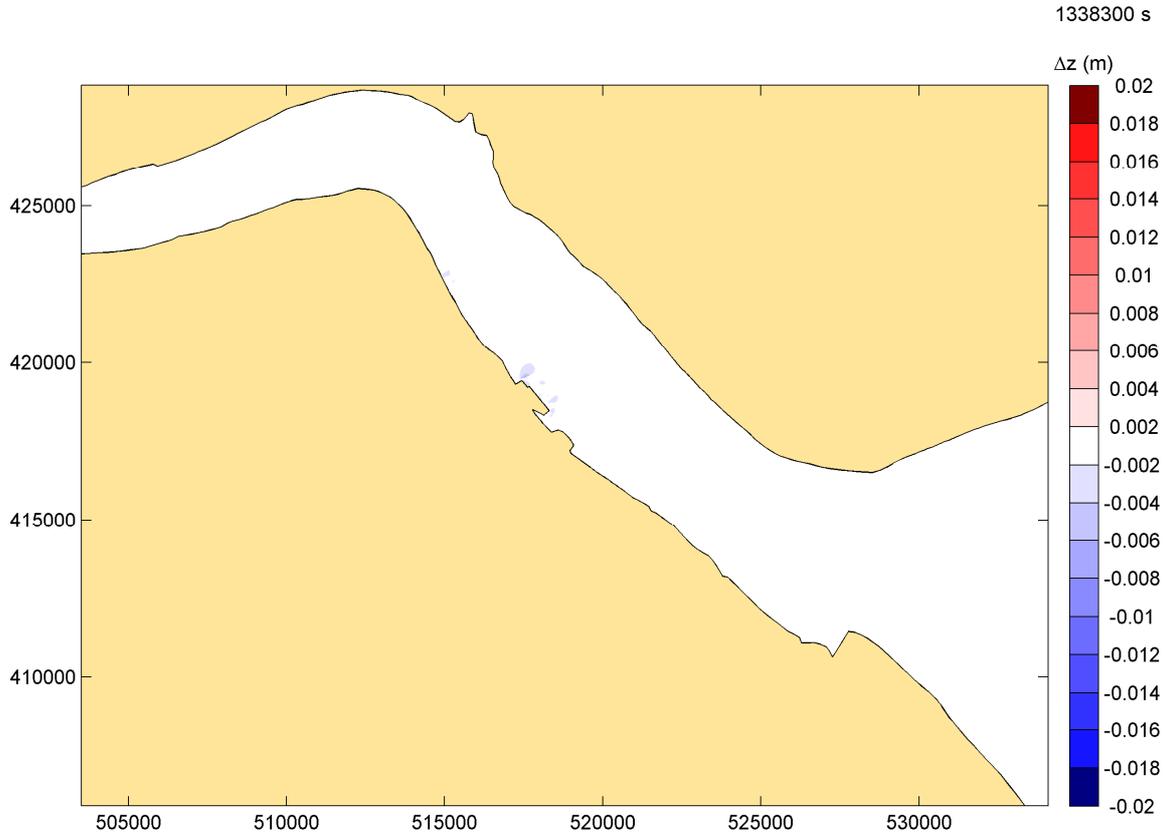
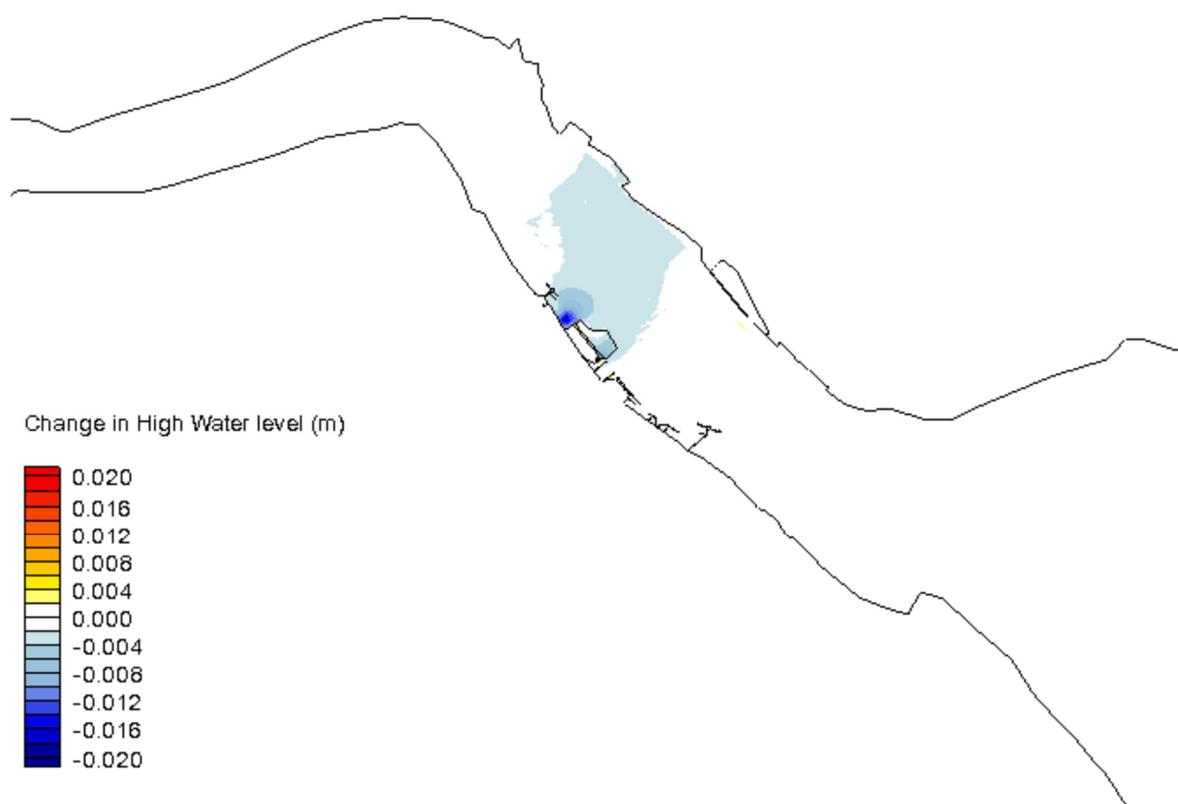


Figure 8-11: Modelled changes to High Water levels (AMEP Amended Quay minus updated Baseline – negative shows a reduction in water High Water level).



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Figure 8-12: Modelled changes to High Water levels for the consented layout (AMEP minus baseline – negative shows a reduction in water High Water level). From EX8.7A (JBA, 2012).



Hydrodynamic Impacts – Impacts on flows

- 8.4.9 Figure 8-13 and Figure 8-15 show modelled changes to peak flood and ebb flows respectively for a mean spring tide, comparing the AMEP Amended Quay layout against the updated baseline.
- 8.4.10 During flood flows (Figure 8-13) as before, reductions in flow speeds are predicted upstream and downstream of AMEP, although the amended quay leads to a smaller footprint of flow speed reduction upstream of AMEP when compared with the consented AMEP layout (Figure 8-14). Reductions of less than 0.1 m/s extend approximately 0.5 km in an upstream and downstream direction, with greater reductions in and near to the AMEP berth pockets.
- 8.4.11 During ebb flows (Figure 8-15) the footprint of flow speed changes immediately upstream and downstream is reduced compared with the consented layout (Figure 8-16) A reduction of less than 0.1 m/s extends for less than 0.5 km upstream. There is no noticeable (<0.05 m/s) reduction in peak ebb flow speed downstream This is partly due to the updated bathymetry (Figure 8-31) showing that significant intertidal accretion has continued in this location (in the lee of the HIT reclamation) since 2012, as well as development of the ‘natural’ channel in front of AMEP, but it is also as a result of the AMEP Amended Quay layout.
- 8.4.12 The Amended Quay leads to two further changes: peak flow speeds in the AMEP turning area are predicted to reduce by up to 0.15 m/s, and more in close proximity to the recessed quay at the northern end of AMEP; the footprint of increased flow speeds immediately downstream and offshore of AMEP is predicted to increase, with an increase in peak ebb flow speed of up to 0.3 m/s extending approximately 300 m downstream of the AMEP Quay, and an increase of 0.1 m/s

extending less than 0.5 km downstream.

Figure 8-13: Modelled changes to peak mean spring tide flood flows (AMEP Amended Quay layout minus updated baseline)

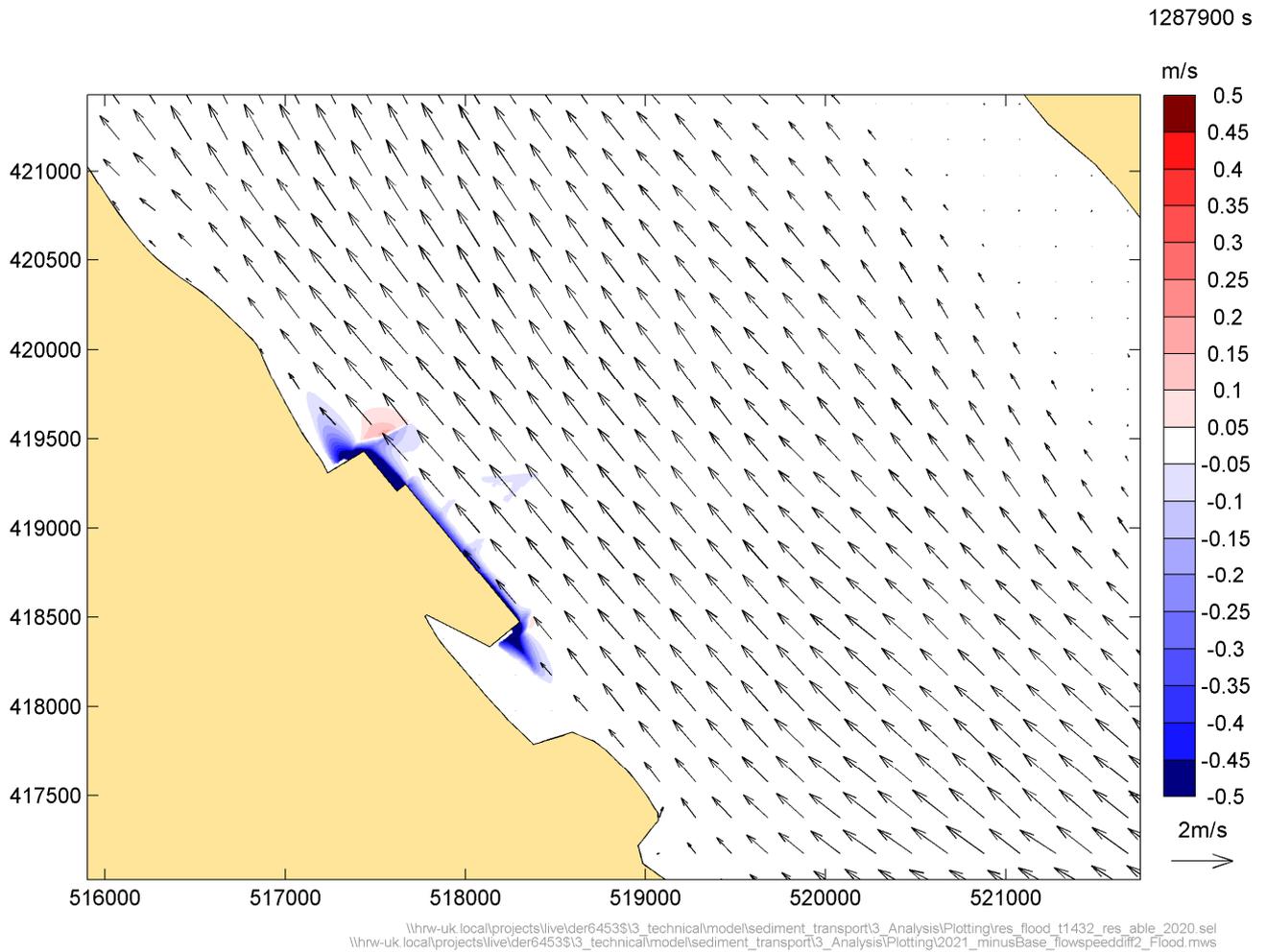


Figure 8-14: Modelled changes to peak mean spring tide flood flows for consented layout (AMEP minus baseline). From EX 8.7A (JBA, 2012)

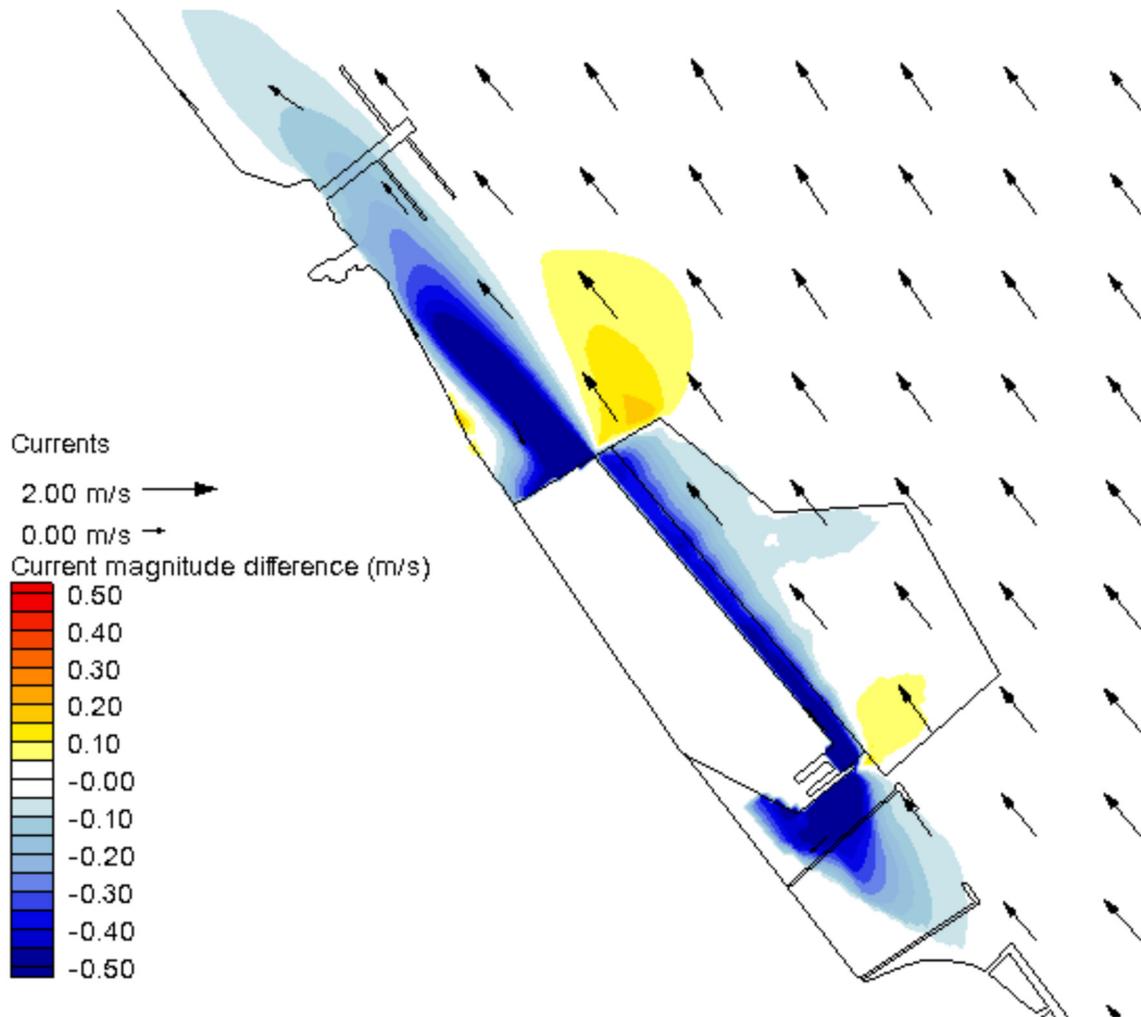
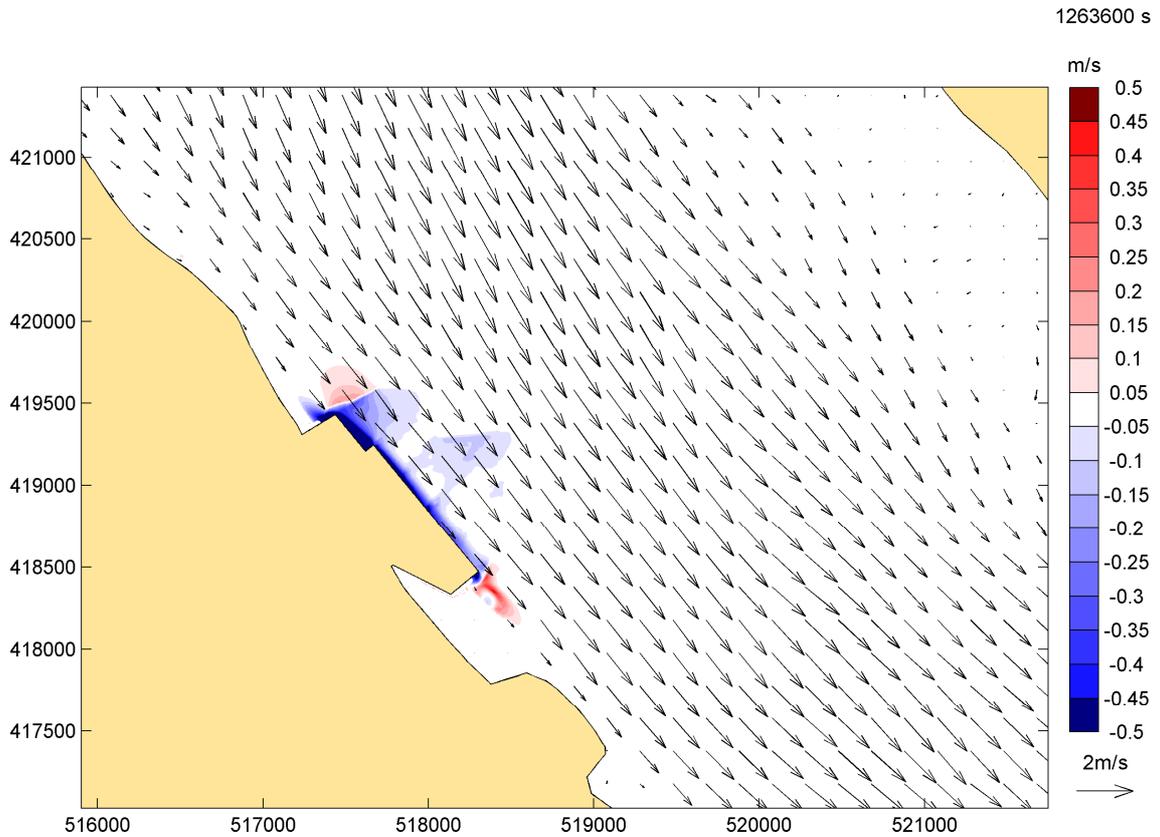
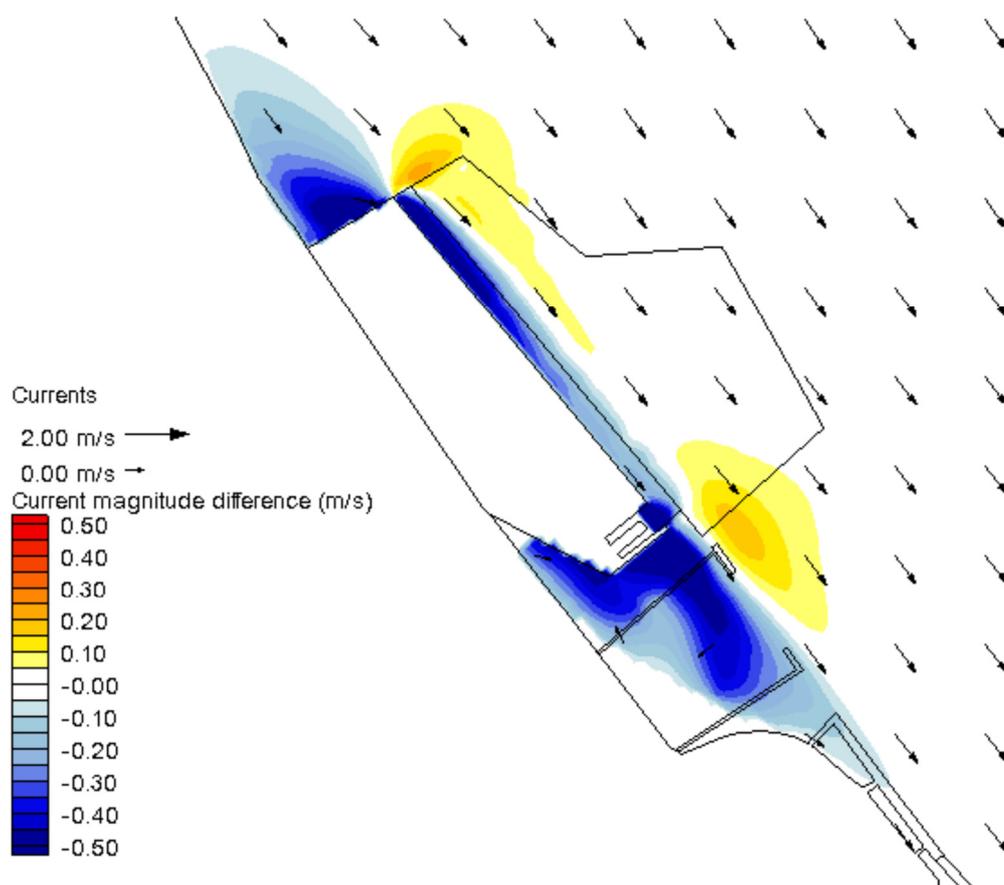


Figure 8-15: Modelled changes to peak mean spring tide ebb flows (AMEP Amended Quay layout minus updated baseline).



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Figure 8-16: Modelled changes to peak mean spring tide ebb flows (AMEP minus baseline). From EX8.7A (JBA, 2012). Impacts on Bed Shear Stress (due to changes in tidal flows)



- 8.4.13 Figure 8-17 and Figure 8-21 show predicted changes to bed shear stress (flood and ebb) in response to the AMEP Amended Quay layout. These are compared against Figures for the previously consented scheme (Figure 8-18 and 8-22 respectively). Figure 8-19 and Figure 8-23 show predicted changes over the wider estuary (compared with Figure 8-20 and 8-24 respectively for the previously consented scheme).
- 8.4.14 The AMEP Amended Quay layout when compared against the updated baseline shows a similar but reduced footprint of reductions to peak bed shear stress immediately upstream and downstream of AMEP when compared with the consented layout (Figure 8-17 and Figure 8-21). Predicted increases in peak bed shear stress are similar in footprint. The AMEP Amended Quay is predicted to result in a decrease in peak bed shear stress in the AMEP turning area compared with the updated baseline, which is due both to the updated bathymetry and the Amended Quay. The wider area figures show that, as for the consented layout, no significant changes to peak bed shear stress are shown in the Estuary further away from AMEP (Figure 8-19, Figure 8-20, Figure 8-23 and Figure 8-24).

Figure 8-17: Modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP Amended Quay minus updated baseline).

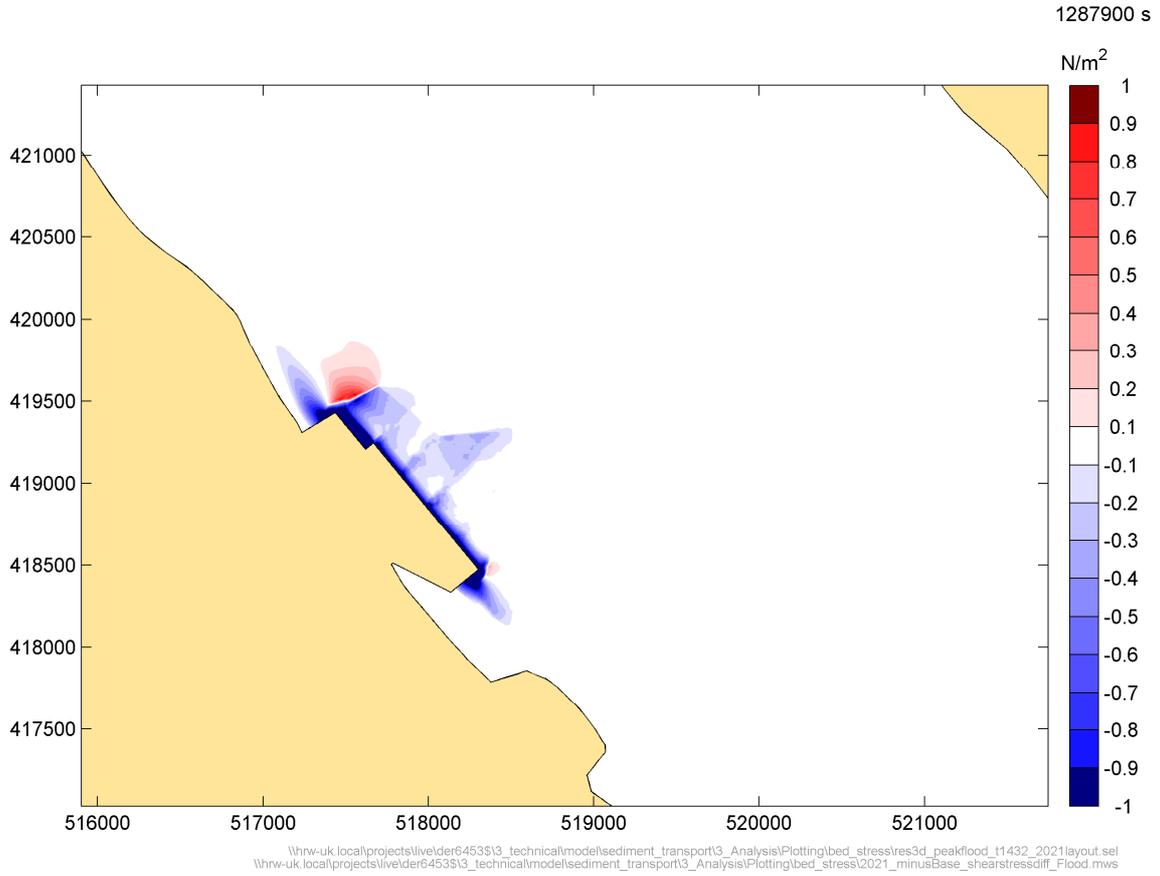


Figure 8-18: Updated modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP minus baseline). From EX8.7A (JBA, 2012).

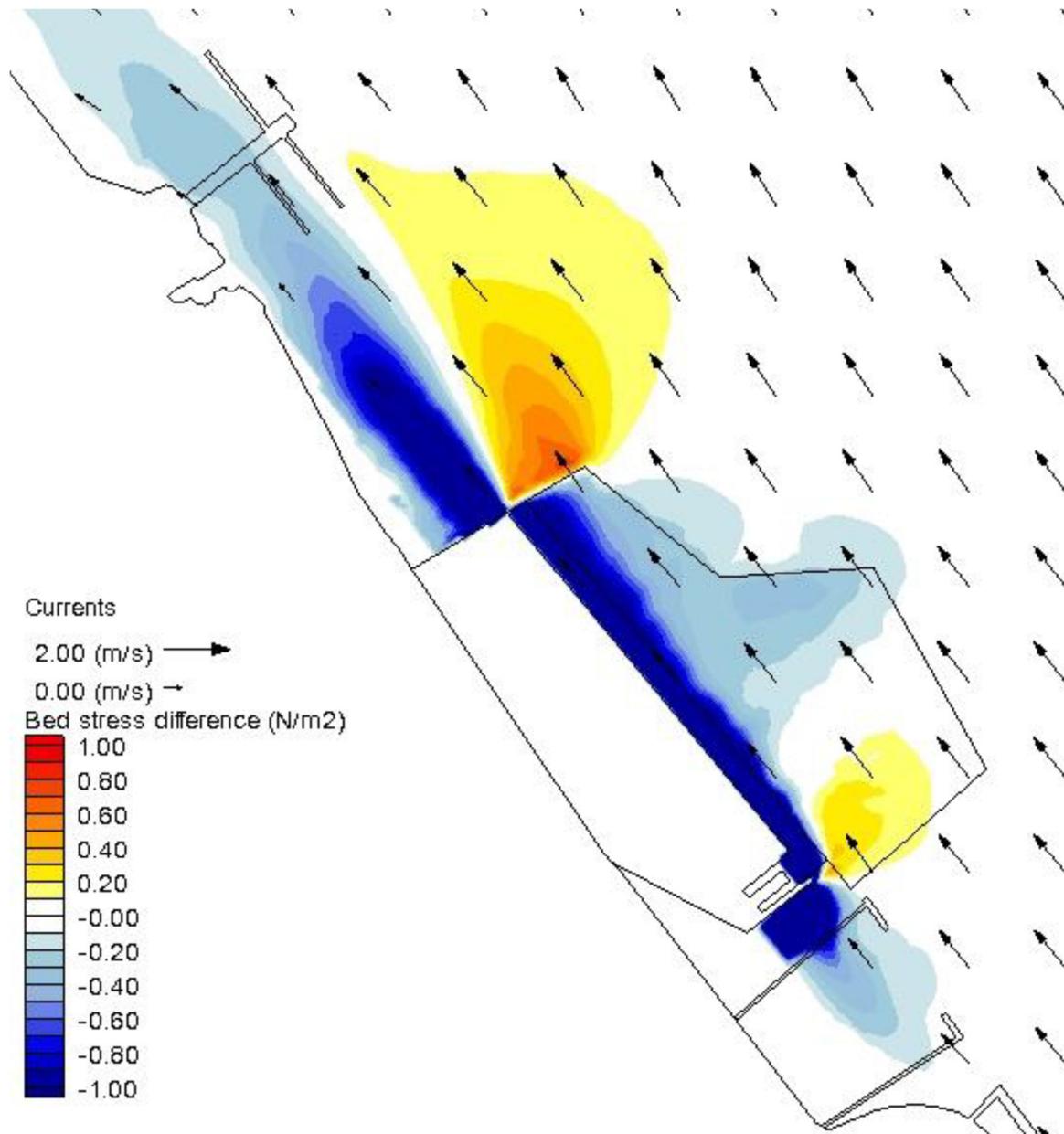
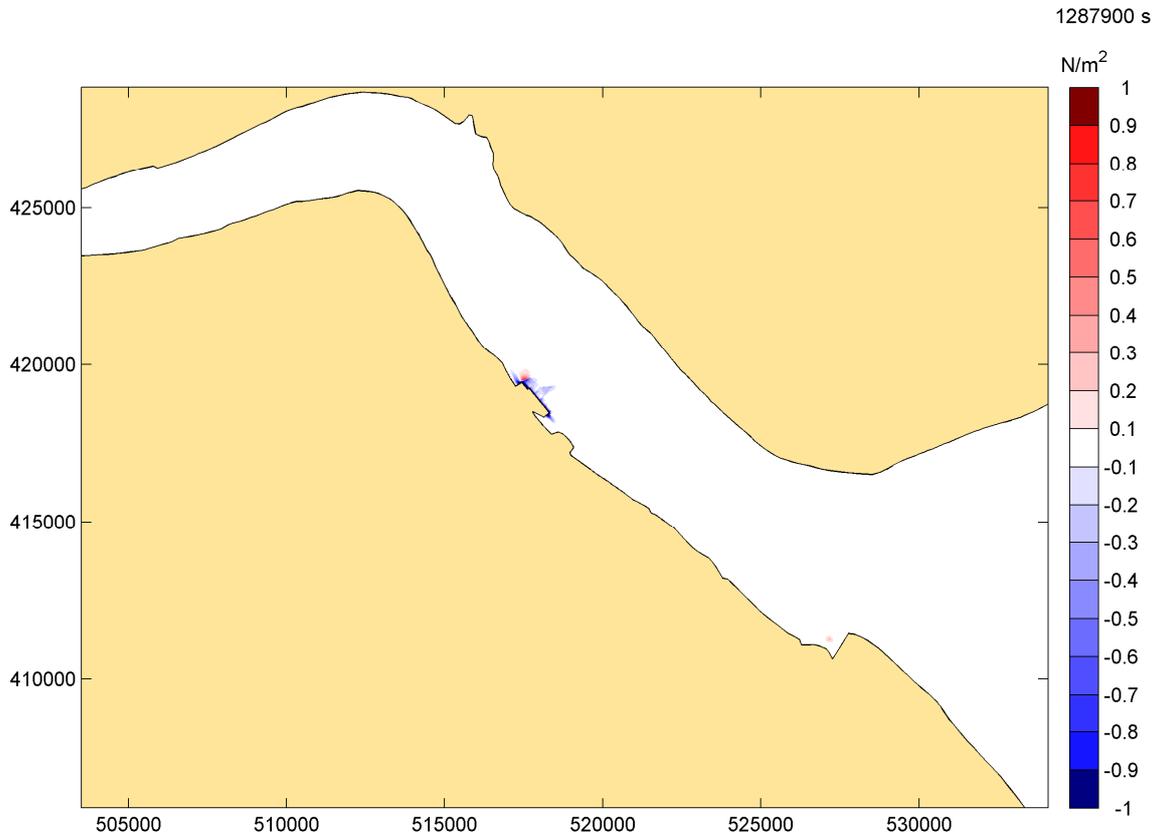


Figure 8-19: Wider Estuary modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP Amended Quay minus updated baseline).



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Figure 8-20: Wider Estuary modelled changes to peak mean spring tide bed shear stress, flood tide (AMEP minus baseline). From EX8.7A (JBA, 2012).

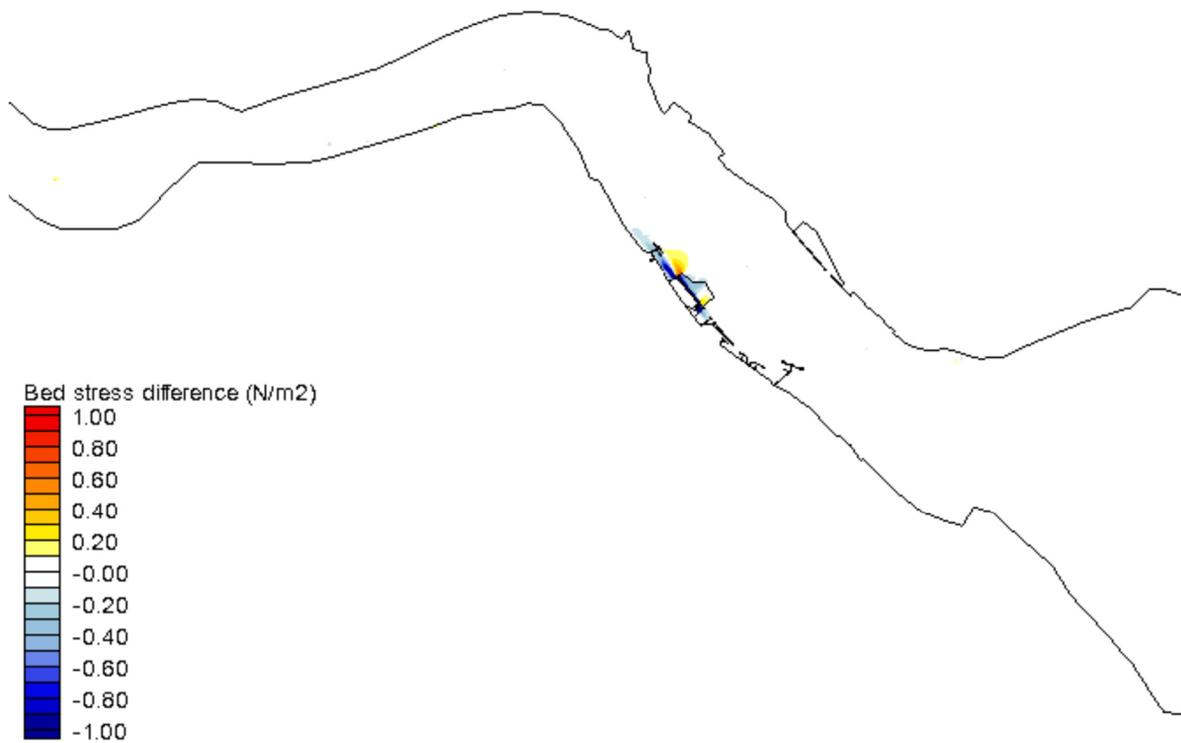


Figure 8-21: Modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP Amended Quay layout minus updated baseline)

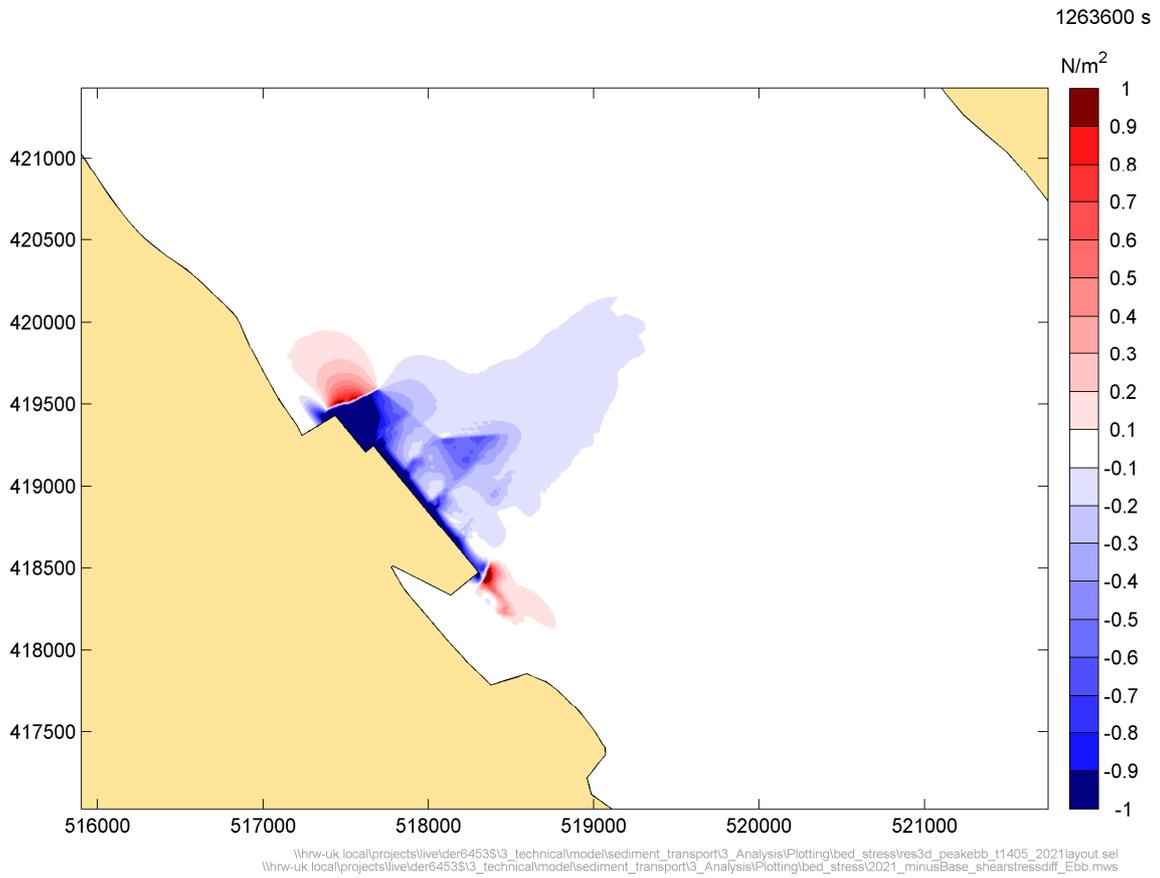


Figure 8-22: Updated modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP minus baseline). From EX8.7A (JBA, 2012)

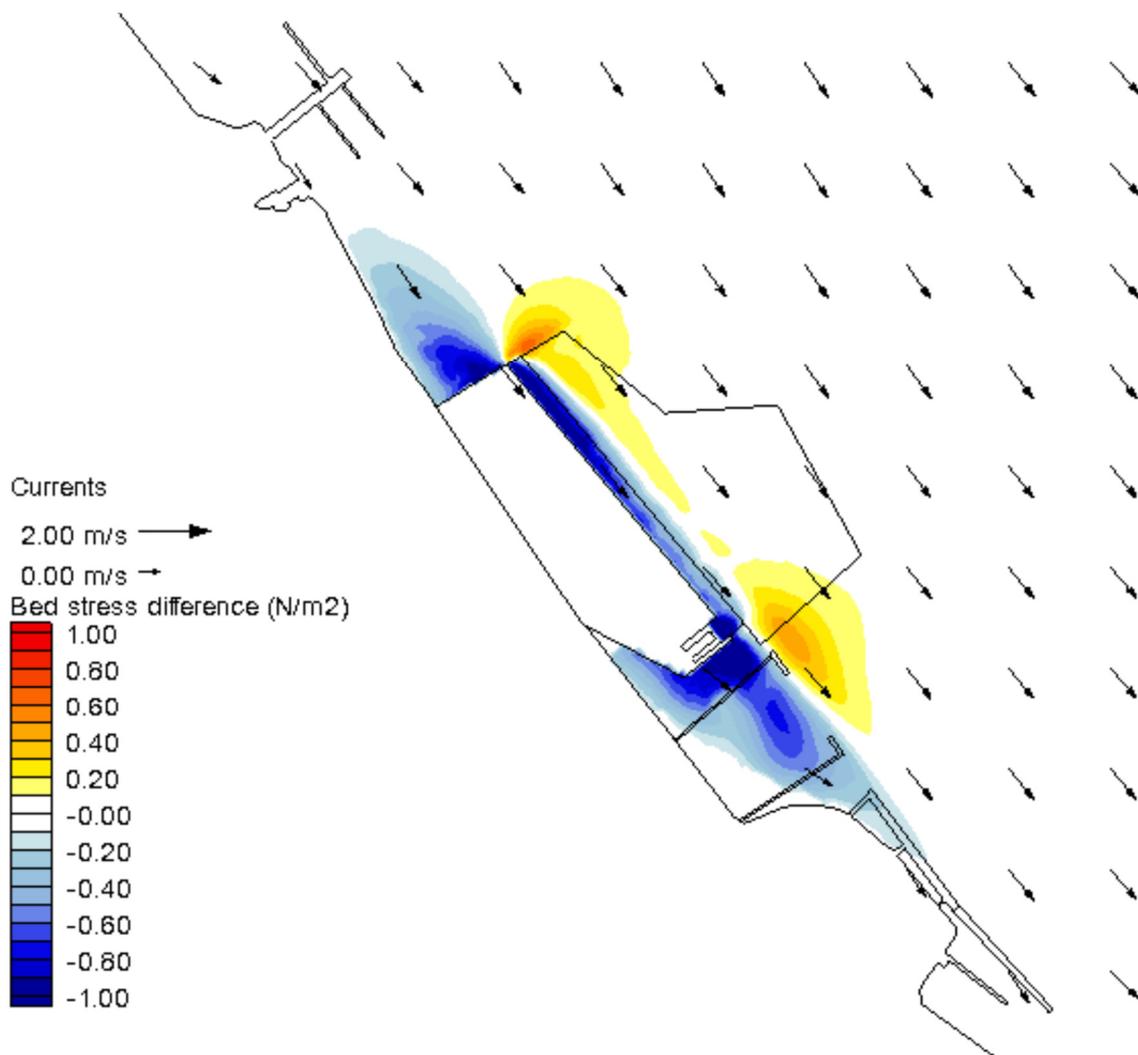
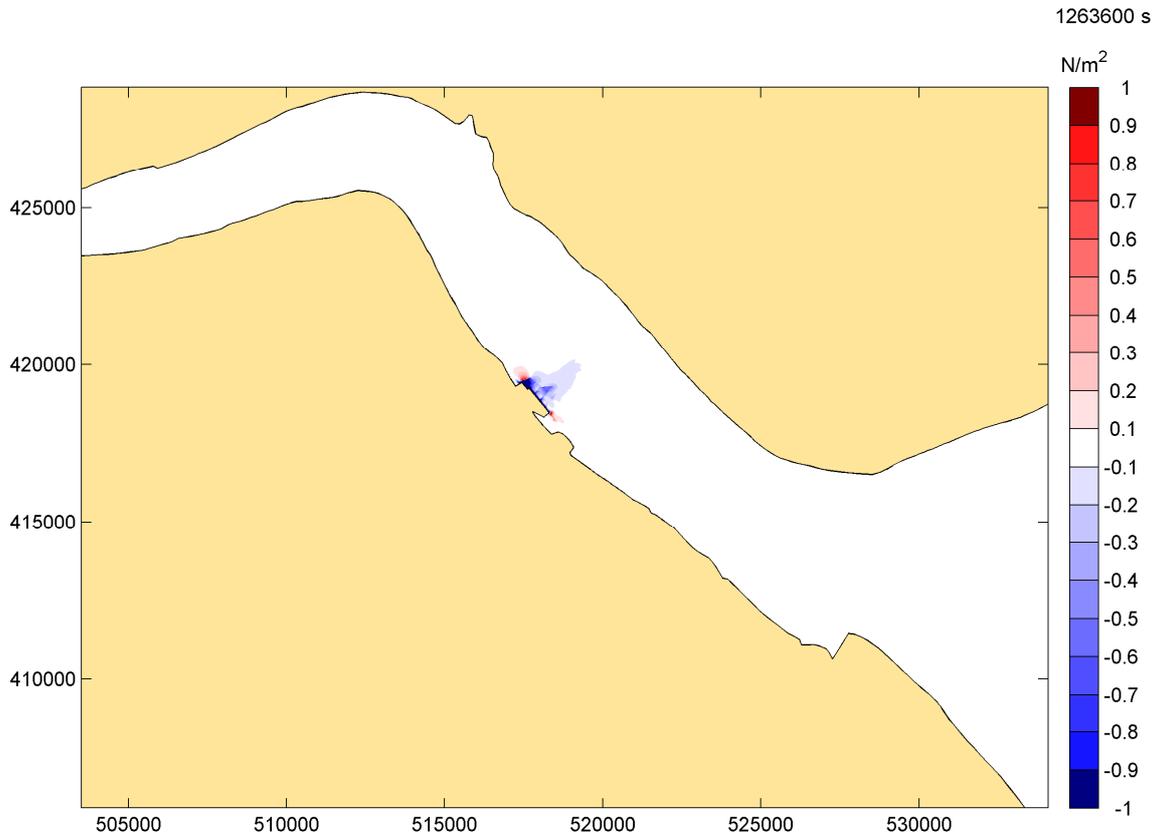
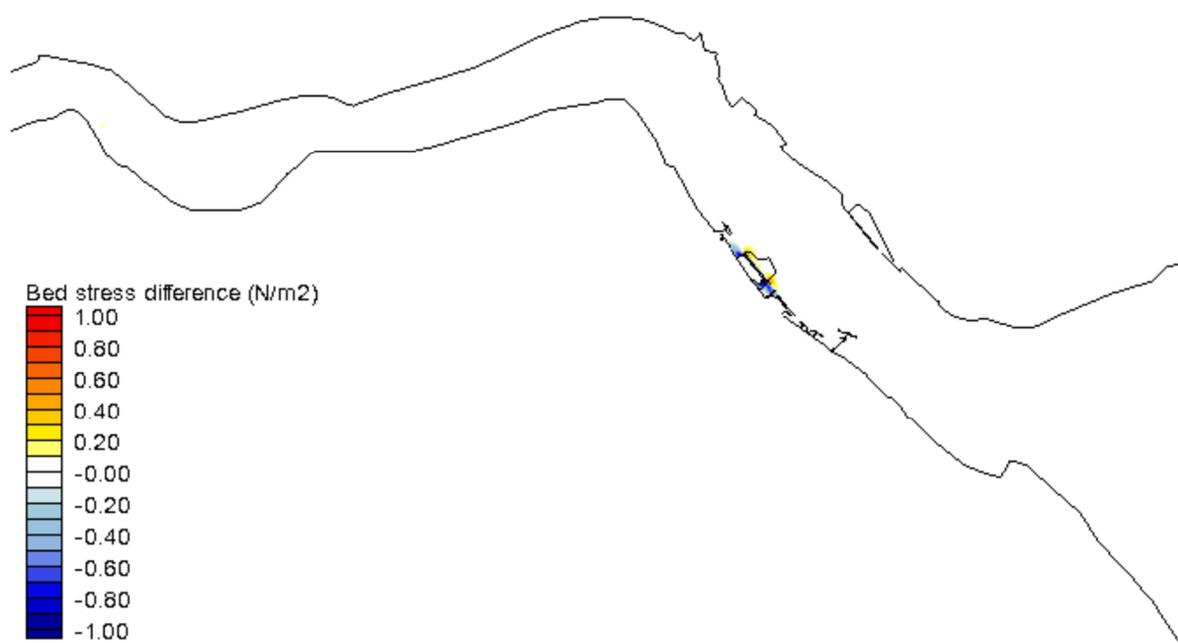


Figure 8-23: Wider estuary modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP Amended Quay layout minus updated baseline).



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\\hrw-uk.local\projects\live\der64533\3_technical\model\sediment_transport\3_Analysis\Plotting\bed_stress\2021_minusBase_shearstressdiff_Ebb_overview.mws

Figure 8-24: Wider estuary modelled changes to peak mean spring tide bed shear stress, ebb tide (AMEP minus baseline). From EX8.7A (JBA, 2012).



Impacts on waves and overtopping

8.4.15 Because of the minor changes associated with the proposed Amended Quay compared with the consented scheme, impact on waves has been assessed by expert analysis rather than by application of further wave modelling.

8.4.16 Figure 8-1 shows the AMEP Amended Quay layout compared with the consented AMEP Quay. The differences between the layouts that may affect waves are as follows:

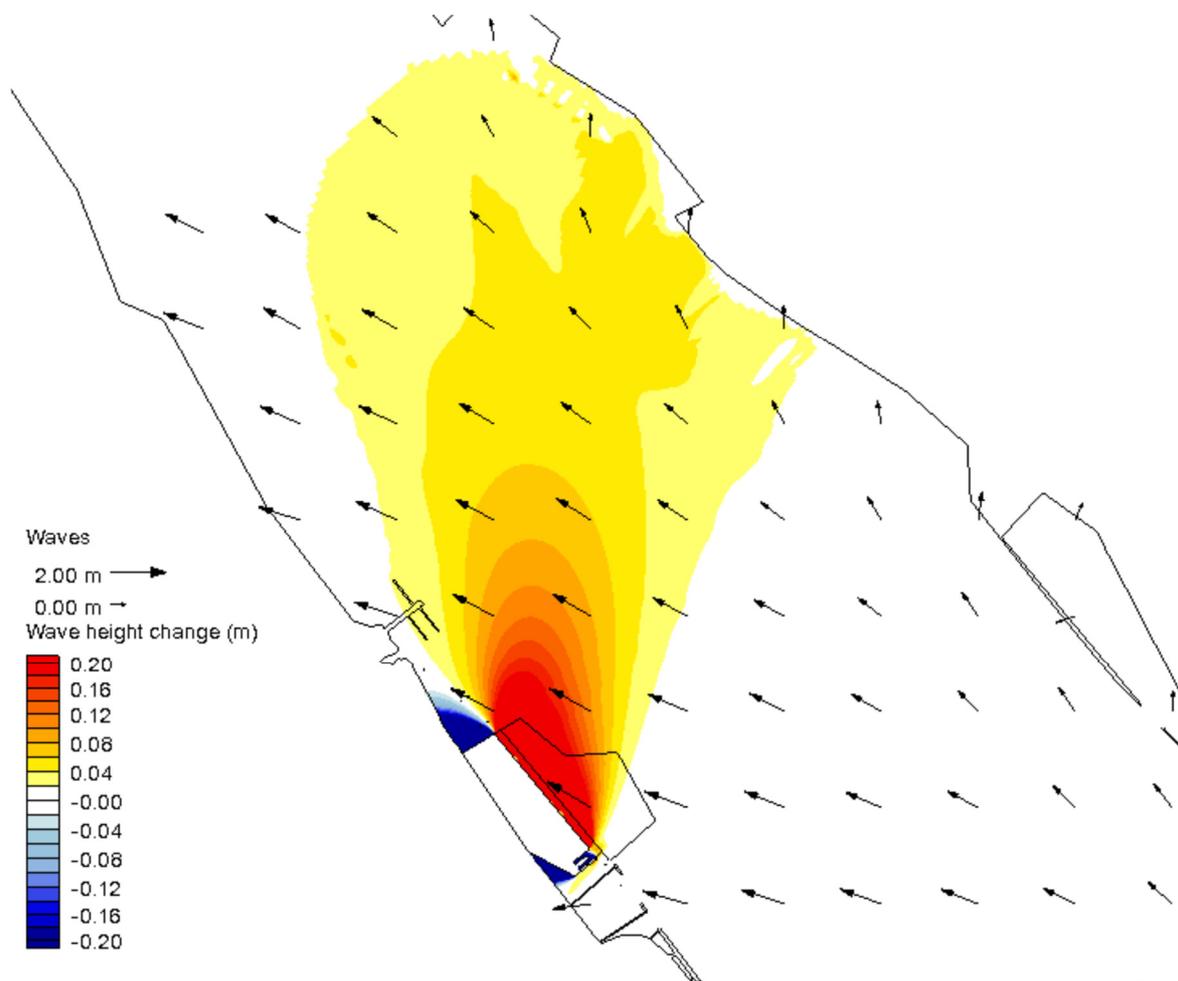
- The berth at Quay 7 (upstream end) has been inset from the line of the other berths
- The specialist dock at Quay 1 (downstream end) has been filled into a straight quay aligned with the main quay face and the caisson breakwater at the south eastern end removed.
- The local baseline intertidal bathymetry has further accreted since the DCO assessment.

8.4.17 Differences to predicted wave impacts arising from the AMEP Amended Quay layout are described below.

Changes to wave reflections from the main quay

8.4.18 For the consented layout, wave reflections from the main quay face were predicted to cause local increases in waves in front of the quay and reflections across the estuary (Figure 8-25).

Figure 8-25: Modelled increase in wave heights for a 1:200-year water level/wave height event in 2033 for waves from the east (Final AMEP Layout minus future 2033 ‘baseline’). From EX8.7A (JBA, 2011)



8.4.19 For the AMEP Amended Quay, the line of the quay is less continuous since the Quay 7 berth is set back. The waves are relatively short period. As the reflected wave travels back out of the berth pocket the refraction effect will be reversed so any change in direction of the reflected waves is likely to be minimal. The fact that the face of the quay wall includes a setback to Quay 7 is likely to induce slightly more spreading of the reflected wave as the wave front is not being reflected from a single plane face. It is therefore concluded that the wave reflected to the north shore will be no greater and likely slightly smaller than for the consented scheme.

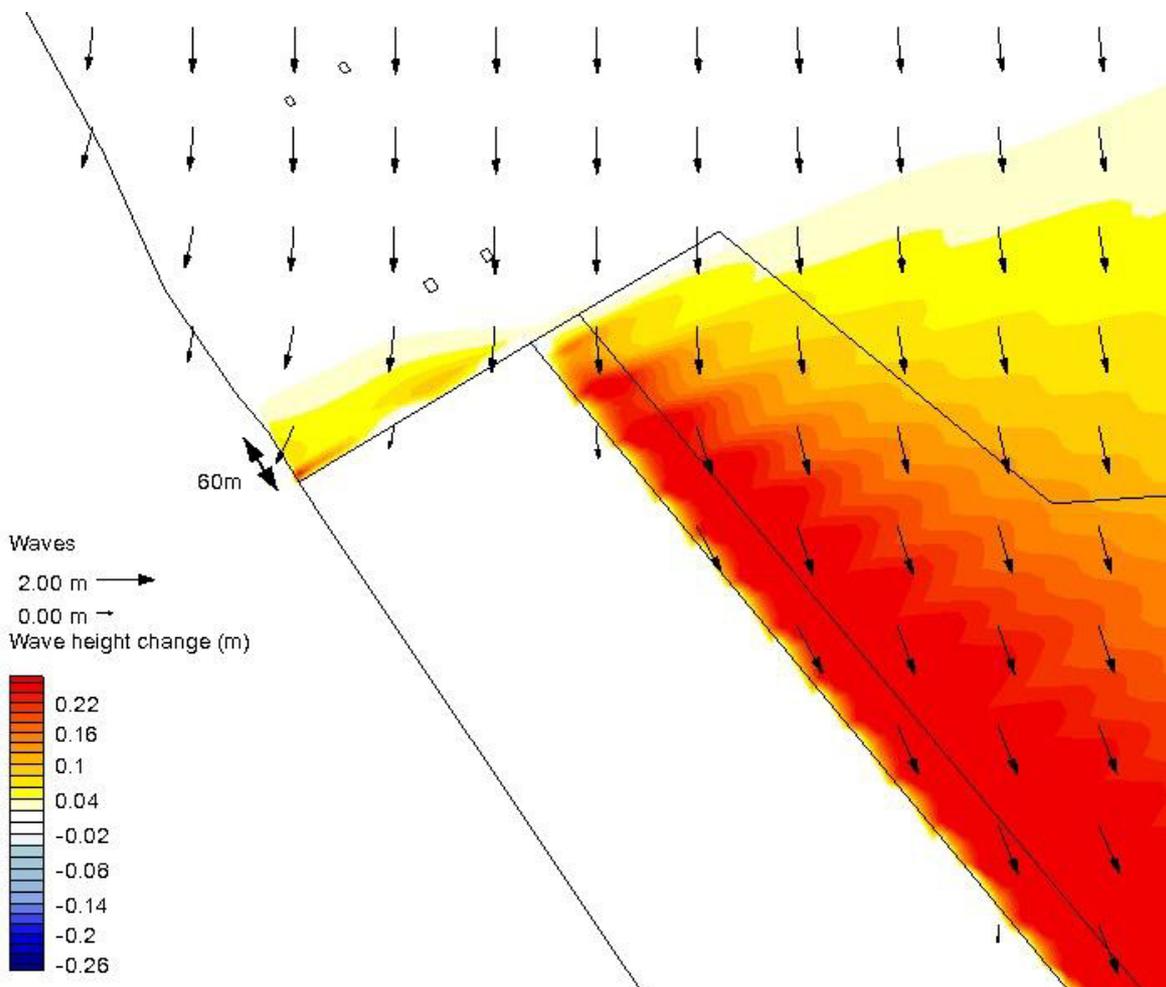
8.4.20 Waves from the Northwest also reflect from the quay wall but do not significantly affect the north shore of the estuary. The difference for these waves in the proposed new layout is that there is a corner in the new Quay 7 berth. There will be a concentration of wave energy in this corner as waves reflect from both Quay 6 and Quay 7 on either side of the corner. This is a local effect that may increase the chance of wave overtopping locally onto the quay in this corner. This will need to be considered in the design of the quay and its drainage arrangements.

Changes to wave reflections from the Northwestern face

8.4.21 For the consented AMEP quay, reflections of Northwesterly waves from the Northwestern face of the reclamation are predicted to cause local increases in wave heights in the corner just upstream of the development (Figure 8-26). The scheme therefore includes a mitigation measure of rock

armour extending 60m upriver in front of the EA sea defences.

Figure 8-26: Modelled increase in wave heights for a 1:200-year water level/wave height event in 2033 for waves from the north (Final AMEP Layout minus future 2033 'baseline'). From EX8.7A (JBA, 2012)



8.4.22 In the proposed amended quay layout, the fact that Quay 7 is inset means that the vertical wall along the Northwestern face of the reclamation extends for a shorter distance. This will mean that reflections from this face onto the upriver shore will be slightly reduced causing less of an impact. It should also be noted that there has been, and is likely to continue to be, accretion of the intertidal area at this location which will provide protection to the sea defences.

Changes to wave reflections from the Southeastern face

8.4.23 Waves from the Southeast also reflect from the Southeastern face of the development. However, as explained in the JBA(2012) report, in this area the depths in front of the sea defences are very shallow so that any additional reflected wave energy will break before it reached the sea defences. Further accretion has continued in this location since 2012 with effects correspondingly further reduced.

8.4.24 For the AMEP Amended Quay, rock armour extending along the same part of this face of the development is proposed as for the consented scheme. The only difference is that the outer (seaward) section will be the vertical face of the reclamation rather than a caisson breakwater. Both the caisson breakwater modelled previously, and a vertical wall would have a similar reflection

coefficient of close to 1.0 so would locally reflect a similar amount of wave energy. Therefore, the proposed layout is likely to have a similar effect on waves to the southeast of the development than the consented scheme.

Impacts on sediments

8.4.25 The sediment on the bed in the vicinity of the proposed quay varies between mud, sandy mud, and muddy sand. For this reason, impacts on sediment transport were assessed through the use of 2D sand transport and 3D mud transport models. The 3D model was used to investigate the likely effects of the scheme on suspended sediments and morphology along the intake/outfall lines and sedimentation onto designated intertidal areas and into the existing adjacent downstream berths.

8.4.26 Figure 8-27 shows predicted deposition into the proposed amended quay berth pockets. A similar pattern of deposition to that in Figure 8-28 (consented layout) is seen downstream of the development. Upstream it is seen that the Amended Quay leads to a change (reduction) in the predicted increase in deposition towards the former HST (now C.Ro Port) berths.

Figure 8-27: Predicted increases to deposition or erosion of muddy sediments after a spring-neap cycle (AMEP Amended Quay layout minus updated baseline)

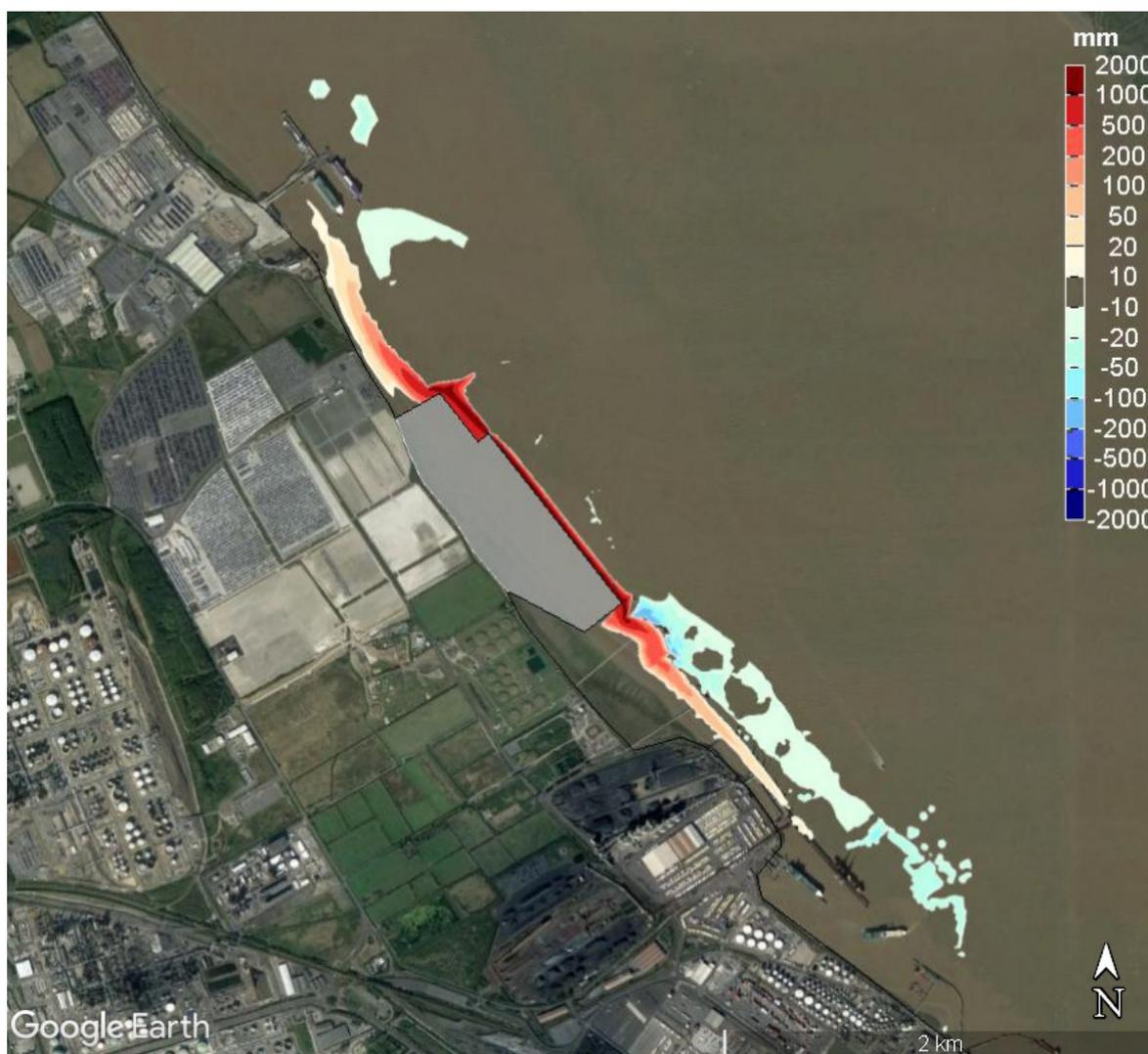


Figure 8-28: Predicted increases to deposition or erosion of muddy sediments after a spring-neap cycle (AMEP minus baseline [consented]). From Annex 8.3 (HR Wallingford, 2011)



Figure 8-29: Predicted increases to potential deposition or potential erosion of sandy sediments after a spring-neap cycle (AMEP Amended Quay layout minus updated baseline).

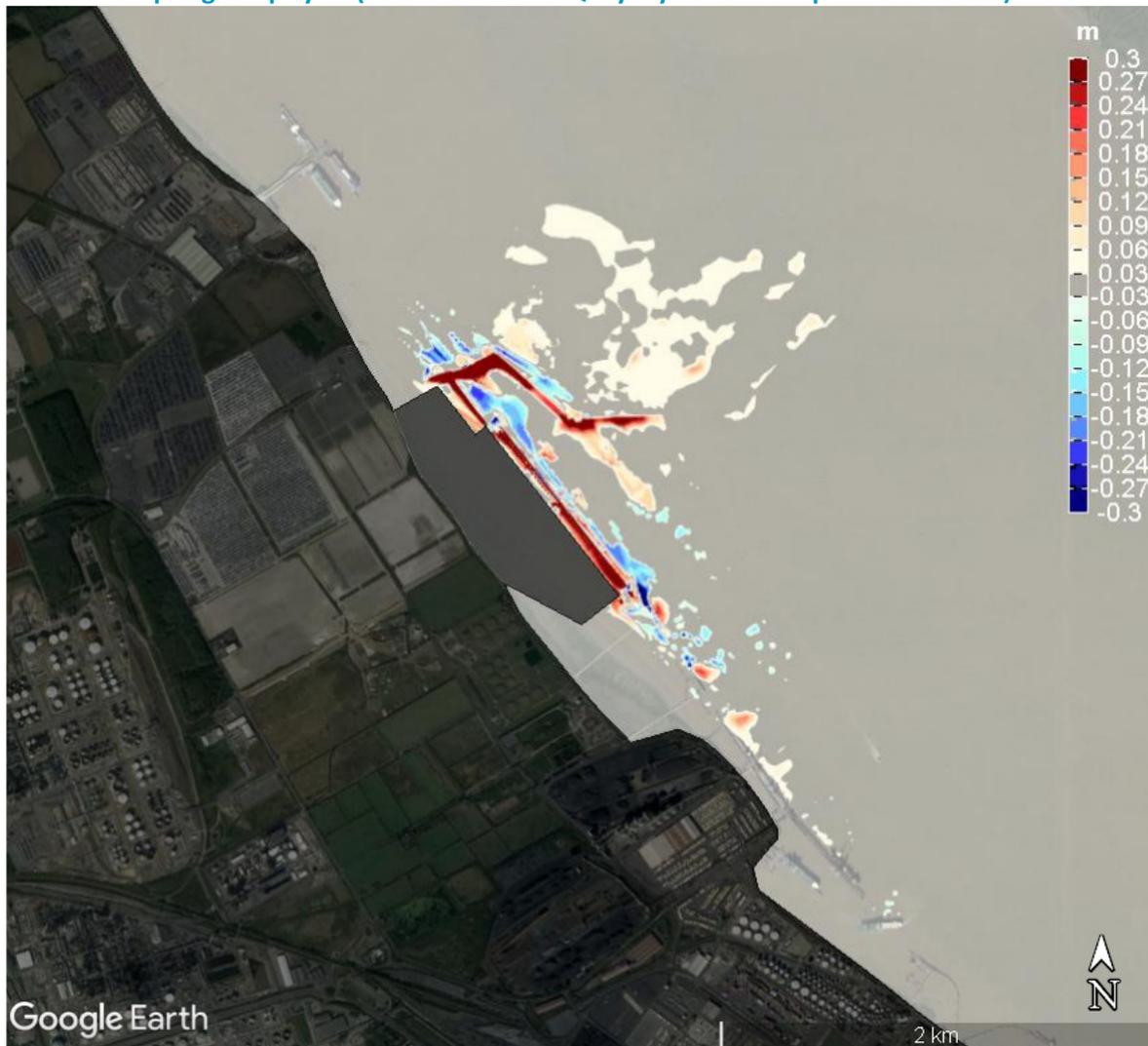
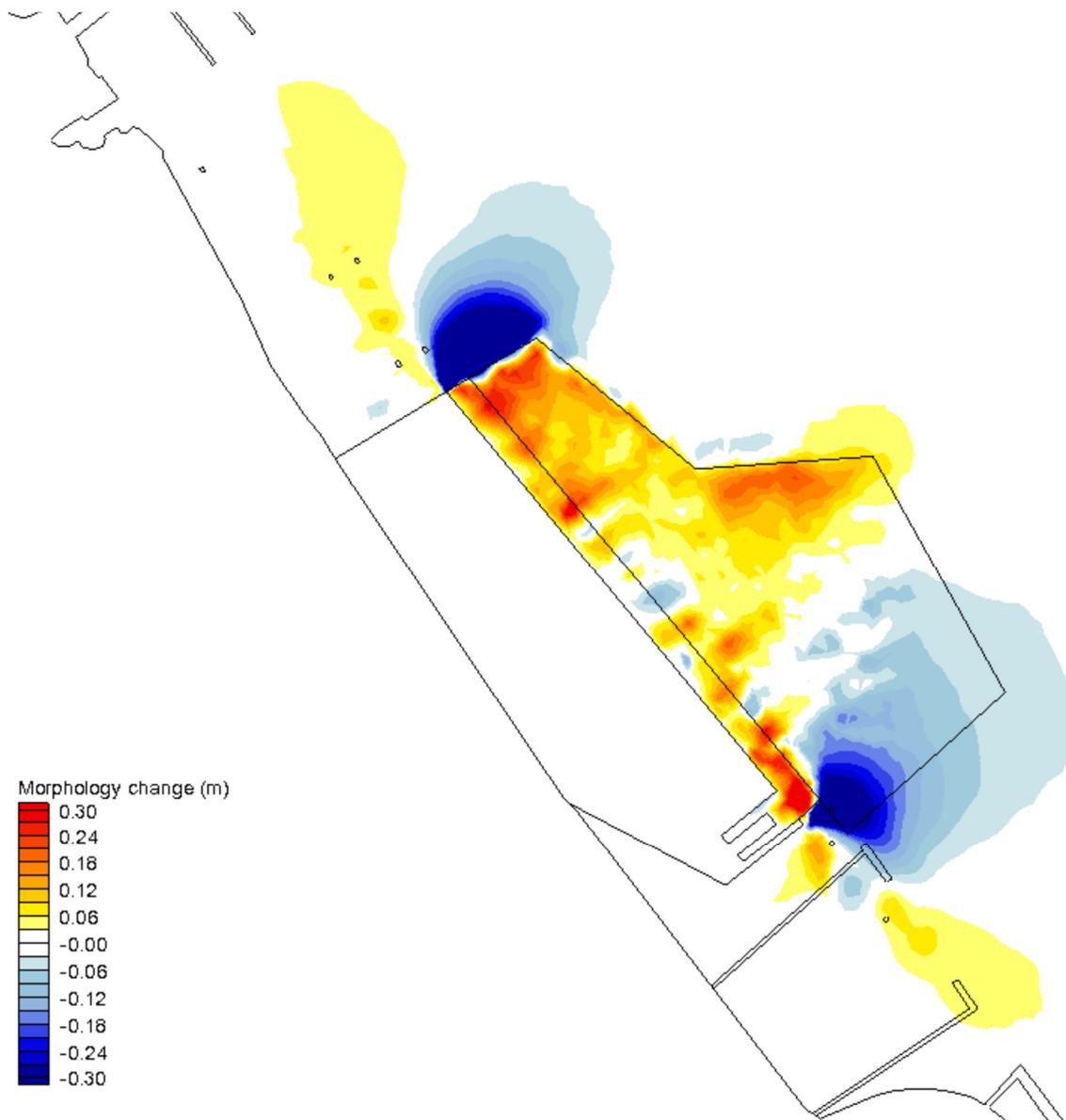


Figure 8-30: Predicted increases to potential deposition or potential erosion of sandy sediments after a spring-neap cycle (AMEP minus baseline). From (EX8.7A, JBA, 2012)



Impacts on Existing and Future Maintenance Dredging Requirements

- 8.4.27 Annualised sedimentation values are presented in Table 8-2 below. To convert from masses in the 3D model to volumes, a dry density of 500 kg/m³ was assumed.
- 8.4.28 Table 8-2 shows the predicted annualised sedimentation into the AMEP Amended Quay layout berths and turning area, as well as the predicted changes to sedimentation rates into adjacent berths, for both mud and sand (AMEP Amended Quay minus updated baseline).

Table 8-2: Annualised changes to deposition and erosion for AMEP Amended Quay compared with updated baseline derived from the 3D mud and 2D sand transport modelling

Area	Predicted Annual Increase in Deposition (m ³ /Year)	Predicted Annual Increase in Deposition (m ³ /Year)
	AMEP Amended Quay	AMEP Amended Quay
	3D mud transport model	2D sand transport model*
Humber Sea Terminal	-9,000 to -22,000	13,000 to 18,000
South Killingholme Oil Jetty	35,000 to 88,000	-100,000 to -204,000
Immingham Gas Terminal	3,000 to 7,000	-29,000 to 18,000
Humber International Terminal	-11,000 to -27,000	50,000 to 102,000
Immingham Bulk Terminal	-19,000 to -47,000	8,000 to 13,000
AMEP	418,000 to 1,044,000	474,000 to 697,000
Inshore of E.ON and Centrica Intakes	131,000 to 327,000	0
Immingham Outer Harbour	-53,000 to -132,000	2,000 to 3,000

* The lower figure assumes a 0.3 mm median grain size and the higher figure a 0.1 mm median grain size for the estuary bed as a whole as the boundary condition for the sand transport modelling. Sand transport volumes reflect potential transport subject to sand availability.

- 8.4.29 The updated baseline bathymetry leads to changes in the overall infill rates predicted for both muddy and sandy sediments. It is worth noting that the operational depth in the turning area was -9 m CD for these simulations and that the polygon defining the outer turning area for the amended layout is slightly different to that used for earlier predictions in 2012.
- 8.4.30 By comparing the AMEP Amended Quay layout simulation against an updated simulation of the consented layout (both using the latest bathymetry), the following changes presented in Table 8-3 are predicted solely as a result of the amendments shown in Figure 8-1.

Table 8-3: Annualised changes to deposition and erosion for AMEP Amended Quay layout compared with updated consented Quay, from the 3D mud and 2D sand transport modelling

Area	Predicted increase in sedimentation (m ³ /Year) arising solely from changes to AMEP	Predicted increase in sedimentation (m ³ /Year) arising solely from changes to AMEP
	3D mud transport model	2D sand transport model**
Humber Sea Terminal	-23,000	5,000 to 10,000
South Killingholme Oil Jetty	-4,000	2,000 to 11,000
Immingham Gas Terminal	-17,000	-22,000 to 1,000
Humber International Terminal	0	10,000 to 12,000
Immingham Bulk Terminal	0	3,000
AMEP Berth Pockets	60,000	-16,000 to -50,000
AMEP ***	60,000	163,000 to 287,000
Inshore of E.ON and Centrica Intakes	-165,000	0 to 31,000
Immingham Outer Harbour	0*	1,000

**As seen in Table 8-2, a reduction in baseline sedimentation of muddy sediments into Immingham Outer Harbour continues to be predicted for the proposed AMEP Amended Quay layout.*

***Predicted potential sand transport will be limited by availability of sand. Examination of recent maintenance reports (volumes/composition) at adjacent berths, if available, would indicate the degree to which modelled potential sand transport is limited by availability of supply.*

**** For mud, the deposition within the AMEP is all within the Berth Pockets, so total additional mud deposition within AMEP is predicted to be 60,000m³*

AMEP berth pockets, turning area and approach channel:

- 8.4.31 Supplementary report EX8.6 was produced in 2012 in response to a request from the MMO/EA to consider an upper estimate maintenance dredging quantity (annual and three-yearly) for AMEP. The study (Maintenance Dredging Variability) took as inputs: the 3D mud modelling results for the latest scheme; OSPAR reported dredge disposal figures, and; ABP published maintenance dredging quantities in 2010 and 2011 for different Humber berths. By relating the modelled sedimentation quantities to the published maintenance dredging quantities and by adding a component of uncertainty based upon variability from year to year in the published returns, the study gave a refined upper estimate for maintenance dredging for AMEP.
- 8.4.32 Using the same methodology described above, the assessment of the AMEP Amended Quay, when compared against the remodelled consented layout with present-day (2017-19) bathymetry, provides an upper estimate of $(60,000 / 1.9 \times 1.3) = 41,000 \text{ m}^3/\text{year}$ additional infill of muddy sediments into the AMEP Amended Quay layout berthing pockets. This net increase reflects the sum of a decrease of sedimentation into the specialist quay dock (because it has been removed) plus the relocation of 288 m of berth pocket 61 m landward (in a location where the natural depths are somewhat shallower), together with the shape of the inset quay meaning that there will be locations within the quay that are likely to be more prone to deposition than the remaining 1 km of quay line.
- 8.4.33 With respect to sandy sediments, it is predicted that the sand volume falling into the berth pockets annually will be decreased compared with the consented scheme. The predicted potential increase of sandy sediment infill to the turning area is up to 196,000m³/year. The predictions of sand infill are considered conservative because the bed deposits contain significant proportions of muddy

material which will reduce the mobility of the sand fraction, and the channel has since 2012 had a period of deepening.

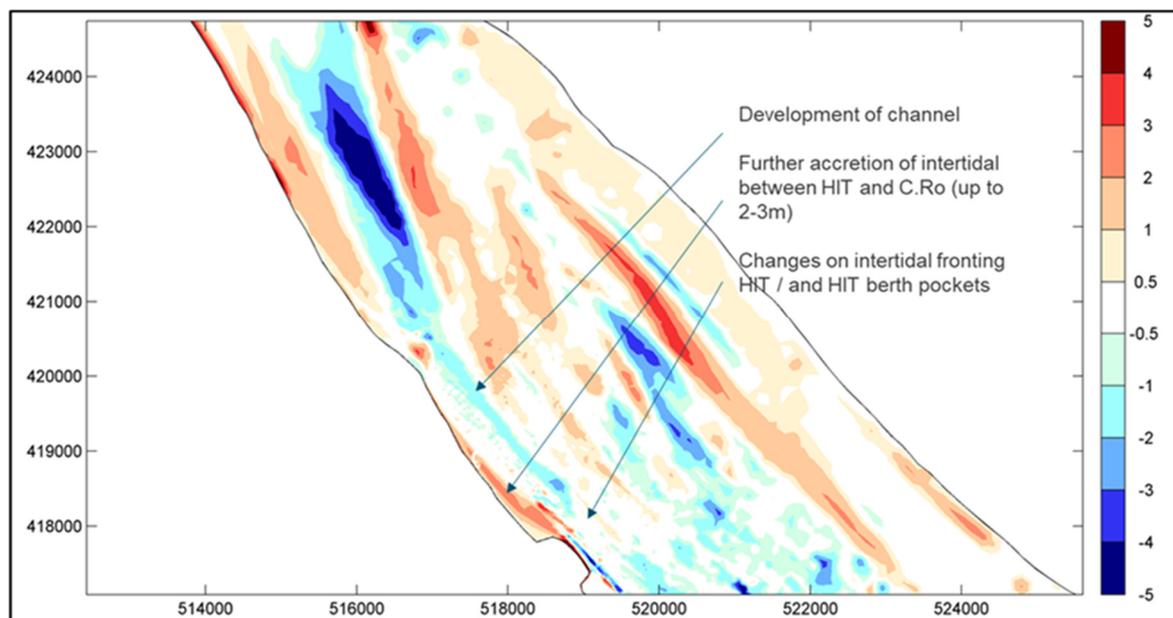
Morphological assessment

- 8.4.34 In terms of muddy sediments for the AMEP Amended Quay layout compared against the updated simulation (present-day bathymetry) of the consented layout, the Amended Quay results in 41,000 m³/year more predicted accretion into the AMEP berth pockets. A beneficial effect of the amended quay design is to reduce the previously predicted impacts on the region inshore of the Uniper (formerly EON) intake and outfall location. The predicted impact at SKOJ is found to be a requirement for increased maintenance dredging as a result of the updated bathymetry. The Amended Quay makes little difference to this situation (a smaller reduction compared to the consented AMEP. A similar picture is seen at IGT, although the overall impact is small. At HIT, IBT and IOH there is no predicted increase in maintenance dredging requirements arising from the AMEP Amended Quay layout.
- 8.4.35 In terms of sandy sediments, impacts of the AMEP Amended Quay layout are a small increase in potential deposition of sands into SKOJ (depending on current actual composition of dredged sediments). At IGT either a little less or more deposition is predicted subject to actual grain sizes, at HST there is a small increase in potential sand transport into the area, less than the reduction in fine sediments; at HIT there is predicted to be more deposition of sandy sediments in the updated scenario, and with a little more (5-10%) predicted to arise solely due to the AMEP Amended Quay layout. Changes at IBT and IOH are minimal. The region behind the Centrica and EON intakes sees no increase in sandy sediment deposition. The berth pockets of the AMEP Amended Quay are predicted to receive 34,000 m³ less sandy sediment per year when compared with the consented scheme. The overall potential deposition of sandy sediments into the turning area is significantly increased, likely due to the different turning area polygons considered and not as a result of the Amended Quay layout, but in practice limited by supply as noted above. The prediction conservatively assumes there is an abundance of mobile sand in proximity to the manoeuvring area.

Bathymetry changes

- 8.4.36 It is noted that intertidal accretion upstream of HIT has continued between 2012 and present day, with a further increase in intertidal level of 2-3 m as can be seen in Figure 8-31 shows the difference between bathymetry and LiDAR available at the time of the assessment in 2012, and the updated bathymetry and LiDAR data now available.

Figure 8-31: Recent changes to local bathymetry and intertidal levels (difference shown in metres with positive or red showing accretion)



Summary of Effects

- 8.4.37 Disposal of stiff glacial till to site HU082 will result in localised changes to the tidal currents and wave action in proximity to the site. The placed material will slowly be eroded by the action of the tidal currents and waves and the silt and clay sized material arising will disperse rapidly from the site. Sands and gravel sized material arising from the erosion will tend to accumulate in the undulations on the seabed at the disposal site created as a result of the disposal activity. This will reduce the overall rate of erosion of the placed till. It is expected that the majority of the placed material will erode within a few years of placement.
- 8.4.38 The proposed amended quay leads to no significant change in assessed impacts on water levels compared to the consented layout.
- 8.4.39 The proposed amended quay leads to no significant change in assessed impacts to flood tide flows compared to the consented layout. During the ebb tide, a localised region of flow acceleration is predicted off the downstream end of the quay. This initial change may diminish with time but should be noted.
- 8.4.40 Similar patterns of bed shear stress are presented for the AMEP Amended Quay as for the consented layout.
- 8.4.41 The proposed amended quay layout leads to no significant change in assessed impacts on waves compared to the consented layout.
- 8.4.42 For the proposed amended quay, mud transport modelling using present-day bathymetry predicts a reduction in maintenance dredging requirements (compared with the updated baseline) at adjacent berths except for a potential increase at SKOJ (35,000 to 88,000 m³/year) and a potential increase (3,000 to 7,000 m³ per year) at IGT. From the sand transport modelling some potential increases of sand deposition compared with baseline are predicted for HIT (50,000 to 102,000 m³), HST (13,000 to 18,000 m³), IBT (8,000 to 13,000 m³), IOH (2,000 to 3,000 m³) with a reduction of

100,000 to 204,000 m³ predicted at SKOJ, and between 18,000 m³ increase or 29,000 m³ reduction likely at IGT. The significance of these potential effects on future maintenance dredging at these berths should be assessed alongside evidence of the composition of the material that is presently dredged from the berths. It is understood that the bulk of the material from the berths is muddy and that the seabed in the vicinity of the berths typically comprises less than 30% sand. If the berths are not presently subject to significant sandy infill, which is understood to be the case, then the changes due to AMEP in terms of sandy sedimentation in the berths are not predicted to arise.

- 8.4.43 The predicted annual maintenance requirement arising from operations will be in the range 210,000 to 520,000 dry tonnes (previously consented scheme 250,000-630,000 dry tonnes) from the dredging of the AMEP Berthing Pocket and Dock. This is likely to require dredging by TSHD and disposal at the Sunk Deep Channel disposal site HU080.
- 8.4.44 Re-applying the same methodology adopted in EX8.6 to the infill volumes for the amended quay presented in Table 8-2 leads to an upper estimate based on present-day bathymetry modelling of 357,000 dry tonnes which is consistent with the value for the consented scheme (429,000 dry tonnes). It is noted however that an additional 21,000 dry tonnes per year is predicted to be deposited into the berth pockets, with 288 m of berth pocket now set 61 m further towards the shore in a slightly shallower location.
- 8.4.45 Significant localised sand deposition onto the dredged slopes of the proposed turning area / approach channel is predicted, again subject to sand availability. The overall potential deposition of sandy sediments into the turning area is significantly increased compared to the previous modelling. This is likely due to the change in sand transport model applied, the changed seabed morphology, the different turning area polygons considered and not substantially as a result of the amended quay layout. In practice any sandy infill will be limited by availability and supply and it is noted that since consent this area has already significantly deepened. The prediction conservatively assumes there is an abundance of mobile sand in proximity to the manoeuvring area.
- 8.4.46 To the north of AMEP larger scale seabed level rising of the estuary, particularly on the intertidal is likely to be at a slightly lower rate with the proposed amended quay layout. To the south there is likely to be no significant change from that predicted, other than to note that significant accretion has taken place since the original assessment (as a result of HIT) which leads to less far accretionary effect possible by AMEP (amended quay or Consented).
- 8.4.47 There are no in-combination projects to be considered relevant to this topic.

8.5.0 Requirement for Additional Mitigation

DCO Mitigation

8.5.1 The extant DCO provides for monitoring and managing the impacts of the scheme on the hydrodynamic and sedimentary regime as follow:

- Schedule 8 contains multiple conditions to control activities in order to mitigate the impacts of construction and dredging. In particular Condition 31 requires detailed method statements for all works below MHWS to be approved by the MMO.
- Schedule 9 contains Protective Provisions for the Harbour Master and neighbouring port operators.
- Schedule 11 Requirement 19 requires a Marine Environmental Management and Monitoring Plan to be agreed with the MMO.
- Schedule 11 Requirement 36 requires a separate Monitoring and Management Plan for the '*Centrica and E.ON cooling intakes and outfalls*' to be approved by the MMO.
- Schedule 11 Requirement 38 requires a scheme for the monitoring of the foreshore levels around the quay to be agreed with the MMO.

Alternate or Additional Mitigation

8.5.2 Taking into account the mitigation already secured through the extant DCO and the relatively low level of change pursuant to the proposed material change, no further mitigation is considered necessary.

8.6.0 Residual Effects

Operational Phase

- 8.6.1 Given that mitigation is not possible, the residual impacts remain as per the impacts described in the Assessment of Effects section of this chapter (Section 8.4.0).
- 8.6.2 The predicted annual maintenance requirement arising from operations will be in the range 210,000 to 520,000 dry tonnes (previously consented scheme 250,000-630,000 dry tonnes) from the dredging of the AMEP Berthing Pocket and Dock. This is likely to require dredging by TSHD and disposal at the Sunk Deep Channel disposal site HU080.
- 8.6.3 Re-applying the same methodology adopted in EX8.6 to the infill volumes for the AMEP amended quay presented in Table 8-2 leads to an upper estimate based on present-day bathymetry modelling of 357,000 dry tonnes which is consistent with the value for the consented scheme (429,000 dry tonnes). It is noted however that an additional 21,000 dry tonnes per year is predicted to be deposited into the berth pockets, with 288 m of berth pocket now set 61 m further towards the shore in a slightly shallower location. Additionally, a potential reduction of 16,000 m³ in sand infill is predicted to occur in the AMEP Amended Quay berthing pockets compared with the consented Quay.
- 8.6.4 The overall potential deposition of sandy sediments into the turning area is significantly increased, likely due to the different turning area polygons considered and not as a result of the amended quay layout, but in practice this will be limited by supply and it is noted that since consent this area has already significantly deepened. The prediction conservatively assumes there is an abundance of mobile sand in proximity to the manoeuvring area.

Consideration of DCO

- 8.6.5 There is an increase in maintenance dredging requirement at the AMEP for the proposed amended quay layout compared with the consented layout, this arises from the potential for sand infill in the manoeuvring area and approaches.

8.7.0 Other Environmental Issues

- 8.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 8.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 8.7.3 Whilst the purpose of the project is to provide the infrastructure necessary to enable new 'green' electricity generating infrastructure to be built, the impacts of the scheme on the hydrodynamic and sedimentary regime has no consequential impacts on existing infrastructure.

Waste

- 8.7.4 The impacts of the scheme on the hydrodynamic and sedimentary regime will result in changes to maintenance dredging and this could result in more waste being generated. Maintenance dredging within the Humber Estuary varies significantly from year to year and the potential additional volume of waste due to the change will be relatively trivial (<1%). The disposal of this waste is controlled by the Marine Management Organisation to ensure it is disposed of appropriately.

Population and Human Health

- 8.7.5 The impacts of the scheme on the hydrodynamic and sedimentary regime has no consequential effects on population or human health.

Climate and Carbon Balance

- 8.7.6 The impacts of the scheme on the hydrodynamic and sedimentary regime has no consequential effect on the climate.

Risks of Major Accidents and/or Disasters

- 8.7.7 The impacts of the scheme on the hydrodynamic and sedimentary regime will not give rise to consequential increase in the risk of major accidents or disasters. The indirect effects of dredging are assessed in Chapter 14 of this document.

8.8.0 Summary of Effects

- 8.8.1 Disposal of stiff glacial till to site HU082 will result in localised changes to the tidal currents and wave action in proximity to the site. It is expected that the majority of the placed material will erode within a few years of placement.
- 8.8.2 The proposed AMEP Amended Quay layout leads to no significant change in assessed impacts on water levels.
- 8.8.3 The proposed AMEP Amended Quay layout leads to no significant change in assessed impacts to flood tide flows compared to the consented layout. During the ebb tide, a localised region of flow acceleration is predicted off the downstream end of the quay. This initial change may diminish with time but should be noted.
- 8.8.4 Similar patterns of bed shear stress are presented for the proposed AMEP Amended Quay layout as for the consented layout.
- 8.8.5 The proposed AMEP Amended Quay layout leads to no significant change in assessed impacts on waves compared to the consented layout.
- 8.8.6 For the proposed AMEP Amended Quay layout, mud transport modelling using present-day bathymetry predicts a reduction in maintenance dredging requirements (compared with the updated baseline) at adjacent berths except for a potential increase at SKOJ (35,000 to 88,000 m³/year) and a potential increase (3,000 to 7,000m³ per year) at IGT. From the sand transport modelling some potential increases of sand deposition compared with baseline are predicted for HIT (50,000 to 102,000 m³), HST (13,000 to 18,000 m³), IBT (8,000 to 13,000 m³), IOH (2,000 to 3,000 m³) with a reduction of 100,000 to 204,000 m³ predicted at SKOJ, and between 18,000 m³ increase or 29,000m³ reduction likely at IGT. The significance of these potential effects on future maintenance dredging at these berths should be assessed alongside evidence of the composition of the material that is presently dredged from the berths. It is understood that the bulk of the material from the berths is muddy. If the berths are not presently subject to significant sandy infill, which is understood to be the case, then the changes due to AMEP in terms of sandy sedimentation in the berths are not predicted to arise.
- 8.8.7 Using the EX8.6 methodology (HR Wallingford 2012), the change to maintenance dredging requirements at the proposed AMEP Amended Quay layout when compared to the consented scheme is predicted to be an increase of up to 41,000 m³/year muddy sediments and a decrease of 34,000 m³/year for sandy sediments into the AMEP Berth Pockets. Significant localised sand deposition onto the dredged slopes of the proposed turning area / approach channel is predicted.
- 8.8.8 To the northwest of AMEP, bed level rising is likely to be at a slightly lower rate with the proposed AMEP Amended Quay layout. To the southeast there is likely to be no significant change from that predicted, other than to note that significant accretion has taken place since the original assessment (as a result of HIT) which leads to less far accretionary effect possible by AMEP.

8.9.0 Conclusions

- 8.9.1 Changes in water levels, bed shear stresses and waves are similar for the material change layout and the consented layout. There are small differences in the peak flow patterns on the ebb tide. Changes to dredging requirements at the AMEP and surrounding facilities are detailed in Table 8-3.

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**ABLE MARINE ENERGY PARK
(MATERIAL CHANGE 2)**

**PRELIMINARY ENVIRONMENTAL
INFORMATION REPORT**

**CHAPTER 9: WATER AND SEDIMENT
QUALITY**

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

9.1.0 INTRODUCTION	9-1
Development Consent Order Context.....	9-1
Consideration of Material Amendment	9-2
Purpose and Structure of Chapter	9-2
9.2.0 METHODOLOGY	9-3
Changes in Legislation, Guidance and Planning Policy.....	9-3
Scoping Opinion	9-3
Additional Consultation.....	9-5
Assessment Methodology	9-5
Effects Not Requiring Further Assessment.....	9-6
9.3.0 CHANGES IN BASELINE CONDITIONS	9-7
DCO Baseline	9-7
DCO Future Baseline.....	9-7
Current Baseline	9-7
Changes in Baseline	9-9
9.4.0 ASSESSMENT OF EFFECTS	9-10
Additional Construction Phase Effects	9-10
Additional Operational Phase Effects.....	9-11
Additional Cumulative Effects	9-11
Consideration of DCO	9-11
9.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	9-13
DCO Mitigation.....	9-13
Alternate or Additional Mitigation	9-13
9.6.0 RESIDUAL EFFECTS	9-14
Construction Phase	9-14
Operational Phase	9-14
Consideration of DCO	9-14
9.7.0 OTHER ENVIRONMENTAL ISSUES	9-16
Other Environmental Issues of Relevance	9-16
Summary	9-16

9.8.0 SUMMARY OF EFFECTS	9-17
9.9.0 CONCLUSIONS.....	9-18

DOCUMENT REFERENCES

TABLES

Table 9-1: Scoping Opinion.....	9-3
Table 9-2: Estuary Ecological and Chemical Quality (WFD Assessment)	9-8
Table 9-3: Baseline Estuarine Water Quality Summary	9-8

APPENDICES

- Appendix U9-1: Agreement with Environment Agency relating to Centrica Power Station
- Appendix U9-2: Active Monitoring Scheme
- Appendix U9-3: AMEP 'Limits of Acceptable Change' Assessment
- Appendix U9-4: Thermal Dispersion Modelling

9.1.0 Introduction

Development Consent Order Context

- 9.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 9.1.2 The associated development also consented through the DCO includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 9.1.3 Documents, relevant to this chapter, that were included in the Environmental Statement (ES) in support of the DCO application ('the original ES') include:
- Environmental Statement Chapter 9: Water and Sediment Quality (AMEP site)¹;
 - Environmental Statement Annex 9.2: Assessment of proposed reclamation impact on Centrica intake-outfall²;
 - Environmental Statement Annex 9.3: Assessment of proposed reclamation impact on EON intake-outfall³; and
 - Able Marine Energy Park and Habitat Compensation Scheme, Water Framework Directive Assessment (Revision 5)⁴
- 9.1.4 Other works relating to Water and Sediment Quality were undertaken with respect to the Compensation Site on the north bank of the Humber Estuary. These are however not considered of relevance to the material amendment being requested.

1 AMEP, Environmental Statement Chapter 9: Water and Sediment Quality, 2012 <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000313-09%20-%20Water%20and%20Sediment%20Quality.pdf>

2 AMEP, Environmental Statement Annex 9.2: Assessment of proposed reclamation impact on Centrica intake-outfall, 2012, <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000376-9.2%20-%20Assessment%20of%20proposed%20reclamation%20impact%20on%20Centrica%20intake-outfall.pdf>

3 AMEP, Environmental Statement Annex 9.3: Assessment of proposed reclamation impact on EON intake-outfall, 2012, <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000377-9.3%20-%20Assessment%20of%20proposed%20reclamation%20impact%20on%20EON%20intake-outfall.pdf>

4 Able Marine Energy Park and Habitat Compensation Scheme, Water Framework Directive Assessment, Revision 5, HR Wallingford, TN DHM6835-02 R5, November 2012, <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001692-121121%20TR030001%20Able%20Humber%20Ports%20Ltd.pdf>

Consideration of Material Amendment

9.1.5 In the context of the proposed material amendment, this chapter considers the following areas:

- changes in the water quality arising from the scheme and consideration of how this might vary as a result of the proposed material amendment; and
- changes in the sediment quality arising from the scheme and consideration of how this might vary as a result of the proposed material amendment.

Purpose and Structure of Chapter

9.1.6 This chapter of the Preliminary Environmental Information Report (PIER) considers the impact of the proposed material amendment on Water and Sediment Quality.

9.1.7 Consideration is given to:

- changes in legislation, policy and guidance relating to Water and Sediment Quality since the DCO application;
- physical changes in the baseline context at the site as relevant to Water and Sediment Quality;
- any changes in the WFD status of the Humber Estuary adjacent to the site; and
- the material amendment to the proposed scheme.

9.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

- 9.2.1 These regulations revoke and replace the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 2003 No. 3242). They continue to transpose Directive 2000/60/EC, for England and Wales, establishing a framework for Community action in the field of water policy (the Water Framework Directive).
- 9.2.2 They also transpose aspects of Directive 2006/118/EEC on the protection of groundwater against pollution and deterioration (the Groundwater Directive) and of Directive 2008/105/EC on environmental quality standards in the field of water policy (the Environmental Quality Standards Directive).

Water Framework Directive assessment: estuarine and coastal waters⁵

- 9.2.3 In December 2016 the Environment Agency published guidance on how to assess the impact of an activity in estuarine (transitional) and coastal waters for the Water Framework Directive (WFD). The guidance is called Clearing the Waters for All.

Scoping Opinion

- 9.2.4 Table 9-1 summarises the key aspects of the scoping opinion as relevant to water and sediment quality This incorporates comments from the Environment Agency and North Lincolnshire Council (the Lead Local Flood Authority).

Table 9-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 20, Paragraph 4.3.1	New or different significant effects from alterations to site run-off and drainage during construction are unlikely and can be scoped out of the updated assessment	Impacts of runoff on water quality are also considered in Chapter 13 (Drainage and Flood Risk) and Chapter 7 (groundwater)	Scoped Out	9.2.16 & 9.2.17
Page 20, Paragraph 4.3.2	Cleethorpes Beach is located at some distance from the Proposed Development and is unlikely to experience new of different significant effects and can be scoped out of the updated assessment.	Agreed	Scoped Out	9.2.14

⁵ Water Framework Directive assessment: estuarine and coastal waters, Environment Agency, Published December 2016 (updated November 2017), <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 20, Paragraph 4.3.2	The proposed change would result in large, albeit localised, changes to the impact characteristics within a number of designated sites. Indirect impacts to sites and features from changes in water quality during construction should be assessed in the updated assessment.	Updated assessments (PIER Appendix U8-1) have confirmed that new or additional dredged material is unlikely to give rise to significant water quality impacts and that potential impacts at the deposition site in terms of sediment loading are likely to be small when considered against the natural range of water quality in the Humber Estuary.	Potential effect assessed as not significant	9.4.3 to 9.4.7 and PEIR Appendix U8-1
Page 21, Paragraph 4.3.3	The proposed changes are unlikely to alter the characteristics of impacts associated with sewage and trade effluent, accidental spills or litter (operational phase) such that new or different significant effects would occur. The Inspectorate agrees that these matters do not need to be scoped into the updated assessment.	Agreed	Scoped Out	9.2.16 & 9.2.17
Page 21, Paragraph 4.3.4	The Scoping Report explains that the existing Centrica outfall is no longer operational and that the applicable environmental permit is bespoke to the previous operator. The Applicant should provide evidence within the updated ES to demonstrate the agreement reached with relevant consultation bodies notably the EA as to this.	Agreement with the EA included in Appendix U9-1	Scoped Out	9.2.15
Page 21, Paragraph 4.3.5	The need to update the assessment of sediment plume impacts and resuspension of contaminated sediment should be informed by the updated assessments for Geology, Hydrogeology and Ground Conditions and Hydrodynamic and Sedimentary Regime. Changes to	Additional sediment sampling has confirmed that the dredge sediment is not significantly contaminated and modelling of the sediment plume (Appendix U8.1) predicts only small uplifts in suspended sediment	Potential effect assessed as not significant	9.4.3 to 9.4.7 and Appendix U8-1

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
	impact characteristics in these aspects should inform the updated ES of impacts to water quality from sediment plume and resuspension of contaminate sediment.	concentration. The potential effects are therefore small when set against the baseline characteristics of the Humber Estuary		
Page 22, Paragraph 4.3.6	The Scoping Report suggests that changes to impact characteristics likely to alter the assessment of WFD objectives will be undertaken qualitatively. The Inspectorate does not agree with this approach uniformly and instead considers that where necessary quantitative assessment should be undertaken.	An updated WFD assessment is being prepared in support of the revised scheme and will be informed by updated monitoring and modelling where considered appropriate and as agreed with the Environment Agency. This document will be included with the future application but a draft for consultation is included with the preliminary environmental information.	Updated WFD Assessment	Separate document in the PEI

Additional Consultation

9.2.5 Outside of the EIA scoping process no further consultation has been undertaken on this topic.

Assessment Methodology

9.2.6 A study area for Water and Sediment Quality was not formally defined within the original ES.

9.2.7 The assessment considered all direct surface water receptors of the site including both the Humber Estuary and Killingholme Marsh, groundwater receptors present at the depth below the site and also areas within the estuary where direct impacts associated with dredging or deposition of sediments are possible.

9.2.8 The same study area will be applied for this update.

Significance of Effect

9.2.9 Significance criteria relating to water and sediment quality were defined in the Table 9.1 of the original ES. These same criteria will be applied for this update.

9.2.10 Criteria used for determining the risk to water quality are set out in Environmental Quality Standards (EQS) produced by the WFD UKTAG (2008) in line with the EU EQS Directive. EQS are identified for a range of water quality characteristics including temperature, dissolved oxygen and for a range of specific pollutants including trace metals.

- 9.2.11 Impacts will be assessed as significant if the impacts to water quality result in an exceedance of standards or guidance values, such as EQS for water quality or Centre for Environment, Fisheries and Aquaculture Science (CEFAS) Action Levels for sediment quality. Any resultant non-compliance with WFD will also be considered as significant with regards to water quality. If impacts do not result in a non-compliance or exceedance of standards they will be considered to be non-significant.

Mitigation Hierarchy

- 9.2.12 While not defined within the original ES for the DCO application, a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.

Effects Not Requiring Further Assessment

- 9.2.13 The key receptor relating to Sediment and Water Quality, as identified in the ES prepared for the DCO application, was the Humber Estuary. Other potential receptors also discussed in Chapter 9, of the ES (see Tables 9-2 and 9-4 of original ES) include the channels within the Killingholme Marshes and Chalk aquifer that underlies the site.
- 9.2.14 With regards to the Humber Estuary, Cleethorpes Beach is located at some distance from the Proposed Development and as such it is considered highly unlikely that this would experience new or different significant effects as a result of the proposed change in the quay alignment of any of the associated works. Impacts to Cleethorpes Beach is therefore scoped out of this assessment.
- 9.2.15 The Centrica power station that was operational at the time of the DCO has been demolished. As such, consideration of temperature impacts to the intake and outfall for that power station are no longer of concern. As set out in Appendix U9-1 this has been confirmed in writing by the Environment Agency.
- 9.2.16 Assessment and mitigation detailed in relation to Flood Risk and Drainage (see chapter 13 of this document) is considered sufficient to address potential impacts to the quality of water within the surface watercourses and channels in and around the Killingholme Marshes. These are therefore not considered further in this chapter.
- 9.2.17 Assessment and mitigation detailed in relation to Geology, Hydrogeology & Ground Conditions (see Chapter 7) is considered sufficient to address potential impacts to the underlying Chalk aquifer. This is therefore not considered further in this chapter.

9.3.0 Changes in Baseline Conditions

DCO Baseline

9.3.1 The assessment of Water and Sediment Quality undertaken for the DCO application sets out the baseline status of the Humber Estuary detailing:

- its status under the Water Framework Directive;
- relevant ecological designations, the condition of these and, where appropriate reasons for failing to achieve good status;
- physico-chemical characteristics including details of temperature, dissolved oxygen and suspended sediment concentration and the variability of these parameters within the estuarine environment; and
- sediment quality.

9.3.2 The picture presented is one of a dynamic and energetic environment with valuable ecological characteristics. This environment has historically been significantly impacted by industrial activity but is now slowly recovering.

DCO Future Baseline

9.3.3 While the original ES highlights a long-term trend of improving water quality in the Humber Estuary, no specific projections for future changes to the estuary are discussed within that document.

Current Baseline

9.3.4 Summary details of the current Chemical and Ecological status of the estuary, based on Environment Agency WFD assessments (Cycle 2 – 2019), are provided in Table 9-2. This indicates that the reach of the estuary past the site, and also including the disposal grounds, has been assessed to have a **moderate** ecological potential. The reach is however classed as **fail** with regards to chemical quality.

9.3.5 The specific parameters that have failed to achieve good chemical status are:

- Cypermethrin (Priority hazardous);
- Dichlorvos (Priority);
- Benzo(b)fluoranthene;
- Benzo(g-h-i)perylene;
- Mercury and Its Compounds; and
- Tributyltin Compounds

Table 9-2: Estuary Ecological and Chemical Quality (WFD Assessment)

Topic	DCO (Cycle 1 – 2010)	Current (Cycle 2 -2019)
Waterbody name	Humber Lower	
Waterbody ID	GB530402609201	
Typology Description	Mixed water column, macro-tidal, extensive intertidal zone	
Hydromorphological Status	Heavily Modified	
Current Ecological Quality	Moderate Potential	Moderate Potential
Current Chemical Quality	Fail	Fail
Overall Physico-Chemical Water Quality	Moderate	Moderate
Dissolved oxygen (%)	High	High
Overall specific pollutant quality	Moderate	High
Copper	High	High

9.3.6 In connection to the DCO Schedule 8 Condition 39, an active monitoring scheme to measure marine environmental parameters during the project has been initiated with the collection of a year of baseline data. This comprises continuous monitoring at two locations, one on a buoy in the estuary adjacent to the site and one on a nearby Jetty. Full details of the monitoring arrangements and location are provided in the report titled ‘Active Monitoring Scheme’ included as Appendix U9-2.

9.3.7 Baseline data at these two monitoring stations was collected for the period from July 2016 through to July 2017. The outputs from the monitoring are detailed in the report titled ‘AMEP ‘Limits of Acceptable Change’ Assessment’ included as Appendix U9-3. Summary data is provided in Table 9-3.

Table 9-3: Baseline Estuarine Water Quality Summary

Buoy Sensor Statistics	Min	Mean	Max	95th percentile
Sea Temperature (°C)	4	12	20	19
Salinity (PSU)	3	18	27	25
Dissolved Oxygen (%)	7	9	12	11
Dissolved Oxygen (mg/l)	78	95	104	101
Total Suspended Solids (mg/l)	0	502	2888	1338
Jetty Sensor Statistics	Min	Mean	Max	95th percentile
Sea Temperature (°C)	4	12	20	19
Salinity (PSU)	5	20	29	26
Dissolved Oxygen (%)	7	9	12	11
Dissolved Oxygen (mg/l)	80	97	105	103

Buoy Sensor Statistics	Min	Mean	Max	95th percentile
Total Suspended Solids (mg/l)	38	812	3303	1846

9.3.8 With regards to sediment quality, sampling was undertaken in May 2011. Based on this data the Marine Management Organisation (MMO) confirmed, that *“the material to be dredged is suitable for disposal within the Humber Estuary”*. Further sampling of the surface sediments was undertaken in 2017 and 2020 in accordance with Sampling Plans agreed with the MMO.

9.3.9 The additional sediment quality data is discussed in Chapter 7 of this PIER. No exceedance of the Cefas Action Level 2 thresholds were recorded.

Changes in Baseline

9.3.10 Table 9-2 provides comparison of the WFD chemical and ecological status of the estuary, between the time of the DCO application and this present time. This indicates that, aside from a small improvement in the water quality, there has been little change in status.

9.3.11 With regards to the data summarised in Table 9-3 there is no earlier period of data against which a direct comparison can be made. Appendix U9-3 does however include a review of the recorded data against other longer term data sets and concludes that the results obtained are realistic and do not demonstrate any fundamental changes in water quality.

9.3.12 With regards to sediment quality, the data collected in 2017 and 2020 does not demonstrate any significant variation in the sediment quality when compared to the testing undertaken in 2011, although confirmation from the MMO that the sediment material remains suitable for disposal at sea, remains pending.

9.4.0 Assessment of Effects

9.4.1 The assessment of Water and Sediment Quality prepared for the DCO highlighted the following potential effects:

- Construction Phase:
 - dredging and disposal operations resulting in a sediment plume with the potential to affect the sediment quality of the depositional areas,
 - potential for release of contaminants from disturbed sediments,
 - deterioration of water quality due to higher fine sediment delivery through surface water run-off,
 - accumulation of litter affecting the water quality of the Humber Estuary with consequences for estuarine organisms, and
 - potential for accidental spillages of oils, lubricants and other industrial substances during the construction phase.
- Operation phase:
 - physical structure of the new quay has the potential for impacting on the mixing of existing outfalls and intakes from two gas fired power stations. Of particular concern is the possibility of changing the temperature at the intake,
 - potential for accidental leaks and spills that may release contaminants into surface waters, and
 - increased area of hard standing than currently exists with the potential for run-off and drainage to surface waters to increase.

9.4.2 A number of these areas of potential impact have however already been screened out of this review as they are either not of relevance to the proposed material amendment or they could be reasonably be altered by the changes proposed.

Additional Construction Phase Effects

9.4.3 Disposal of sediment will be increased by the material amendment but will take place over a longer period. As such while the sediment plume that will develop following dredge disposal will be around for longer, it should not result in higher maximum sediment load. The proposed material amendment will therefore only have a small potential effect on impacts associated with the sediment plume and the resuspension of contaminated sediment occurring as a result of the capital dredge requirements.

9.4.4 The sediment plume modelling undertaken for the original ES has been updated and is considered within Chapter 8 of this PEIR: Hydrodynamic and Sedimentary Regime, and more particularly in Technical Appendix U8-1. In summary the report concludes that the difference in impact between the consented and amended schemes is minor but that the plume will extend further upstream.

- 9.4.5 Despite this it is concluded that dredging will not cause a significant impact to the sediment transport in the Humber Estuary, although temporary and significant rises in background concentrations are likely to occur during the dredging of sand / gravel over the course of a week (or less). With the exception of the dredging location itself all of the predicted increases in sediment concentration caused by dredging activity are assessed to be small compared to the natural variation in suspended sediment concentration.
- 9.4.6 For contaminated sediments, updated sampling was undertaken in 2017 and 2020 and is considered within Chapter 7 of this PEIR: Geology, Hydrogeology and Ground Conditions. No exceedance of the Cefas Action Level 2 exceedance thresholds were recorded and based on this it is considered that there will be no change to the potential impacts associated with resuspension during construction. The Applicant is currently awaiting confirmation from MMO regarding the continued suitability of the material for disposal at sea.

Additional Operational Phase Effects

- 9.4.7 Flow patterns near the Uniper (formerly E.ON) power station intake and outfall could change as a result of the material amendment, with resulting impacts on the operation of the power station.
- 9.4.8 The changes to flows are reported in Chapter 8: Hydrodynamic and Sedimentary Regime, with supporting assessment undertaken in accordance with the methodology previously applied for the DCO. The assessment of the thermal impact at the Uniper outfall has then been updated to enable assessment of the potential changes in impacts arising from the proposed material amendment. This updated assessment is included as Appendix U9-4.
- 9.4.9 Intake and outfalls from the power station were included within a thermal dispersion modelling for the reach of the estuary. This simulated the thermal plumes over a full spring-neap tidal cycle for two wind conditions. These simulations considered both the existing condition and the developed condition including the proposed material amendment to the DCO scheme.
- 9.4.10 The modelling indicates that under existing condition the plume from the outfall is rapidly dispersed so that water abstracted at the intake is likely to be less than 0.1°C above the ambient temperature. The presence of the quay will only slightly affect the behaviour of the plume from the outfall and will result in a maximum uplift at the outfall of 0.3°C. This level of impact (0.2°C) is identical to that which was projected for the consented DCO scheme.
- 9.4.11 In terms of the potential impacts of future maintenance dredging requirements on water and sediment quality these will not be significantly different than previously assessed within the original ES. Updated modelling is reported in Chapter 8 of this PIER: Hydrodynamic and Sedimentary Regime and concludes that potential changes in sediment concentration are small when considered in the light of natural variations within the Humber Estuary.

Additional Cumulative Effects

- 9.4.12 There will be no additional cumulative effects associated with Water and Sediment Quality.

Consideration of DCO

- 9.4.13 Following this review, it is concluded that the changes in baseline understanding and the changes to the scheme will not result in any new or significant increased effects on Water and Sediment

Quality over and above those outlined in the original ES.

9.5.0 Requirement for Additional Mitigation

DCO Mitigation

- 9.5.1 A dredge plume assessment was conducted and presented as part of the DCO application. This addressed the potential for dredging operations to affect the marine environment (see Chapter 8 of original ES⁶). Based on this assessment mitigation measures to control potential adverse effects were agreed by the conditions in Schedule 8.
- 9.5.2 Additional studies were also carried out to quantify the impact of the scheme on intakes of the (former) Centrica and EON (now Uniper) power plants. These were included as Annex 9.2, Annex 9.3 and Annex 8.3 of the original ES. Based on these studies a commitment was made for ongoing maintenance dredging to be carried out at discrete intervals to prevent sedimentation at the EON and Centrica intakes.
- 9.5.3 Schedule 11 Requirement 22 requires a Code of Construction Practice to be approved by the Local Planning Authority for each stage of the works. This will set out the measures that will be implemented during construction to minimise pollution of the estuarine environment.
- 9.5.4 Schedule 8 Requirement Condition 31 requires detailed method statements to be approved by the MMO for all works before the level of MHWS. This provides further controls to be secured to minimise the risk of pollution of the estuarine environment.
- 9.5.5 Under DCO Schedule 8, Condition 39, an active monitoring scheme to measure marine environmental parameters during the project has been agreed and implemented. Full details of the monitoring arrangements and location are provided in PIER Appendix U9.3 with preliminary baseline results discussed in PIER Appendix U9.4.
- 9.5.6 Schedule 8 Condition 54 requires the licence holder to employ methods to minimise resuspension of sediment during the construction and dredging operations.
- 9.5.7 Within the DCO, trigger levels for key water quality parameters were specified or required to be agreed. These trigger levels have been confirmed with the MMO following the baseline monitoring programme and will be used during construction to confirm that adverse impacts are not occurring and, if ever required (i.e., if exceedances are observed), for working methods to be modified to achieve compliance.

Alternate or Additional Mitigation

- 9.5.8 Following this review, it is concluded that no further mitigation is required, over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Water and Sediment Quality relating to the proposed scheme.

6 AMEP, Environmental Statement Chapter 8: Hydrodynamic and Sedimentary Regime, 2012 <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030001/TR030001-000312-08%20-%20Hydrodynamic%20and%20Sedimentary%20Regime.pdf>

9.6.0 Residual Effects

Construction Phase

- 9.6.1 Within the ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Water and Sediment Quality during the construction phase were identified to be restricted to minor impacts associated with the dredging operation. Following additional assessment, no further residual impacts have been identified by this review.
- 9.6.2 The updated modelling (PIER Appendix U8.1) predicts that for backhoe dredging of glacial till the increases in suspended sediment concentration at the Uniper Power Station intake were a maximum of 70mg/l while for the proposed dredging of alluvium by TSHD (without overflowing) the maximum uplift in concentrations were just 45mg/l. TSHD Dredging of sand/gravel would result in greater uplifts of up to 450mg/l for a period of up to one week.
- 9.6.3 The modelling indicates that increases in peak sediment concentration of more than 10mg/l will occur up to 17km from the point of dredging and will extend slightly further upstream for the amended scheme than for the consented scheme. However, when compared to the baseline range of suspended sediment concentrations (see Table 9-3 above) these potential small uplifts are not considered to be significant.
- 9.6.4 During construction, the removal of sediment through dredging may result in changes to the composition of surface sediments. A number of heavy metal contaminants, including copper, exceed the UK CEFAS Action Level 1 Guidelines. The removal of sediments through dredging will cause sediment bound contaminants to become widely redistributed within the estuary with a minor portion permanently removed from the estuary with the outgoing tides to coastal waters. The overall impact is not considered to be significant, because of the wide dispersion, and tendency of contaminants to remain bound to or quickly be reabsorbed upon dissociation from the sediment. It is considered unlikely that average sediment quality in any given location will deteriorate.

Operational Phase

- 9.6.5 Within the original ES, following consideration of mitigation, the residual effects relating to Water and Sediment Quality during the construction phase were identified to be restricted to thermal impacts and sediment impact associated with maintenance dredging. Following additional assessment, no further residential impacts have been identified by this review.
- 9.6.6 In relation to thermal impacts it was previously identified that changes in circulation associated with the quay could reduce mixing around the E.On intake and result in a slight uplift in peak temperature. The modelled changes were however small (<0.2°C). Updated modelling (PIER Appendix U9.4) has confirmed that the material amendment will result in no discernible change in the level of potential effect. This is not considered significant.
- 9.6.7 With regards to the impact associated with maintenance dredging this will be no greater than already considered in relation to the dredging required for construction. This should therefore not result in significant adverse effects.

Consideration of DCO

- 9.6.8 Following this review, it is concluded that there are no changes to the residual effects previously

identified as part of the DCO.

9.7.0 Other Environmental Issues

9.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.

9.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

9.7.3 The risks associated with Infrastructure are not of relevance to this Chapter.

Waste

9.7.4 Aside from the disposal of dredge materials, which is already considered, the risks associated with Waste are not of relevance to this Chapter.

Population and Human Health

9.7.5 Aside from the potential impact to bathing water, which is already considered, the risks associated with population and human health are not of relevance to this Chapter.

Climate and Carbon Balance

9.7.6 The risks associated with climate and carbon balance are not of relevance to this Chapter.

Risks of Major Accidents and/or Disasters

9.7.7 The risk associated with major accidents and / or disasters is not of relevance to this Chapter.

Summary

9.7.8 With regards to the EIA regulations 2017, in terms of Water and Sediment Quality there are not considered to be any likely significant effects with regards to Other Environmental Issues.

9.8.0 Summary of Effects

- 9.8.1 As detailed in the original ES residual effects relating to Water and Sediment Quality will be minimal provided that proposed control measures and monitoring are fully implemented. Updated technical assessment and additional monitoring indicates that this conclusion will not be changed by the proposed material amendment.

9.9.0 Conclusions

- 9.9.1 The AMEP site is located within and adjacent to the Humber Estuary which is a dynamic and energetic environment with valuable ecological characteristics.
- 9.9.2 The proposed material amendment would involve changes to physical works within and immediately adjacent to the estuary. As a result, there is a potential for a change in the effect of the scheme during construction associated primarily with dredging and deposition of estuarine sediment. Detailed analysis and assessment has however confirmed that these impacts will remain small and are not significant.
- 9.9.3 The proposed material amendment would also involve a variation to the final quay profile extending out into the estuary. While associated impacts of this on flow patterns and sediment deposition are considered in Chapter 8 of this PIER there is also a potential for changes in mixing and circulation to impact water quality. Detailed analysis and assessment has however confirmed that these impacts will remain small and are not significant.

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APPENDIX 9.1

Agreement with Environment Agency relating to Centrica Power Station

APPENDIX 9.2

AMEP Active Monitoring Scheme

APPENDIX 9.3

AMEP 'Limits of Acceptable Change' Assessment

APPENDIX 9.4

Thermal Dispersion Modelling

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 10: AQUATIC ECOLOGY

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

10.1.0 INTRODUCTION	10-1
Development Consent Order Context.....	10-1
Consideration of Material Amendment	10-2
Purpose and Structure of Chapter	10-2
10.2.0 METHODOLOGY.....	10-4
Changes in Legislation, Guidance and Planning Policy.....	10-4
Scoping Opinion	10-6
Additional Consultation.....	10-8
Assessment Methodology	10-8
10.3.0 CHANGES IN BASELINE CONDITIONS.....	10-11
DCO Baseline	10-11
DCO Future Baseline.....	10-14
Current Baseline	10-14
Changes in Baseline.....	10-50
10.4.0 ASSESSMENT OF EFFECTS	10-53
Additional Construction Phase Effects	10-53
Additional Operational Phase Effects.....	10-63
Additional Cumulative Effects	10-63
Consideration of DCO.....	10-64
10.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	10-65
DCO Mitigation.....	10-65
Alternate or Additional Mitigation	10-65
10.6.0 RESIDUAL EFFECTS	10-66
Consideration of DCO.....	10-66
10.7.0 OTHER ENVIRONMENTAL ISSUES.....	10-67
Other Environmental Issues of Relevance	10-67
Summary	10-67
10.8.0 SUMMARY OF EFFECTS	10-68
10.9.0 CONCLUSIONS	10-69

DOCUMENT REFERENCES

TABLES

Table 10-1: Scoping Opinion	10-6
Table 10-2: Subtidal Biotopes of the Middle Humber Estuary. Source: HARBASINS, 2006.....	10-25
Table 10-3: Metal Contaminant Levels 2017 & 2020 (Able UK Ltd)	10-32
Table 10-4: PAH Contaminant Levels 2017 & 2020 (Able UK Ltd)	10-32
Table 10-5: PCB Congener Contaminant Levels 2017 & 2020 (Able UK Ltd)	10-33
Table 10-6: Abundance data for the intertidal beam trawl survey – June 2013 (PMSL, 2014a).....	10-41
Table 10-7: Abundance data for the intertidal beam trawl survey – October 2013 (Source: PMSL 2014b)....	10-42
Table 10-8: Abundance data for the intertidal seine net survey – June 2013 (PMSL, 2014a)	10-43
Table 10-9: Abundance data for the intertidal seine net survey – November 2013 (PMSL, 2014b).....	10-44
Table 10-10: Fish abundance data for the subtidal otter trawl survey – November-December 2013 (PMSL, 2014b)	10-45
Table 10-11: Faunal catches from the intertidal fyke net surveys undertaken at Killingholme Marshes in 2016 and 2017. Frequency indicates number of samples where a species occurred out of the total number of samples collected at each station and size range is given for fish (IECS, 2017).....	10-47

FIGURES

Figure 10-1: AMEP frontage showing saltmarsh colonisation (Photograph taken winter 2020/2021) ..	10-15
Figure 10-2: NVC Communities (Thomson Environmental Consultants, 2020).....	10-17
Figure 10-3: Saltmarsh Extent to the South-east of the AMEP Site (Thomson Environmental Consultants, 2021)	10-18
Figure 10-4: AMEP Intertidal Invertebrate Surveys – Sediment Type (Allen, 2017 Left & Allen 2020 Right)20	
Figure 10-5: AMEP Intertidal Invertebrate Survey – Number of Taxa (Allen, 2017 Left & Allen, 2020 Right)	10-21
Figure 10-6: AMEP Intertidal Invertebrate Survey – Density of <i>Hediste diversicolor</i> (Allen, 2017 Left & Allen, 2020 Right)	10-22
Figure 10-7: AMEP Intertidal Invertebrate Survey – Density of <i>Macoma (Limecola) balthica</i> (Allen, 2017 Left & Allen, 2020 Right)	10-22
Figure 10-8: Size Class vs Abundance & Biomass for the AMEP (North Killingholme Marshes) and Cherry Cobb Sands Sites for <i>Hediste diversicolor</i> and <i>Macoma (Limecola) balthica</i> (g/0.01m ²) (Allen, 2017)	10-23
Figure 10-9: AMEP Intertidal Invertebrate Survey – Biotope Distribution (Allen, 2017 Left and Allen, 2020 Right)	10-24
Figure 10-10: Subtidal sample locations and sediment type, 2016 (Allen, 2020)	10-26
Figure 10-11: Mean number of taxa per station, 2016 (Allen, 2020).....	10-27
Figure 10-12: Mean number of individuals per 0.1m ² , 2016 (Allen, 2020)	10-27

Figure 10-13: Subtidal biotope distribution (Allen, 2020)	10-28
Figure 10-14: Humber Estuary Dredge Areas (Active – Green, Orange – Disused, Red - Closed). TIDE, 2013	10-30
Figure 10-15: Sediment Contamination Re-Sampling Locations around the AMEP Development Site (Allen, 2018)	10-31
Figure 10-16: Subtidal Sampling Locations and Proportion Mud, Sand & Gravel (Allen, 2016).....	10-34
Figure 10-17: Total Taxa and Toral Abundance (Allen, 2017).....	10-35
Figure 10-18: Subtidal Biotopes (Allen, 2016)	10-36
Figure 10-19: Humber Estuary areas (numbered) used in the EA 2013 fish population review. Indicative locations of the AMEP site (blue triangle) and the dredge disposal sites HU080/HU082 (yellow triangle) have been added (modified from EA, 2013).....	10-37
Figure 10-20: Seine net and beam trawl locations – June 2013 (spring) (PMSL, 2014a)	10-39
Figure 10-21: Seine net, beam trawl and otter trawl locations – October-December 2013 (autumn) (PMSL 2014b)	10-40
Figure 10-22: Fyke net locations at Killingholme marshes – September 2016 (summer), December 2016 (autumn), April-May 2017 (spring) (IECS, 2017)	10-46
Figure 10-23: Harbour Porpoise Distribution around the UK (JNCC, 2019) (left) and the predicted density of Harbour Porpoise across the central North Sea (created from density surface modelling) (Cucknell et al, 2016).....	10-48
Figure 10-24: Grey Seal (left) and Common Seal (right) Predicted Mean Total Distribution around the UK (Russell et al, 2017)	10-49

APPENDICES

- Appendix U10-1: Thomson Environmental Consultants, 2020. North Killingholme Marshes Saltmarsh Survey 2020.
- Appendix U10-2: Allen 2016. AMEP Disposal Sites – Subtidal Benthic Survey 2015. Report to Able UK Ltd
- Appendix U10-3: Allen 2017. Marine Surveys at North Killingholme and Cherry Cobb Sands (Autumn 2015). Report to Able UK Ltd
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- Appendix U10-6: PMSL. 2014. Marine Surveys at North Killingholme and Cherry Cobb Sands (Autumn 2013). Report to Able UK Ltd
- Appendix U10-7: IECS. 2017. European Eel Status Assessment at Killingholme Marshes and Halton Marshes. Report to Able UK Ltd
- Appendix U10-8: MMO Letter 18-05-2018 re Changes to Pile Diameter and Existing Mitigation Suitability.

10.1.0 Introduction

Development Consent Order Context

- 10.1.1 The development consent order (DCO) for the site, approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 10.1.2 The associated development for the above proposals includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 10.1.3 An assessment of the impacts of the development on Aquatic Ecology was included in the Environmental Statement (ES) that supported the DCO application in 2012 ('the original ES')¹. A full list of the documents and assessments submitted in support of the original ES are as follows:
- ES Chapter:
 - Able Marine Energy Park Environmental Statement. Chapter 10, Aquatic Ecology (2012);
 - Appendices:
 - 10.1 Benthic and Fish Surveys Report;
 - 10.2 Impact Assessment of AMEP on Humber Lamprey;
 - 10.3 MEP Impact of Underwater Piling Noise on Migratory Fish;
 - 34.1 Saltmarsh Survey Cherry Cobb Sands;
 - Examination Documents:
 - EX10.4 Impact of Dredging and Dredged Material Disposal on 1) Subtidal and Intertidal Features and 2) Aquatic Ecology;
 - EX10.5 Supporting Information on Harbour Porpoises in the Humber Estuary;
 - EX10.6 Impact of Berthing Pocket Construction EX10.7 Soft Start and Seals; and
 - EX34.2 An Assessment of Temporal Variation of Benthic Invertebrate Communities in the

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000314-10%20-%20Aquatic%20Ecology.pdf>

Humber Estuary.

Consideration of Material Amendment

10.1.4 On this basis, the following consequential issues will need to be addressed in the context of their potential impacts and where appropriate, mitigation measures reviewed and revised.

10.1.5 Change in quay layout leading to:

- alteration to quay design potentially modifying hydrodynamic processes in the vicinity of the quay;
- decrease of quay footprint (construction) on intertidal and shallow subtidal habitats from 45.0ha to 43.1ha;
- changes in dredging activity (construction phase), with higher volumes of sediments requiring disposal within the estuary; and
- possible influence of this activity on sediment plumes (e.g. the extent and concentration of suspended solids and water oxygenation effects), redeposition of sediment on adjacent areas (changes in sediment particle size and smothering of faunal communities).

10.1.6 Changes to dredge disposal leading to:

- increased volume of disposal at HU082 and HU080 (during construction);
- changes in sediment plume/redistribution and wave climate on adjacent environments; and
- changes in vessel activity at the disposal site (during construction).

10.1.7 This Chapter forms part of the Preliminary Environmental Impact Report for the material amendment to the proposed AMEP development, together with any changes to baseline conditions characterised in the Environmental Statement (ES) submitted with the DCO ('the original ES') (Chapter 10: Aquatic Ecology).

Purpose and Structure of Chapter

10.1.8 The environmental impact of the consented scheme on the aquatic ecology of the development site and its environs was reported in Chapter 10 of the original ES² and its accompanying appendices.

10.1.9 A considerable volume of reports was produced for the original Application. A signposting document detailing the Applicant's Environment Information produced for the original application is available³.

10.1.10 This Chapter of the PEIR assesses the impacts on the Aquatic Ecology of the Humber Estuary in the vicinity of the proposed development in relation to proposed material amendment to the consented development and is based on the outcomes of the Scoping Opinion (Planning Inspectorate, 2021).

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000314-10%20-%20Aquatic%20Ecology.pdf>

³[Signposting Document for the Applicant's Environment Information \(TR030001-001645-120924\)](#)

That document identified the following issues of significance:

- Saltmarsh Communities;
- Intertidal and Subtidal Invertebrate Communities;
- Fish Communities;
- Marine Mammals; and
- Based on the updated characterisation of the above appropriate baseline conditions, changes to expected potential impacts arising from the material amendment, mitigation measures and residual impacts if and when they occur.

10.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

Legislation

- 10.2.1 There have been no significant changes to extent or content of the conservation / protection designations to the Humber Estuary since the original ES and associated Application e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) and Wetland of International Importance (Ramsar) designations.
- 10.2.2 However, Defra has published a new policy document to explain the changes made to the Conservation of Habitats and Species Regulations 2017 (as amended). The 2017 Regulations transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) into UK law.
- 10.2.3 The main changes to the updated 2019 Regulations apply to making them operable from 1 January 2021. The changes cover England and Wales including their inshore waters up to 12 nautical miles.
- 10.2.4 The main changes to the 2017 Regulations are:
- the creation of a national site network within the UK territory comprising the protected sites already designated under the Nature Directives, and any further sites designated under these Regulations;
 - the establishment of management objectives for the national site network (the 'network objectives');
 - a duty for appropriate authorities to manage and where necessary adapt the national site network as a whole to achieve the network objectives;
 - an amended process for the designation of Special Areas of Conservation (SACs);
 - arrangements for reporting on the implementation of the Regulations, given that the UK no longer provides reports to the European Commission;
 - arrangements replacing the European Commission's functions with regard to the imperative reasons of overriding public interest (IROPI) test where a plan or project affects a priority habitat or species; and
 - arrangements for amending the schedules to the Regulations and the annexes to the Nature Directives that apply to the UK
- 10.2.5 SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and instead the 2019 Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:
- existing SACs and SPAs; and

- new SACs and SPAs designated under these Regulations

10.2.6 Any references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new national site network.

10.2.7 Designated Wetlands of International Importance (known as Ramsar sites) do not form part of the national site network. Many Ramsar sites overlap with SACs and SPAs, and may be designated for the same or different species and habitats.

10.2.8 All Ramsar sites remain protected in the same way as SACs and SPAs.

Policy and Guidance

10.2.9 There have been some changes to planning policy and guidance since the original application.

10.2.10 The National Planning Policy Framework (NPPF) has replaced the individual Planning Policy Statements (PPS) and was first published in 2012 and updated in 2018 and 2019. The NPPF sets out the government's planning policies for England and how these are expected to be applied and includes components of relevance to this Chapter e.g. Meeting the challenge of climate change, flooding and coastal change⁴; Conserving and enhancing the natural environment⁵.

10.2.11 Of particular relevance to this Chapter, Chapter 15 of the NPPF sets out the main planning principles in relation to wildlife, habitat and biodiversity protection and should be read with reference to:

- Planning practice guidance at Ministry of Housing, Communities and Local Government: Planning practice guidance: Natural environment;
- GOV.UK: Planning and development - protected sites and species;
- Office of the Deputy Prime Minister (ODPM) and Defra Circular 06/2005: Biodiversity and geological conservation (August 2005) (Biodiversity Circular);
- TCPA and The Wildlife Trusts: Planning for a healthy environment - good practice guidance for green infrastructure and biodiversity (July 2012);
- Natural England: Protected species: how to review planning applications; and
- Defra and Natural England: Guidance: Protected sites and areas: how to review planning applications.

10.2.12 Chapter 15 of the NPPF requires that planning policies and decisions should contribute to, and enhance, the natural and local environment by:

- Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- Recognising the intrinsic character and beauty of the countryside, and the wider benefits from

⁴ NPPF, [Meeting the challenge of climate change, flooding and coastal change](#)

⁵ NPPF, [Conserving and enhancing the natural environment](#)

natural capital and ecosystem services, including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

- Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

10.2.13 North Lincolnshire Council are currently producing a new Local Plan⁶, which is currently at the Preferred Options Consultation (Regulation 18) Stage.

Scoping Opinion

10.2.14 A Scoping Report was submitted by the Applicant (Appendix U5-1 Fairhurst, 2021)⁷, which addressed the material amendment and associated potential impacts including components requiring additional characterisation and assessment. In response, the Scoping Opinion (Appendix U5.2) identified, in addition to the initial Scoped-in components as described in Fairhurst (2021), further matters requiring to be Scoped-in. The list of issues is summarised in Table 10-1 below.

Table 10-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Pages 46-48, Table 7	<p>Construction Impacts - Dredging</p> <p><i>Habitat change from substrate removal</i></p> <p><i>Habitat and benthic communities disturbance from the sediment plume</i></p> <p><i>Disturbance to fish from construction activity noise and vibration due to dredging</i></p> <p><i>Indirect changes to habitats from project-induced changes in</i></p>	<p><i>Disturbance to fish from construction activity noise and vibration due to dredging initially Scoped Out</i></p> <p>MMO concern that the baseline assessments for fish and fisheries need to be updated. The Inspectorate considers this updated assessment should be included in the updated ES. The</p>	<p><i>Disturbance to fish from construction activity noise and vibration due to dredging addressed in PEIR</i></p>	Sections 10.3 and 10.4

⁶ [North Lincolnshire Council: Local Plan](#)

⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030006/TR030006-000009-TR030006%20-%20Scoping%20Report.pdf>

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
	<i>hydrodynamic and morphodynamic regimes</i>	Applicant should update the assessment and make effort to agree with the relevant consultation bodies the approach to the assessment.		
Pages 46-48, Table 7	<p>Construction Impacts - Dredge Disposal</p> <p><i>Loss of subtidal habitat and benthic communities from dredge spoil disposal</i></p> <p><i>Habitat and benthic communities disturbance from the sediment plume</i></p> <p><i>Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes</i></p>			Sections 10.3 and 10.4
Pages 46-48, Table 7	<p>Construction Impacts – Quay Construction</p> <p><i>Loss of habitat (intertidal and subtidal) and benthic communities from land take required for the quay</i></p> <p><i>Creation of new hard substrata habitat</i></p> <p><i>Habitat disturbance from water quality changes in the Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regime</i></p> <p><i>Disturbance to fish from habitat loss and construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from reduced prey availability</i></p> <p><i>Changes to aquatic environment in adjacent water bodies</i></p>	<p><i>Initially Scoped Out:</i></p> <p><i>Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regime</i></p> <p><i>Disturbance to fish from habitat loss and construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from reduced prey availability</i></p> <p>Opinion requires updated ES to describe the impact characteristics associated with the proposed change to the quay and construction works and assess any</p>	<p><i>Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regime</i></p> <p><i>Disturbance to fish from habitat loss and construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from construction activity noise and vibration</i></p> <p><i>Disturbance to marine mammals from reduced prey availability</i></p> <p>All of above addressed in the PEIR.</p>	Sections 10.3 and 10.4

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
		likely significant effects. The Applicant should make effort to agree the approach with relevant consultation bodies. The Scoping Report identifies that there is potential for the changes to impact fish and fish eggs/larvae through habitat loss and disturbance. As such the ES should include an assessment of this matter and any likely significant effects associated. The Applicant should make effort to agree the approach with relevant consultation bodies.		

Additional Consultation

10.2.15 Consultation has been undertaken with the Marine Management Organisation (MMO), Environment Agency (EA) and Natural England (NE) on 25th March 2021, where it was agreed that:

- the benthic ecology of the disposal grounds did not need a new baseline;
- in the absence of any significant alteration to construction techniques, agreed measures to mitigate impacts to the fish community from piling (timing restrictions set out in Schedule 8 of the DCO, paragraphs 37-43) that were agreed as part of the original ES to the DCO would remain relevant for the material amendment;
- in the absence of any significant alteration to construction techniques agreed measures to mitigate impacts to marine mammals (soft start, marine mammal observer etc.) would remain relevant for the material amendment.

Assessment Methodology

10.2.16 For the most part, the revised baseline description, impact assessment coverage and approach follows that undertaken in the original ES. However, where reflecting the proposed material changes, then additional information has been collected, collated and assessed using the standard methodology outlined below.

Study Area

10.2.17 In accordance with the Scoping Opinion, the study area has been defined to characterise and address both the directly affected / influenced areas around the proposed development footprint,

and dredge disposal sites, together with a wider area of the Humber estuary which could be potentially affected indirectly by the proposed material amendment, these based around morphodynamic /hydrodynamic changes and direct and indirect habitat loss or alteration.

10.2.18 As such, the Zone of Influence (Zoi) differs for a range of receptors e.g. for some species e.g. sessile invertebrate communities, affects will be limited to the development area, whilst for more mobile species such as marine mammals and fish, the affects may be wider.

Sensitivity Criteria

10.2.19 Sensitivity criteria for the receptors assessed within this Chapter remain the same as in the original ES (paragraph 10.3.10) and receptors within the vicinity of the proposed project that are considered sensitive are:

- habitats:
- intertidal mudflats;
- intertidal gravel and sandflats;
- subtidal seabed;
- subtidal sandbanks;
- salt marshes;
- coastal lagoons;
- reed beds
- rare or nationally important benthic invertebrates associated with the estuary or saline/coastal lagoons;
- diadromous fish (e.g. river and sea lamprey, eel, smelt, Atlantic salmon, sea trout and allis and twaite shad);
- other fish fauna of conservation and/or commercial interest; and
- grey seals and other marine mammals.

10.2.20 Sensitivity criteria for the receptors assessed within this chapter remain the same as in the original ES (paragraph 10.3.12), and include:

- the vulnerability of the habitat or species to the changes likely to arise from the development;
- the ability of the habitat, species or ecosystem to recover, considering both fragility and resilience;
- the viability of component ecological elements and the integrity of ecosystem function, processes and favourable condition;
- value within a defined geographic frame of reference (e.g. national, regional or district);

- the biodiversity value of affected species, populations, communities, habitats and ecosystems, considering aspects such as rarity, distinct sub-populations of a species, habitat diversity and connectivity, species-rich assemblages, and species distribution and extent; and
- designated site and protected species status, and Priority Biodiversity Action Plan (BAP)

Magnitude of Change (Impact)

10.2.21 The approach has been used as defined for the assessment methodology applied in the original ES (paragraph 10.3.7):

10.2.22 'The magnitude of impact encompasses the following:

- the nature of the change (what is affected and how);
- the type of impact;
- its size, scale or intensity;
- its geographical extent and distribution;
- its timing, duration, frequency, reversibility; and
- where relevant, the probability of the impact occurring as a result of accidental or unplanned events.

10.2.23 Evaluation of the impact takes the magnitude of impact and explains what it means in terms of its importance to society and the environment.'

Significance of Effect

10.2.24 The Significance of Effects have been assessed based on the criteria established in the original ES which followed IEEM guidance (IEEM, 2010). This has been updated where appropriate using additional CIEEM guidance e.g. CIEEM (2019).

10.2.25 Significance has been determined by the interaction of the above criteria and described in paragraph 10.3.13 of the original ES. The value of the affected feature is used to determine the geographical scale at which the impact is significant (e.g. international, national, regional and local levels). The determination of significance is then calculated based on whether the impact will affect the integrity or conservation status of the species, habitat, site or ecosystem within a given geographical frame of reference.

10.2.26 Given the location of the AMEP site, within and adjacent to, the Humber Estuary European Marine Site, the assessment is carried out with particular consideration to the proposed project and associated activities likely to undermine the conservation objectives of the site, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features.

10.2.27 The consideration of effects is contained within Section 10.4 of this Chapter.

10.3.0 Changes in Baseline Conditions

DCO Baseline

Overview of the Humber Ecosystem

- 10.3.1 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.
- 10.3.2 Importantly, the dynamic nature of the system, and its effects on associated habitats and biological communities are acknowledged within the Site Designations and associated Conservation Objectives, with management cognisant of these dynamisms.
- 10.3.3 This dynamism occurs both at a system and local scale, and potential changes in the habitats and associated communities within and around the AMEP development and was acknowledged in the Examining Authorities Report (2013)⁸ following completion of the examination of the original application in 2012. Specifically, the Examiner recorded:
- 1. That the Humber estuary is highly dynamic, both as a result of the natural characteristics of an estuary with a high tidal range and the added consequences of rising sea levels associated with climate change.*
 - 2. That the habitats affected by the proposal are found extensively throughout the estuary and that they are subject to continuous change through natural and man-induced processes of erosion, including dredging, and deposition.*
 - 3. That the combined effect of rising sea level and fixed flood defences results in the estuary as a whole being subject to "coastal squeeze" with pressure particularly on salt marsh habitat.*
 - 4. That as a response to coastal squeeze the Environment Agency has promoted a policy of selective managed retreat of flood defences to re-establish estuarine habitat on land reclaimed for agriculture in historical times.*
 - 5. That this policy has been implemented in association with schemes of habitat compensation carried out as part of harbour works on the Humber, including ABP's works at Welwick, Chowderness and Alkborough associated with the Immingham Outer Harbour and at Green Port Hull.*
 - 6. That the character of the foreshore at both the main application site and Cherry Cobb Sands has changed in living memory, that the changes are measurable and can be expected to continue to evolve.*
 - 7. That conditions favourable to the formation of extensive areas of very gently sloping inter-tidal mudflat at the North Killingholme Marshes have been reinforced by the creation of the Immingham Outer Harbour but that the general pattern is that accreting shorelines will develop*

⁸ Examining Authorities Report, 2013. Panel's Findings and Recommendations to the Secretary of State. 24th February, 2013. The Planning Inspectorate.

into salt marsh as has happened observably at Cherry Cobb Sands and in some locations on the Killingholme shore adjacent to the floodwall', (Examining Authorities Report, paragraph 10.79).

- 10.3.4 This dynamic estuarine system with changes in currents, tidal inundation, salinity etc. creates an environment that can be a problem for many aquatic and marine animals. For instance, the invertebrate community that colonises such areas can be restricted to a relatively low number of species that are able to adapt to these environmental rigors.
- 10.3.5 However, 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.
- 10.3.6 Productivity from these communities has been estimated at over 500kg per ha per year on the Humber (e.g. 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.
- 10.3.7 The whole of the Humber Estuary is covered by a number of wildlife protection designations. The estuary is designated as a Special Protection Area (SPA) for its waterbird community, and as a Special Area of Conservation (SAC) for habitats, several species of fish and the Grey Seal.

The Potential for Intertidal Saltmarsh Community around the AMEP Development

- 10.3.8 The Aquatic Ecology Chapter from the original ES did not identify any saltmarsh communities in the intertidal habitat around the AMEP site. However, in the Examining Authorities Report (2013) the potential for 'natural' intertidal accretion to occur in the vicinity of the AMEP site and colonisation by saltmarsh plants was acknowledged.

Overview of Middle Humber Invertebrate Fauna

- 10.3.9 The Aquatic Ecology Chapter (paragraph 10.5.8) from the original ES identified the presence of a series of extensive mudflats in the mid and outer estuary with areas of stable sediment supporting invertebrate communities that are often highly abundant, typically dominated by polychaete worms such as the lugworm *Arenicola marina* and the estuarine fanworm *Manayunkia aestuarina* and bivalve molluscs such as *Macoma balthica*.

Intertidal Invertebrate Community around the AMEP Development

- 10.3.10 The most commonly occurring species from a survey of the intertidal zone around the AMEP site conducted in 2010 were the oligochaete *Tubificoides benedii*, Nematoda, the polychaete *Streblospio shrubsolii* and the amphipod crustacean *Corophium volutator*. These species were present in most of the samples and were present at higher abundances than all other species throughout the survey area. The bivalve *Macoma balthica* was widespread and the polychaete *Hediste diversicolor* was present at most of the upper shore stations.
- 10.3.11 Differences in community dominance were observed across the profile with *T. benedii* the dominant species at the upper and mid shore intertidal stations and *S. shrubsolii* dominant at the lower shore intertidal stations where the sediments were presumably sandier.

- 10.3.12 All species recorded from the survey were typical for the intertidal area of the middle region of the Humber Estuary, with moderate abundance and diversity of mostly common species. There were no species of particular conservation importance although those present are key prey species for birds.

Subtidal Invertebrate Community around the AMEP Development

- 10.3.13 A 2010 survey of the subtidal area surrounding the AMEP site (IECS, 2010) recorded the most widespread species as the polychaete *Capitella capitata* with the barnacles *Balanus improvisus* and *Elminius modestus* being the most abundant encrusting species).
- 10.3.14 The polychaetes *Polydora cornuta*, *Streblospio shrubsolii* and *Arenicola marina*, *Mytilus edulis* (Bivalvia) and the bryozoans *Electra crustulenta*, *E. monostachys* and *Flustra foliacea* were also common and indicating a coarse but mixed sediment.
- 10.3.15 Further details of the invertebrate community structure from the 2010 surveys are given in paragraphs 10.5.30 *et seq* of the original ES - Aquatic Ecology Chapter from the original ES.

Overview of Fish Fauna

- 10.3.16 The baseline in the original ES qualified the fish fauna in the lower Humber Estuary based on the available information obtained over the course of several years of fish surveys (Pérez-Dominguez 2008). The data from two fish and shellfish surveys conducted in the immediate intertidal and subtidal area around the project site in 2010 (IECS 2010, 2011) also informed this baseline specifically for the AMEP site.

Fish Fauna around the AMEP Development

- 10.3.17 The original baseline showed that the fish fauna at the AMEP site was consistent with the typical fish communities in the middle and lower reaches of the Humber Estuary, these being dominated by small bodied demersal estuarine species such as gobies of the genus *Pomatoschistus* and juvenile stages of larger species that use the estuary as a nursery ground.
- 10.3.18 The results of the surveys highlighted the use of the area (particularly the intertidal zone) as a nursery habitat especially for flounder, Dover sole and whiting. It also confirmed the presence of brown shrimp, which has a dual fishery importance; as a target fishery species and a key element of the local fish food webs. Other sensitive receptors, as for example migratory fish (e.g. lamprey, eel, salmon, smelt) were mostly absent from the catches.
- 10.3.19 Further details can be found in paragraphs 10.5.4 *et seq* the Aquatic Ecology Chapter from the original ES for the DCO.

Overview of Marine Mammals

- 10.3.20 The Aquatic Ecology Chapter from the original ES, paragraphs 10.5.57 *et seq*, identified the Humber Estuary as supporting populations, or regularly visited by, a number of marine mammals, with notable species being the Harbour Porpoise (*Phocoena phocoena*), the Grey Seal (*Halichoerus grypus*) and the Common or Harbour Seal (*Phoca vitulina vitulina*).
- 10.3.21 The area around Spurn Head and the outer Humber Estuary is considered to be an important coastal site in England for Harbour Porpoise, although they occur elsewhere in the Humber Estuary

including in the vicinity of the development site and further upstream.

- 10.3.22 The Humber Estuary SSSI is a nationally important site for a breeding Grey Seals, with the colony at Donna Nook on the Lincolnshire coast being one of the largest breeding colonies in England, and featuring a high rate of pup production (Russell et al, 2019).
- 10.3.23 Common Seals are also present in the Humber estuary, with Donna Nook being a known haul out area (Allen et al, 2003).

Marine Mammals around the AMEP Development

- 10.3.24 As mobile aquatic species, Harbour Porpoise, Grey Seal and Common Seal have been reported from the vicinity of the AMEP site.

DCO Future Baseline

- 10.3.25 No specific alterations to the Aquatic Ecology baseline components were identified in the original ES - Aquatic Ecology Chapter. However, as noted above and in the Examining Authorities Report (2013), the estuarine ecosystem was identified as naturally dynamic and subject to natural change.

Current Baseline

Saltmarsh

Overview of Saltmarsh Communities in the Middle Estuary

- 10.3.26 The Humber Estuary supports approximately 630ha of saltmarsh habitat, which accounts for 2% of estuarine area, compared to a national average of 6% (HMS online 2021).
- 10.3.27 This low percentage saltmarsh extent value reflects historical loss from land claim, with 2,200ha of intertidal habitat lost from the middle estuary since 1800, of which 200ha has been calculated as saltmarsh (HARBASINS, 2008).
- 10.3.28 In addition to land-claim, 'coastal squeeze' resulting from sea level rise has affected the extent of intertidal area in some parts of the estuary. Over the last couple of decades, management initiatives by the Environment Agency to offset these long-term losses have been introduced through managed realignment techniques. In the middle estuary, sites have included Paull Holme Strays, with 80ha of intertidal habitat created (Cutts et al, 2019).
- 10.3.29 However, based on experience from several sites around the estuary, the provision of sheltered embayments as managed realignment sites has led to high rates of accretion within them, as a result of the high suspended sediment load in the estuary and the low energy environment created within these sites. This has led to increases in elevation within sites and colonisation by saltmarsh vegetation over time (e.g. Cutts et al, 2019).
- 10.3.30 Conditions in the Humber therefore are able to deliver sedimentation and saltmarsh development where physical factors allow, and often these are provided by anthropogenic activity e.g. modification to hydrodynamics along the estuarine margin creating low energy accretionary environments.
- 10.3.31 Although a number of saltmarsh NVC communities are present on the intertidal of the middle

estuary, the majority of saltmarsh extent is made-up of SM6 (*Spartina anglica*), SM14 (*Antriplex*) and SM24 (*Elymus pycnanthus*) communities (Allen et al, 2003).

Saltmarsh Communities around the AMEP Development

- 10.3.32 A trajectory of increased elevation from accretion and mudflat profile change, potentially leading to colonisation by saltmarsh communities, was identified in the Examining Authorities Report (2013).
- 10.3.33 This has been confirmed in HR Wallingford (2012 and 2017), with measurements of the shore profile from LIDAR data analysed for a series of intertidal transects fronting the AMEP site between 2001 to 2010 and 2010 to 2015. These data indicate rapid accretion having occurred along most of this frontage, for instance with an advancement of the Mean High Water Neap (MHWN) elevation seawards by 190m over the period 2001-2015 for the shore transect directly off from Station Road.
- 10.3.34 Given the increase in elevation of the intertidal profile around the MHWN elevation, and a corresponding increase in the width of upper shore intertidal zone, there would be an expectation that an increase in the extent of colonisation by saltmarsh vegetation could occur.
- 10.3.35 Photographs at the AMEP site suggest this has in fact occurred e.g. Figure 10-1, taken in December 2020, with a considerable saltmarsh habitat having developed across much of the eastern, downstream part of the AMEP development area. This saltmarsh has colonised areas of largely soft sediment mudflat which had been identified at the time of the original ES.
- 10.3.36 This change to the intertidal habitat prompted a re-surveying of the AMEP frontage in 2020 (Thomson Environmental Consultants, 2020) (Appendix U10-1). The survey was conducted in the summer of 2020 using standard NVC techniques including transect and quadrat sampling.

Figure 10-1: AMEP frontage showing saltmarsh colonisation (Photograph taken winter 2020/2021)



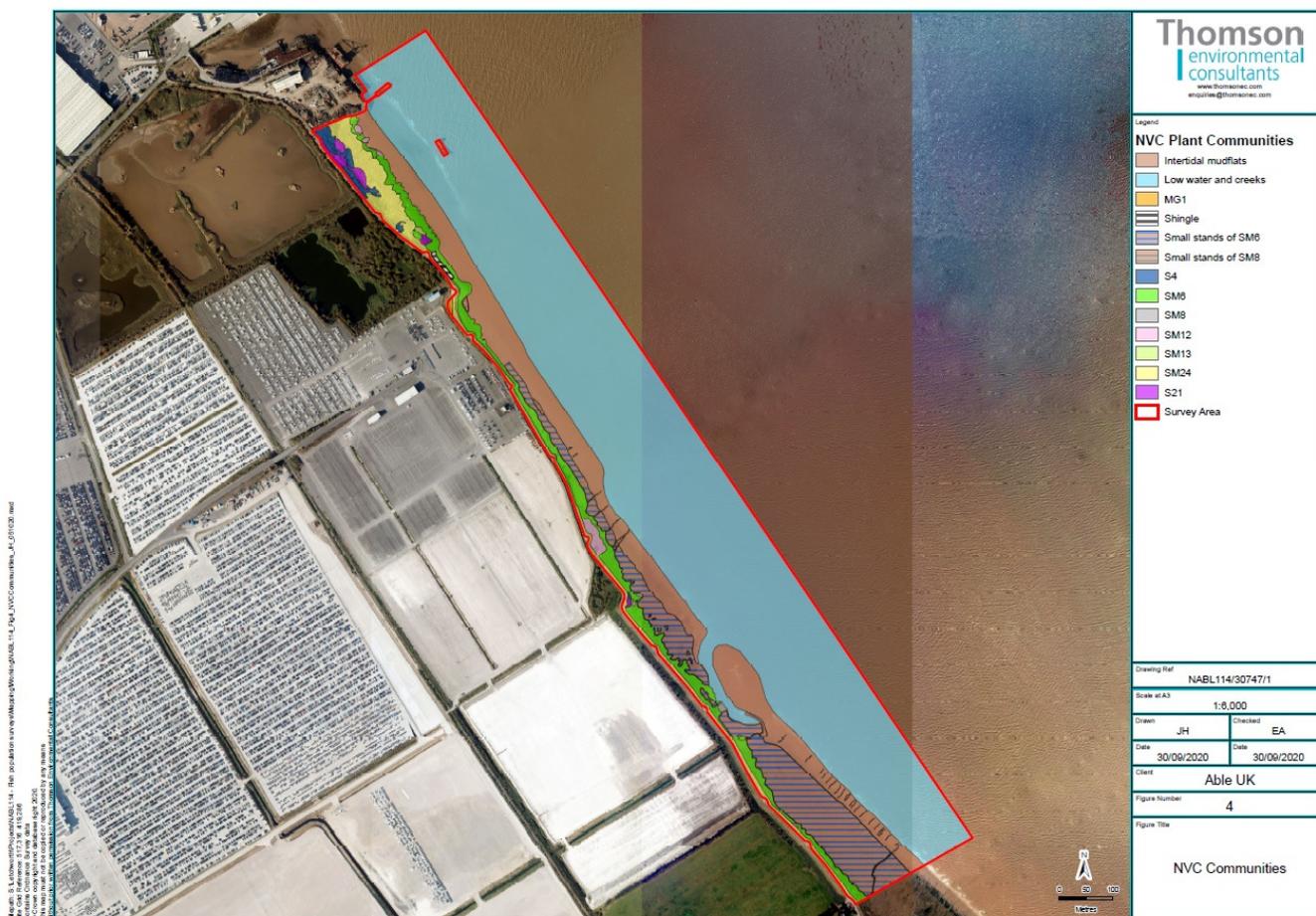
- 10.3.37 The saltmarsh survey of the AMEP intertidal frontage identified a number of saltmarsh NVC communities, these shown in Figure 10-2:

- SM6, *Spartina anglica* saltmarsh

- SM8, Annual *Salicornia* saltmarsh
- SM12, Rayed *Aster tripolium* on saltmarsh
- SM24, *Elymus pycnanthus* saltmarsh
- S4, *Phragmites australis* swamp and reedbed
- S21b, *Scirpus maritimus* swamp, *Atriplex prostrata* sub-community
- MG1, *Arrhenatherum elatius* grassland

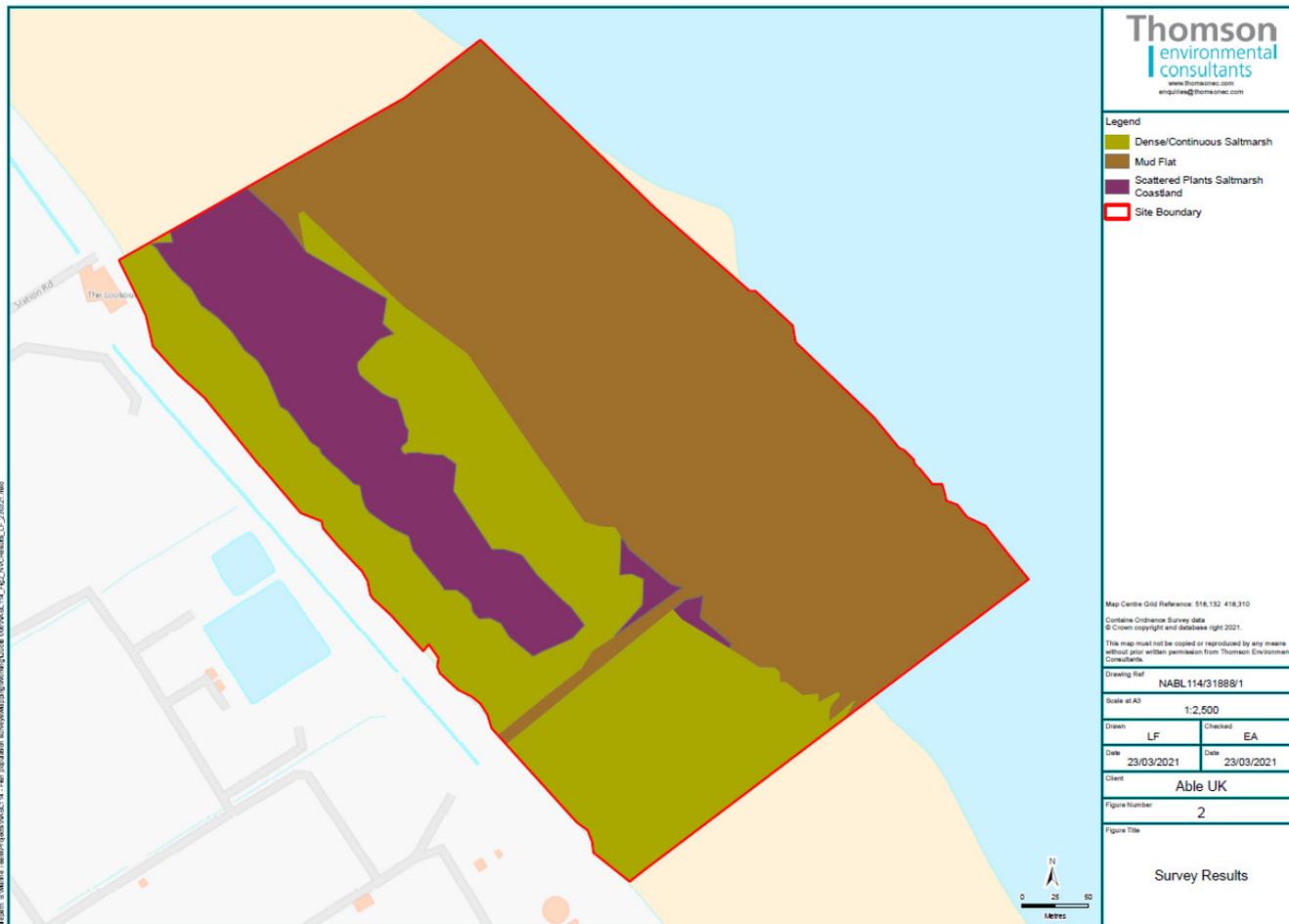
- 10.3.38 The most commonly recorded community from the survey was SM6 *Spartina anglica*, recorded in dense patches from the upper shore, but more patchily in the mid shore. *Spartina anglica* (Common Cord-grass) is a commonly recorded species from the lower and middle Humber, colonising large areas of intertidal habitat. The sward tends to be species poor.
- 10.3.39 On the lower edge of the saltmarsh, SM8 *Salicornia europaea* agg. was the dominant community, the species (Common Glasswort) recorded in the lower to middle estuary as the early coloniser and located in more muddy less elevated areas of the intertidal profile.
- 10.3.40 In areas of the upper shore in the middle marsh the SM12 Rayed *Aster tripolium* community was present. This is a more species-rich community including *Puccinellia maritima* (Common Saltmarsh Grass), *Plantago maritima* (Sea Plantain), *Spergularia media* (Greater Sea-spurrey), *Sueda maritima* (Annual Sea-blight), *Armeria maritima* (Thrift), *Cochleria anglica* (English Scurveygrass) and *Lysimachia maritimum* (Sea-milkwort) as well as other common species. It was concluded that in areas of this community, it was colonising the species poor *Spartina* as part of a natural succession to a more species rich permanent saltmarsh.
- 10.3.41 Further communities were recorded from the mid to upper shore including *Puccinellia maritima* (SM13), which in places was observed to be increasing in species richness towards a more permanent SM12 and *Elymus pycnanthus* (SM24), recorded primarily from the north-western part of the survey area, and also associated with species including *Phragmites australis*, *Festuca rubra* and *Atriplex prostrata*.
- 10.3.42 More extensive stands of *Phragmites Australis* (S4) were recorded on the upper shore at the north-western part of the survey area. *Puccinellia maritima*, *Bolboschoenus maritimus*, *Festuca rubra* and *Lysimachia maritimum* were also recorded.
- 10.3.43 A further distinct area of *Bolboschoenus maritimus* was recorded in the north-west of the survey area, as well as other species associated with S21 communities e.g. *Juncus gerardii* and *Triglochin maritimum*.
- 10.3.44 On the upper shore of the central part of the saltmarsh an area of *Arrhenatherum elatius* (MG1) sward was recorded, including Teasel (*Dipsacus fullonum*), Perennial Sow-thistle (*Sonchus arvensis*), Dandelion (*Taraxacum* agg), Bristle Ox-tongue (*Helminthotheca echioides*), Spear-leaved Orache, Sea Couch (*Elytrigia pycnanthus*), Red Fescue, Smooth Tare (*Vicia tetrasperma*), and Wild Carrot (*Daucus carota*). The notable plant Common Valerian (*Valeriana officinalis*) was also recorded in this community.

Figure 10-2: NVC Communities (Thomson Environmental Consultants, 2020)



- 10.3.45 The survey identified within the wider survey area (Figure 10-2) several rare or nationally / locally notable species from the frontage (seaward berm) and flood protection wall; Wall Bedstaw (*Galium parisiense*), Sea Wormwood (*Artemisia maritima*), Common Valerian (*Valeriana officinalis*), Thrift (*Armeria maritima*).
- 10.3.46 Details of the methods, NVC communities and species recorded and detailed distribution maps are included in Thomson Environmental Consultants, 2020 as Appendix U10-1.
- 10.3.47 A further saltmarsh survey was carried in March 2021 (Thomson Environmental Consultants, 2021), this being simply a marsh vegetation extent survey being outwith the period for more detailed vegetation survey, and covered the intertidal frontage to the south-east of the area surveyed in 2020 (Figure 10-2 above).
- 10.3.48 The 2021 survey (Figure 10-3) recorded an extensive saltmarsh colonisation of the mid to upper shore intertidal zone, with areas of more sparse cover towards the centre of this colonised area, and an absence of colonisation under an elevated pipeline which extends over the intertidal zone downstream of the AMEP site.

Figure 10-3: Saltmarsh Extent to the South-east of the AMEP Site (Thomson Environmental Consultants, 2021)



Benthic Invertebrates

Overview of Intertidal Invertebrates in the Middle Estuary

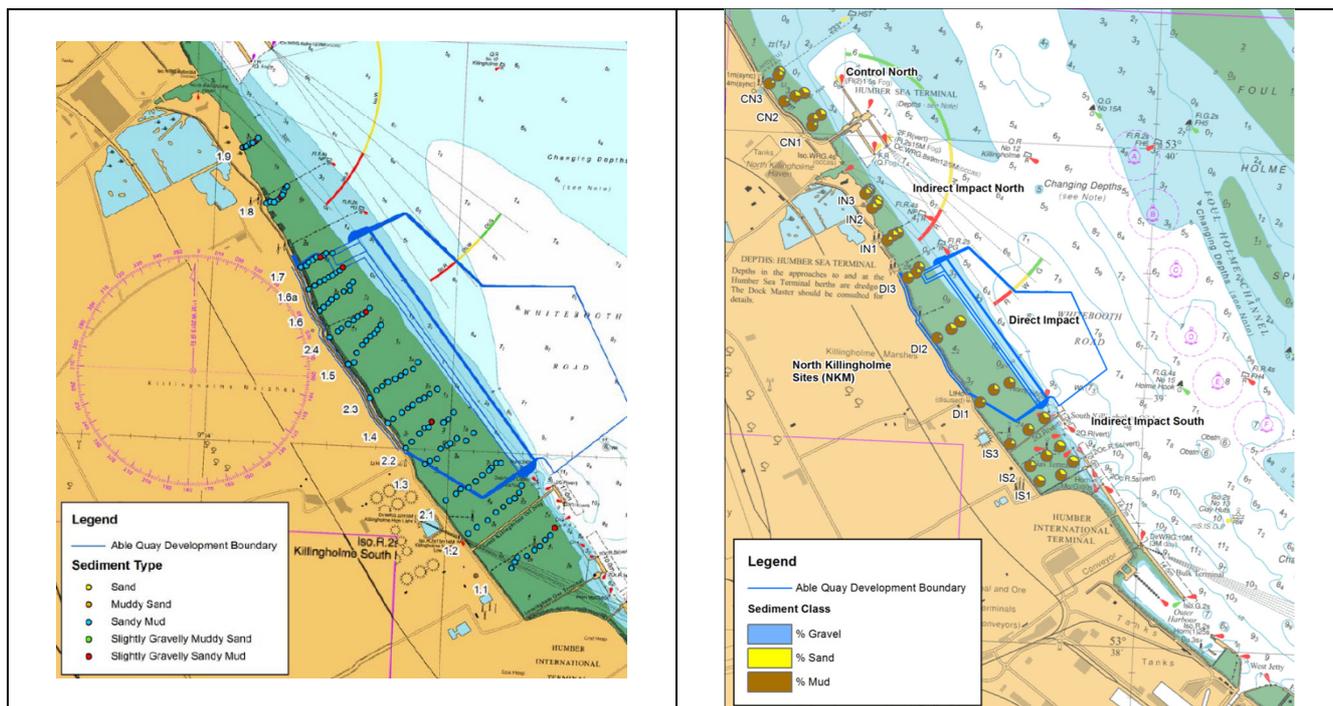
- 10.3.49 As noted earlier, the Humber is a dynamic estuarine system with changes in currents, tidal inundation, salinity etc. that create a difficult environment for many invertebrate organisms to flourish. The invertebrate community that colonises such areas can therefore be restricted to a relatively low number of species that are able to adapt to these environmental rigors.
- 10.3.50 However, 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. Productivity from these communities has been estimated at over 500kg per ha per year on the Humber (e.g. IECS, 1987), 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 the series of International/European conservation designations.
- 10.3.51 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.

- 10.3.52 Allen 2006 concludes that communities in the middle estuary 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.
- 10.3.53 Addressing temporal change in intertidal invertebrate community properties using historical data from Environment Agency monitoring stations, Allen, 2007 describes the community at East Halton upstream of the proposed development as featuring an increase in numbers of *Corophium volutator* from 1990 onwards with the polychaete *Polydora* having reduced significantly in abundance during the early 1980s.
- 10.3.54 At South Killingholme, downstream from the AMEP site, Allen (2007) concluded that there was no clear temporal trend in abundance changes with the mid shore generally dominated by *Tubificoides benedii* along with other species such as *Paranais litoralis*, *Pygospio elegans*, *Hediste diversicolor* and *Macoma balthica* present.

Intertidal Invertebrate Communities around the AMEP Development

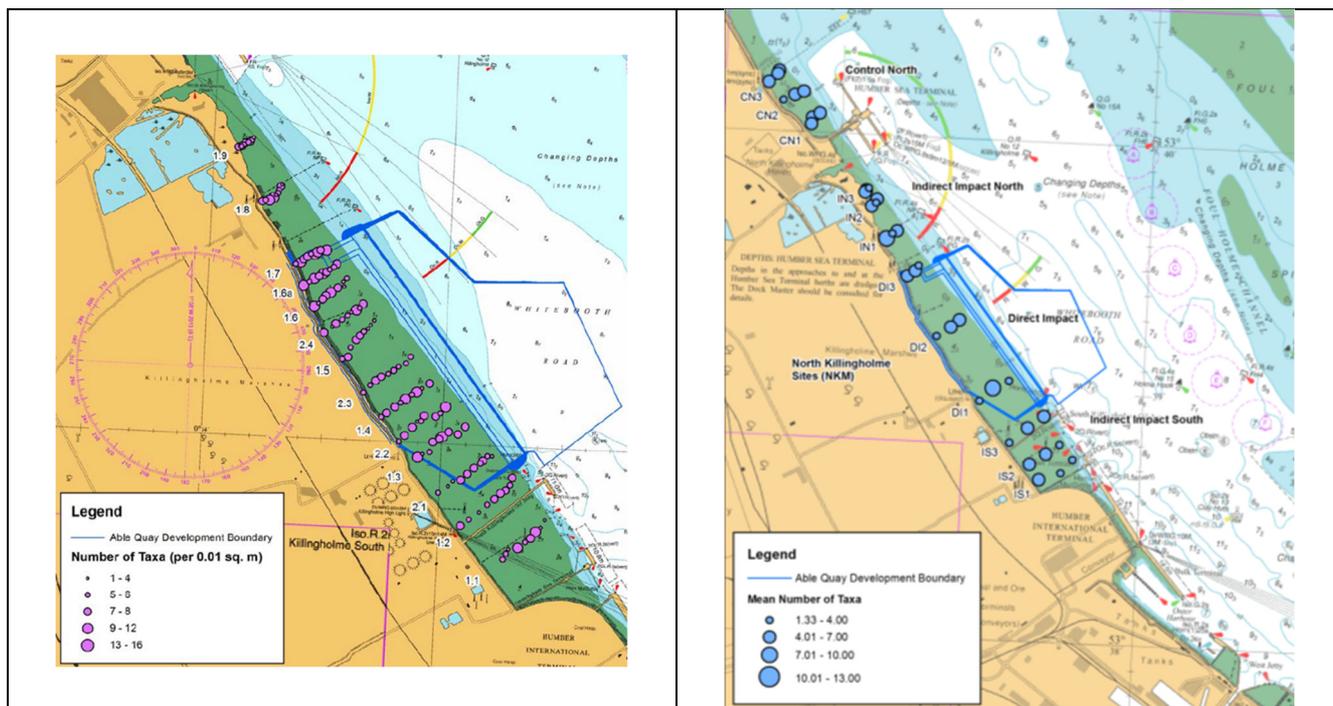
- 10.3.55 The dynamic nature of the Humber ecosystem means that the communities present can change substantially over time, and this was acknowledged in the Examining Authorities Report (2013) where the potential for 'natural' intertidal accretion to occur in the vicinity of the AMEP site was identified. The implications of this trajectory of change have resulted in a reduction in the extent of bare intertidal mudflat, and an increase in saltmarsh community cover (see above).
- 10.3.56 As such, it is important to note that the invertebrate community present at the AMEP development site is subject to ongoing change (changing elevation, sediment characteristics and marsh colonisation), and the intertidal community described below can only be a snapshot of the community structure at the time of sampling, in this instance autumn 2015 (Allen, 2017) (Appendix U10-2) and spring 2016 (Allen, 2020) (Appendix U10-3). Comparison data are also available from earlier survey periods subsequent to the original ES e.g. PMSL, 2014a & 2014b.
- 10.3.57 The intertidal invertebrate survey described by Allen (2017) featured a large number of samples taken along a series of intertidal transects, with the 2016 survey (Allen, 2020) featuring a smaller number of sample points along a smaller number of transects. Both surveys recorded a soft sediment primarily consisting of sandy mud, but with slightly gravelly sand in the mid to low shore at some locations (Figure 10-4).

Figure 10-4: AMEP Intertidal Invertebrate Surveys – Sediment Type (Allen, 2017 Left & Allen 2020 Right)



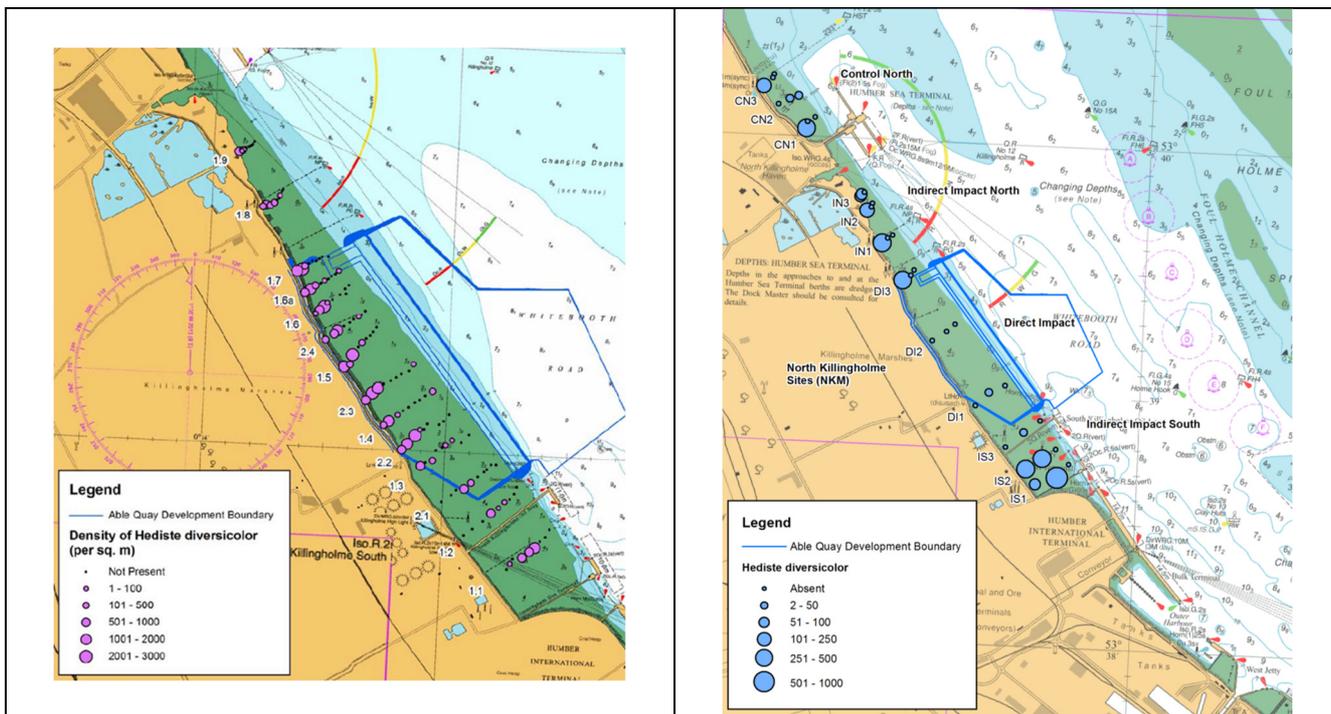
- 10.3.58 Allen, 2017 describes the biological parameters of the proposed AMEP development intertidal area as being typical of mid estuary muddy intertidal habitats, with the sediment parameters from the 2015 and 2016 surveys generally corresponding to sediment parameters recorded elsewhere in the middle Humber.
- 10.3.59 Some spatial patterns were recorded, relating to position on the shore profile, although with a further pattern in the southern (downstream) part of the survey area showing a slightly reduced number of taxa where saltmarsh encroachment had occurred (the surveys having been carried out in 2015 & 2016) (Figure 10-5).
- 10.3.60 A degree of patchiness in faunal abundance and biomass was also recorded with the spatial variation in the number of taxa recorded, suggesting a slightly more diverse community present towards the northern extent of the AMEP development footprint, and possibly reflecting saltmarsh encroachment at the southern section, although there remains considerable variation across the transects and other environmental factors may also be influencing community structure.

Figure 10-5: AMEP Intertidal Invertebrate Survey – Number of Taxa (Allen, 2017 Left & Allen, 2020 Right)



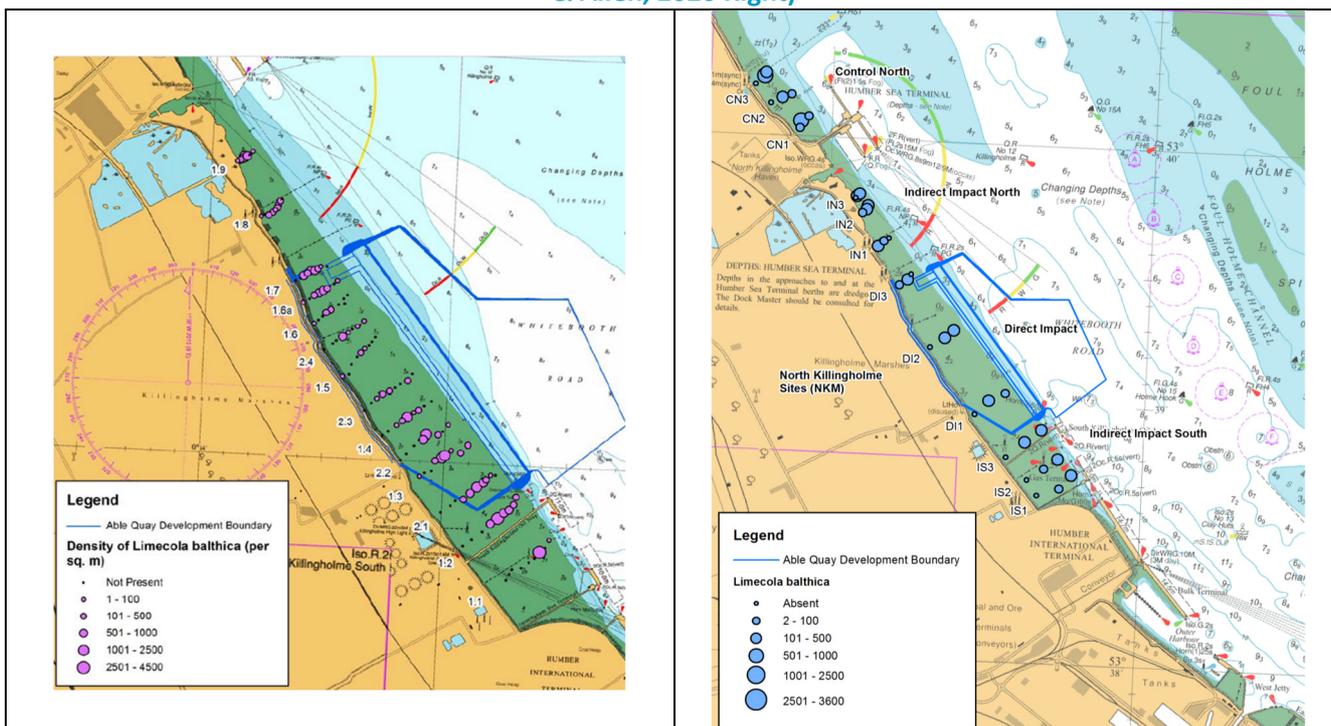
- 10.3.61 The dominant invertebrate species at the AMEP site from the 2015 survey reported by Allen (2017) was *Corophium volutator*, with an extrapolated mean abundance of almost 8,000 individuals per m², but with a biomass (AFDW) of just under 1g per m², the species present in 97% of the sampling stations. *Corophium* can provide an important prey resource for a number of waterbird species, including a number of duck species and some small to medium sized waders for instance Redshank (*Tringa totanus*).
- 10.3.62 The second most abundant species recorded from the 2015 sampling programme, *Tubificoides benedii* can form a dietary component for some waterbirds, but its small size and thus biomass, means it does not form an important component for most species, although it is often present in diet on filter feeders and thus whilst a mean abundance of 2,147 per m² of the species was recorded at the site, this only yielded a mean biomass of <0.1g per m².
- 10.3.63 The most dominant taxa from the 2016 survey (Allen, 2020) were again *Corophium volutator* and *Tubificoides benedii* which accounted for over 70% of the total abundance and were recorded at the majority of sites (74% and 75% respectively). Other oligochaetes (*Tubificoides* species, *Baltidrilus costatus* and Enchytraeidae sp.) were also recorded in moderately to high abundances at a lower number of sites.
- 10.3.64 The importance of *Hediste diversicolor* as a source of prey item biomass can be seen from both surveys (Figure 10-6). *Hediste*, a relatively large errant polychaete is commonly recorded in north-west European estuaries and forms a key dietary component for a number of waterbird species, including many larger waders which will actively forage for the species.
- 10.3.65 *Hediste diversicolor* were primarily recorded from samples taken from the upper shore of the central survey area (Figure 10-6). However, the encroachment of saltmarsh in the south-central part of the survey area can be seen to have been potentially restricting the abundance of the species, although other external factors including predation can also affect abundance.

Figure 10-6: AMEP Intertidal Invertebrate Survey – Density of *Hediste diversicolor* (Allen, 2017 Left & Allen, 2020 Right)



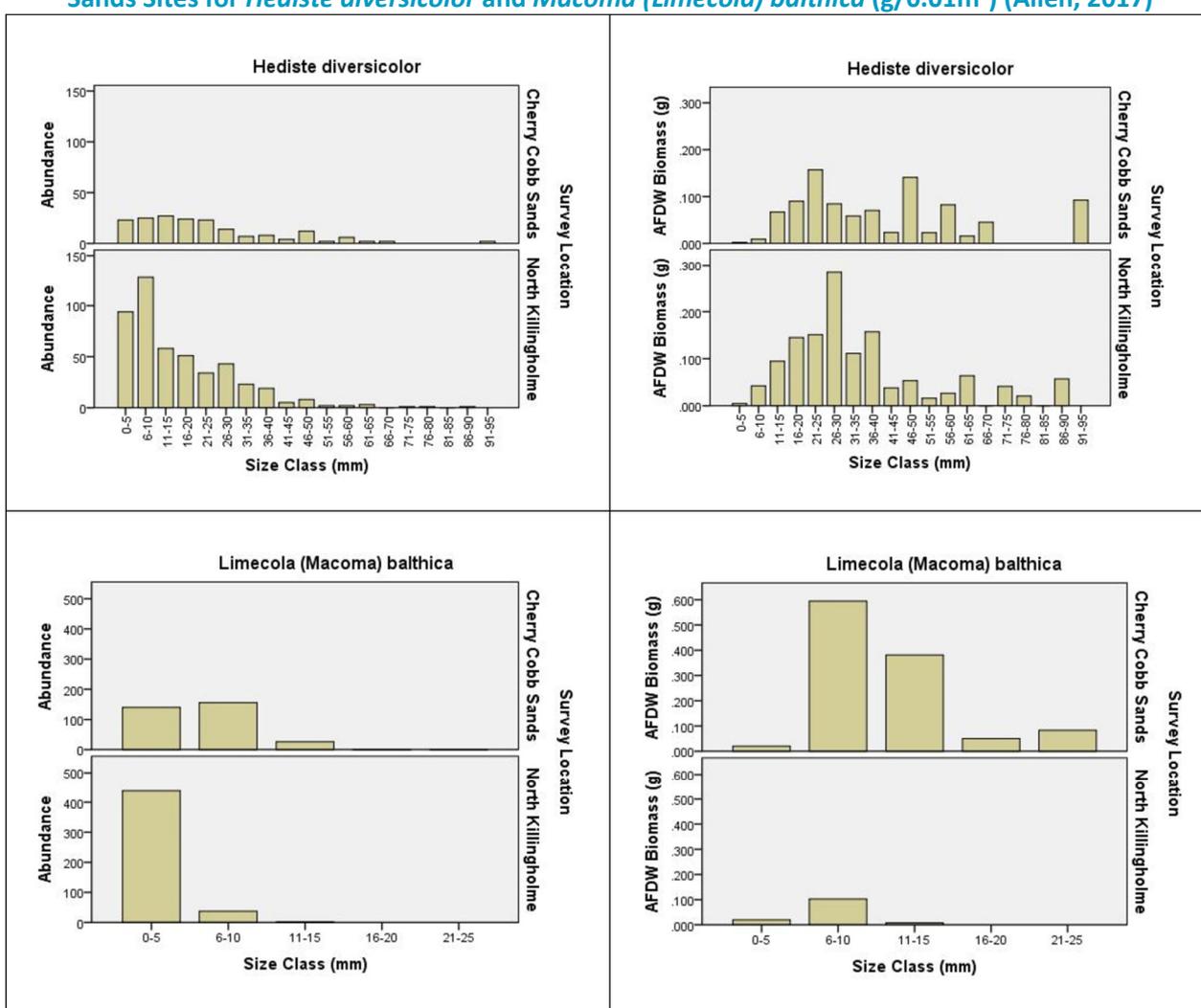
10.3.66 Another important component of predator diets can be the bivalve *Macoma (Limecola) balthica*. The surveys found the distribution of the species to be different to that of *Hediste*, with the majority of individuals recorded from the mid to low shore part of the AMEP frontage, including areas to the south-east, fronting the saltmarsh at the time of sampling (Figure 10-7).

Figure 10-7: AMEP Intertidal Invertebrate Survey – Density of *Macoma (Limecola) balthica* (Allen, 2017 Left & Allen, 2020 Right)



- 10.3.67 Size class:abundance and size class:biomass calculations were undertaken on the 2015 data by Allen (2017) for invertebrate species which form key prey items for waterbirds, comparing the AMEP site with the intertidal area on the opposite (north) bank of the estuary on Cherry Cobb Sands (Figure 10-8).
- 10.3.68 These data suggest that for *Hediste diversicolor*, abundance is greater for the AMEP site than Cherry Cobb Sands for the small to small-medium size classes e.g. 0-40mm in length, but with comparability in abundance for the medium to large size classes e.g. 41-95mm size classes. Biomass information suggests the AMEP site provides slightly more biomass from the small to small / medium size classes, compared to Cherry Cobb Sands, but with Cherry Cobb Sands potentially having a slightly higher biomass in the larger medium size classes.

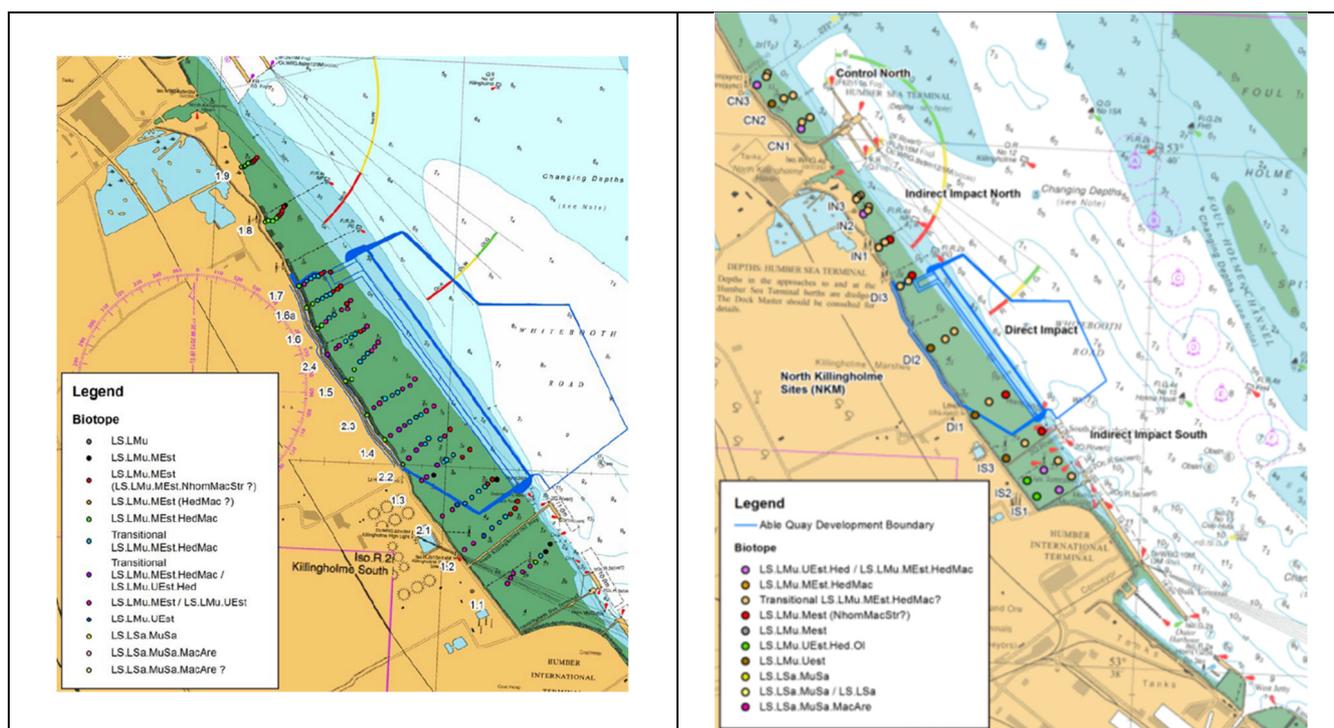
Figure 10-8: Size Class vs Abundance & Biomass for the AMEP (North Killingholme Marshes) and Cherry Cobb Sands Sites for *Hediste diversicolor* and *Macoma (Limecola) balthica* (g/0.01m²) (Allen, 2017)



- 10.3.69 Allen (2020) indicates that there is a degree of overlap in the intertidal benthic communities of the proposed AMEP development area on the south shore of the estuary and Cherry Cobb Sands on the north shore, but with a degree of dissimilarity also occurring, with for the 2016 data, *Corophium volutator* notably different, being widespread and abundant at the AMEP development site, but largely absent from Cherry Cobb Sands.

- 10.3.70 Intertidal biotopes identified by Allen (2017 & 2020) for the AMEP development area (Figure 10-9) are characteristic of middle estuary environments and are described by Allen (2017) as transitional variants of LS.LMu.MEst and LS.LMu.MEst.HedMac or LS.LMu.MEst.NhomMacStr e.g. polychaete/bivalve-dominated mid estuarine mud shores or *Hediste diversicolor* and *Macoma (Limecola) balthica* in littoral sandy mud or *Nephtys hombergii*, *Macoma (Limecola) balthica* and *Streblospio shrubsolii* in littoral sandy mud
- 10.3.71 The more elevated areas of the intertidal frontage e.g. the southern part of the NKM site, subject to accretion and some saltmarsh colonisation were described as being either slightly impoverished LS.LMu.MEst or a transitional variant of the more upper estuary biotope LS.LMu.Uest (polychaete/oligochaete-dominated upper estuarine mud shores) or LS.LMu.Eest.Hed (*Hediste diversicolor* in littoral mud). *LS.LMu.UEst.Hed.Cvol* (*Hediste diversicolor* and *Corophium volutator* in littoral mud) or *LS.LMu.UEst.Hed.Str* (*Hediste diversicolor* and *Streblospio shrubsolii* in littoral sandy mud) were also present in the AMEP site (Allen, 2020) (Figure 10-9).
- 10.3.72 These biotopes are characteristic of north-west European estuaries including the Humber Estuary e.g. HARBASINS, 2006.

Figure 10-9: AMEP Intertidal Invertebrate Survey – Biotope Distribution (Allen, 2017 Left and Allen, 2020 Right)



- 10.3.73 Allen (2017 & 2020) concludes 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).

Overview of Subtidal Communities in the Middle Estuary

10.3.74 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 Table 10-2.

Table 10-2: Subtidal Biotopes of the Middle Humber Estuary. Source: HARBASINS, 2006

Biotope	UK Marine Biotope Classification	Extent within the Estuary
Infralittoral mobile sand in variable salinity (estuaries)	SS.SSa.SSaVS.MoSaVS	Upper to mid estuary
<i>Neomysis integer</i> and <i>Gammarus</i> spp. in variable salinity infralittoral mobile sand	SS.SSa.SSaVS.NintGam	Upper to mid estuary
<i>Nephtys cirrosa</i> and <i>Macoma balthica</i> in variable salinity infralittoral mobile sand	SS.SSa.SSaVS.NcirMac	Mid Estuary
<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand	SS.SSa.IFiSa.NcirBat	Mid to Outer Estuary
<i>Arenicola marina</i> in infralittoral fine sand or muddy sand	SS.SSa.IMuSa.AreISa	Mid Estuary
<i>Nephtys hombergii</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral soft mud	SS.SMu.SMuVS.NhomTubi	Mid Estuary
Infralittoral fluid mobile mud	SS.SMu.SMuVS.MoMu	Mid Estuary
<i>Capitella capitata</i> and <i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment	SS.SMu.SMuVS.CapTubi	Mid Estuary
<i>Nephtys hombergii</i> and <i>Macoma balthica</i> in infralittoral sandy mud	SS.SMu.ISaMu.NhomMac	Mid Estuary
<i>Capitella capitata</i> in enriched sublittoral muddy sediments	SS.SMu.ISaMu.Cap	Mid Estuary
<i>Aphelocheata marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud	SS.SMu.SMuVS.AphTubi	Mid to Outer estuary
<i>Nephtys hombergii</i> and <i>Macoma balthica</i> in infralittoral sandy mud	SS.SMu.ISaMu.NhomMac	Mid to Outer estuary
<i>Aphelocheata</i> spp. and <i>Polydora</i> spp. in variable salinity infralittoral mixed sediment	SS.SMx.SMxVS.AphPol	Mid to Outer estuary

10.3.75 The position and relative extent of these will alter slightly over time, in response to changing physical conditions and arising from hydrodynamic pressures.

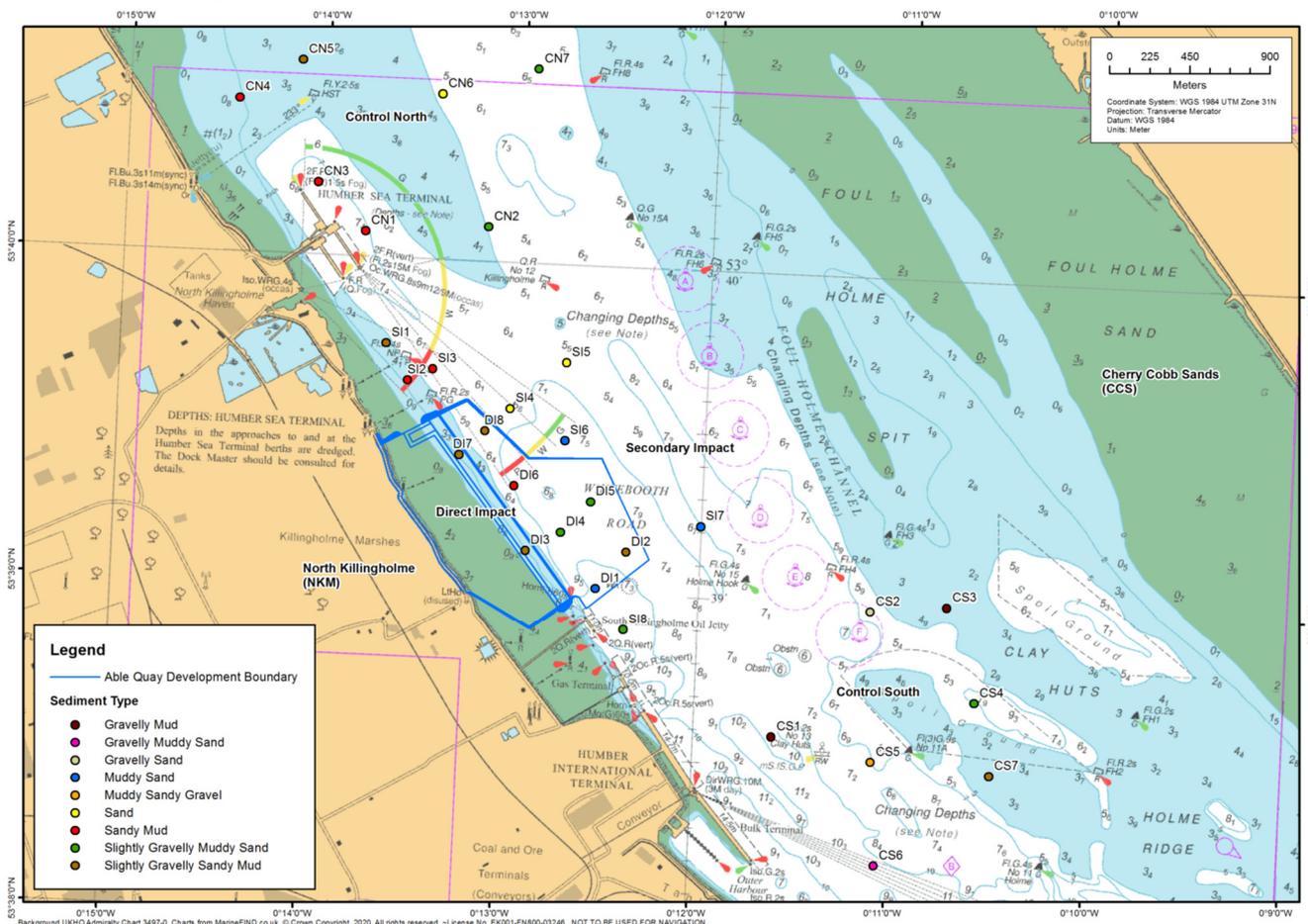
Subtidal Communities around the AMEP Development

10.3.76 A subtidal invertebrate survey was carried out in the waters fronting the proposed AMEP development site in 2016, with the sediment types recorded from the sampling locations shown in Figure 10-10 (Allen, 2020) (Appendix U10-4). As part of the analysis, the survey area was divided into four areas, two relating directly to the AMEP development (impact, secondary impact area) as well as north and south control areas.

10.3.77 The direct impact area tended 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). The secondary impact area also included muddy habitats including sandy muds or muddy sands (or slightly gravelly muddy sand/sandy muds) but also included two sandier sites

(Allen, 2020) (Figure 10-10).

Figure 10-10: Subtidal sample locations and sediment type, 2016 (Allen, 2020)



- 10.3.78 In total 49 taxa were recorded during the subtidal survey although many of these were present in low densities or only recorded occasionally (Figure 10-11 and Figure 10-12).
- 10.3.79 Sites in the northern control area were characterised by *Capitella* sp., Arenicolidae sp. (*Arenicola marina*) and *Gammarus salinus* although these were only present at around 50% of the sites. *Limecola balthica*, *Crangon crangon*, Arenicolidae sp. (*Arenicola marina*) and *Nephtys hombergii* contributed the greatest biomass in the northern control area.
- 10.3.80 The southern control area included a more variable range of species but only *Capitella* sp. and *Eurydice pulchra* were present in over 50% of the sites.
- 10.3.81 The direct impact and secondary impact areas were also characterised by low numbers of *Capitella* sp. but included modest numbers of species such *Corophium volutator* and *Streblospio shrubsolei*. However, many of the taxa present in these areas were recorded at relatively few sites.

Figure 10-11: Mean number of taxa per station, 2016 (Allen, 2020)

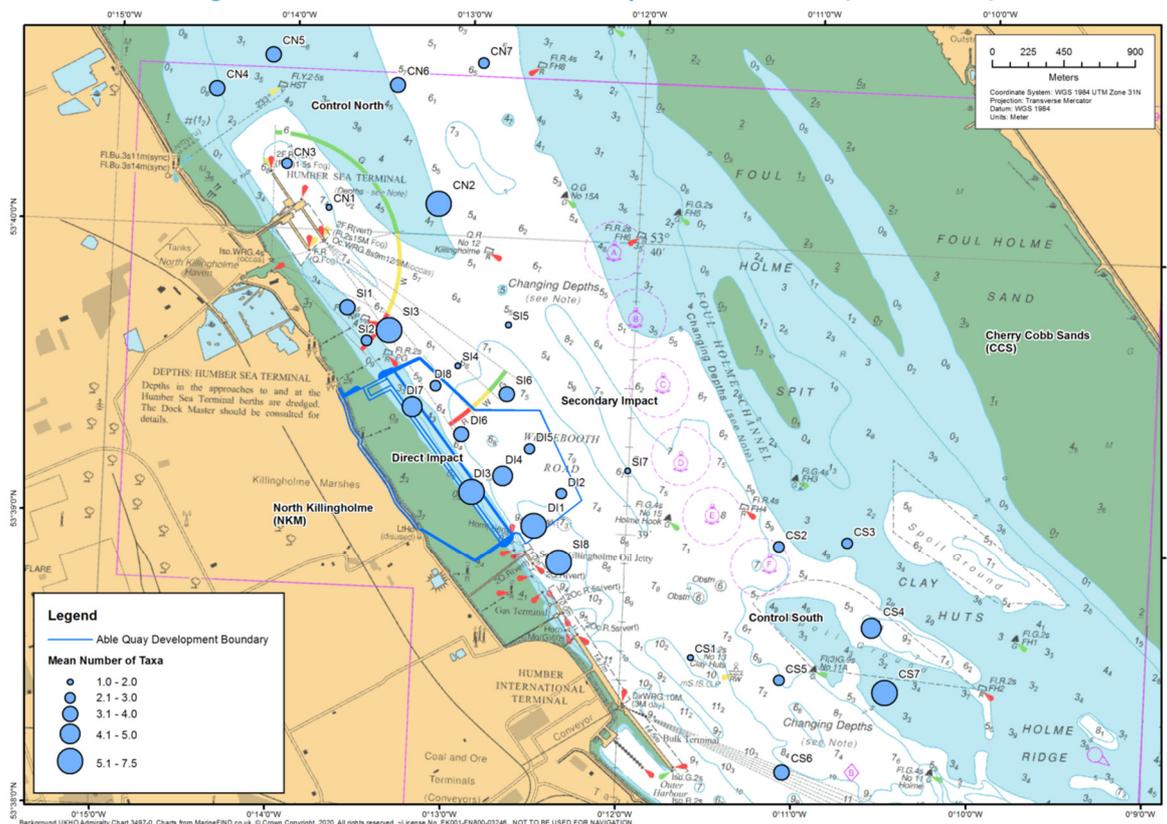


Figure 10-12: Mean number of individuals per 0.1m², 2016 (Allen, 2020)

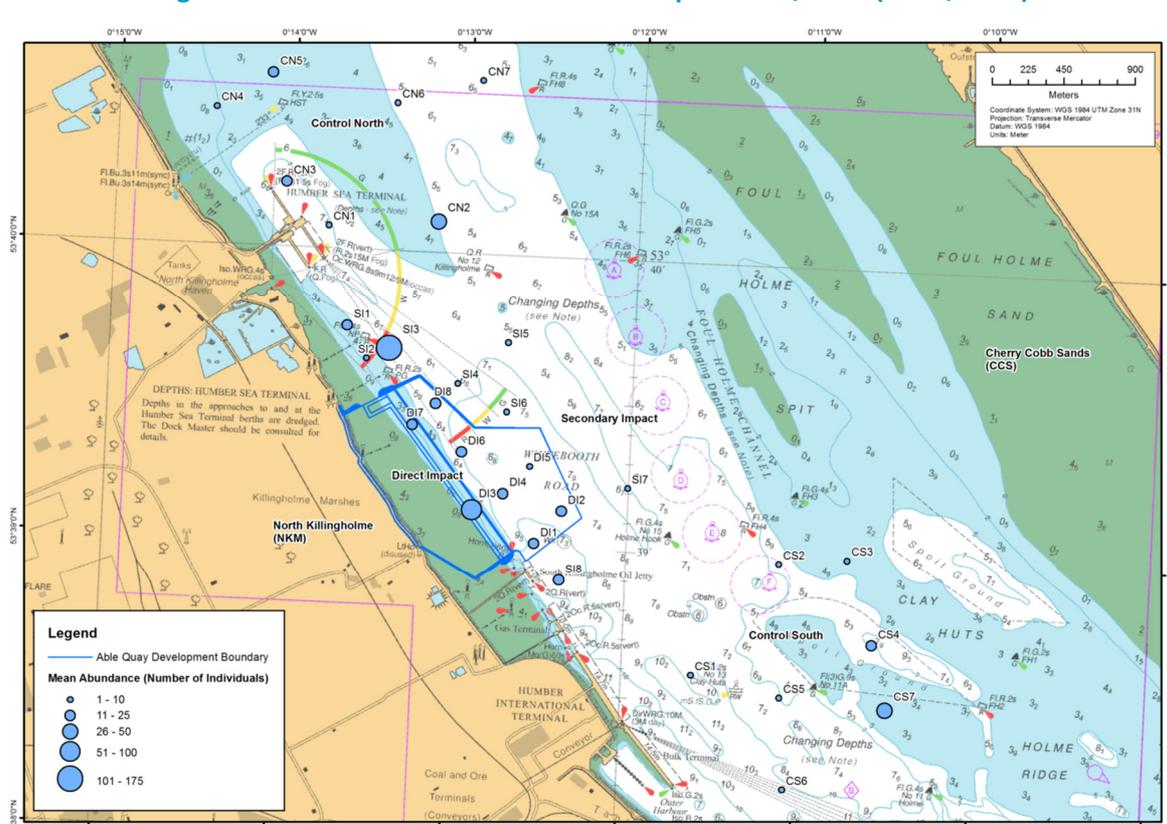
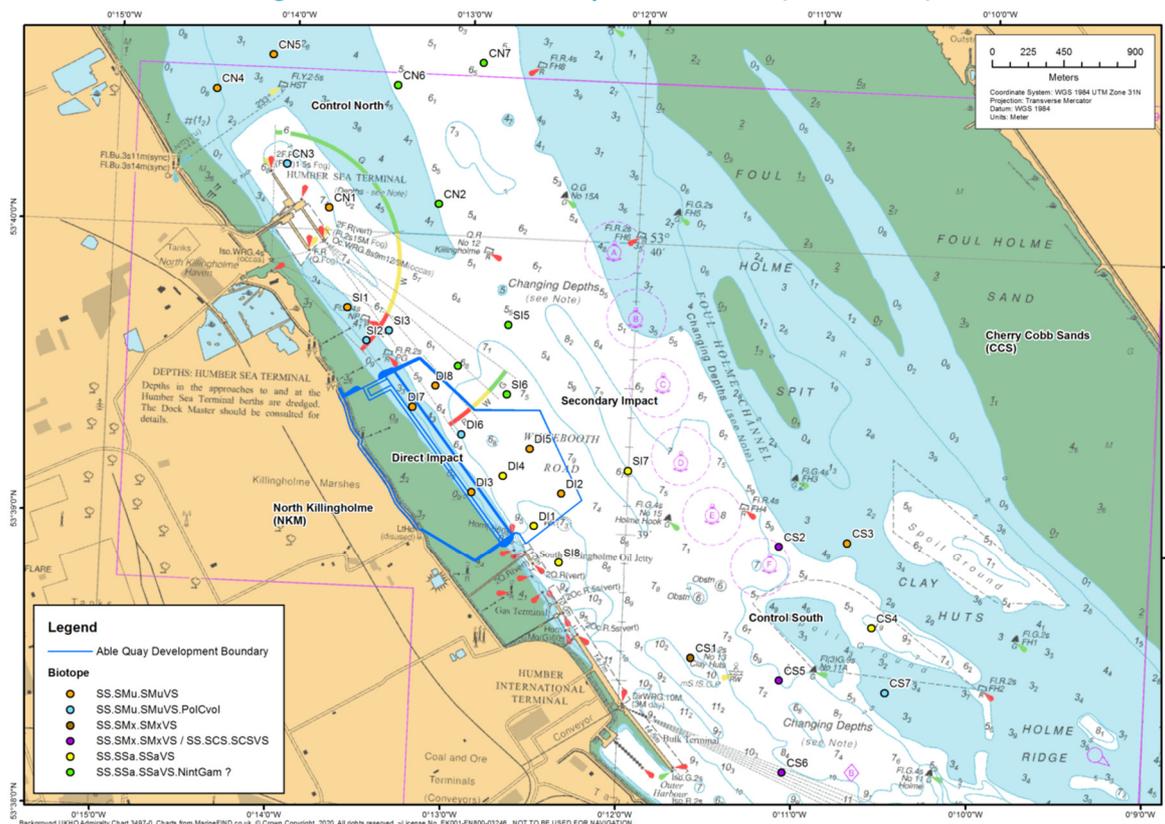


Figure 10-13: Subtidal biotope distribution (Allen, 2020)



- 10.3.82 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.
- 10.3.83 The survey recorded a number of impoverished and often transitional forms of variable salinity biotopes which are typically recorded in the middle Humber (Figure 10-13). These included SS.SMx.SMxVS and SS.SCS.SCSVS and variants of SS.SSa.SSaVS biotopes such as SS.SSa.SSaVS.NintGam (*Neomysis integer* and *Gammarus* spp. in fluctuating low salinity infralittoral mobile sand). A number of the samples also exhibited some resemblance to the biotope SS.SSa.SSaVS.MoSaVS.
- 10.3.84 The muddier sites were generally classified as rather impoverished forms of SS.SMu.SMuVS, although a number of sites which included moderate densities of the polychaete *Polydora ciliata* were classified as the biotope SS.SMu.SMuVS.PolCvol.
- 10.3.85 Allen (2020) concludes that a range of sedimentary habitats including muds, sandy muds, sand and sandy gravel or mixed gravelly muddy habitats are present on the subtidal seabed around the proposed AMEP development site.
- 10.3.86 These habitats tended to be very impoverished which is typical for the middle Humber and in line with findings from previous surveys (e.g. as described in paragraphs 10.5.26 et seq of the original ES and supporting documentation). Characteristic taxa from the subtidal survey included 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*.

Dredge Material around the AMEP Development and Disposal Site Attributes

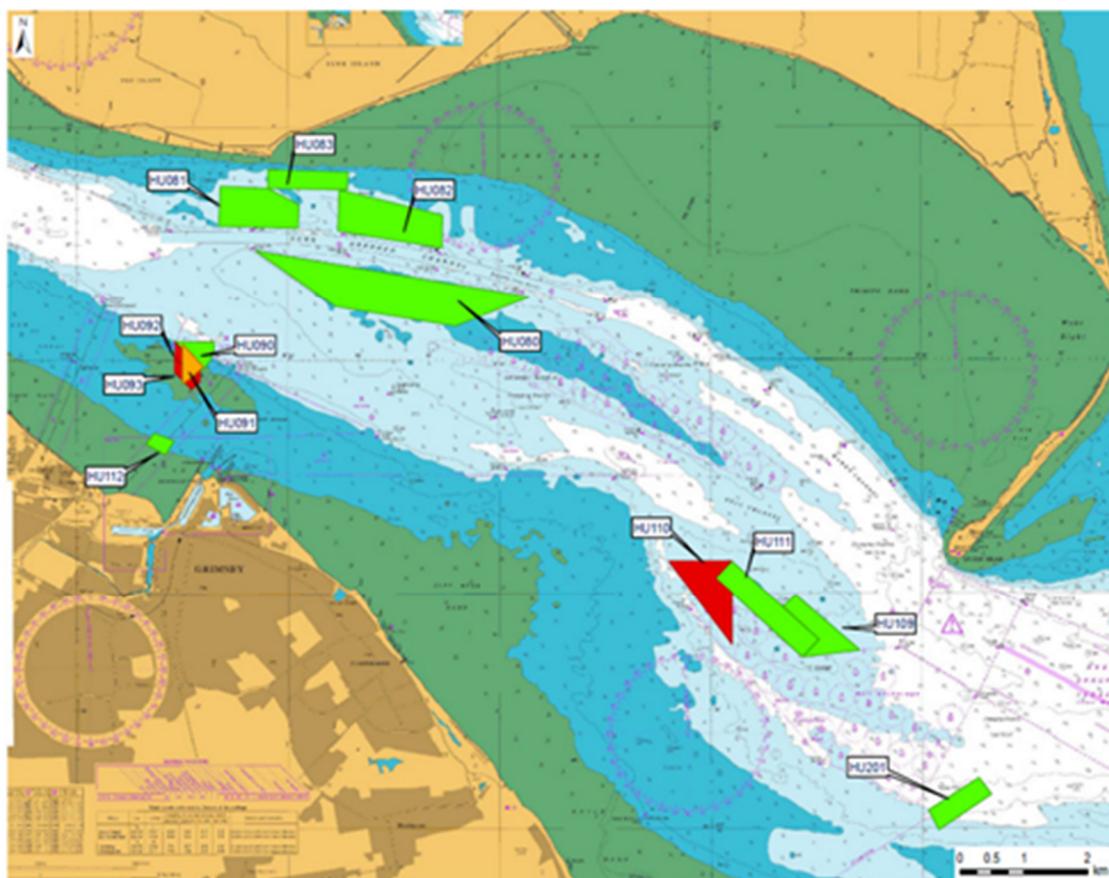
- 10.3.87 In broad terms, the existing Marine License for the development⁹ permits the capital dredging of up to 4.318M tonnes of material with disposal of up to 2.218M tonnes of erodible deposits at HU080, up to 1M tonnes of inerodible material at HU082 and the remainder of the inerodible deposits with terrestrial areas of the development.
- 10.3.88 Dredging permissions are proposed to be changed to the extent necessary to dredge the berthing pockets and approaches for the amended quay line. Dredging works are also proposed to be changed to permit all clay arisings from the berthing pocket to be deposited at the HU082 deposit site in the Humber Estuary, instead of some having to be deposited on *'terrestrial areas landward of the existing Killingholme Marshes flood defence wall'* (DCO Schedule 8, paragraph 11(2)).
- 10.3.89 Details of the dredge techniques, phases, material characteristics, volumes and disposal site strategies are provided in Technical Appendix U4-2 of the PEIR, but in summary, the volume of capital dredged material will be 1,970,000m³, with the arisings consisting of alluvium and soft clays, glacial till and silty & gravelly sands. A series of dredging stages are planned:
- Stage 1: Enabling works dredge using a hydraulic dredger to create a working area for marine plant along the line of the quay wall and to partly dredge an anchor trench behind the quay line in the event that flap anchors are utilised. This working area will be dredged to between -4mCD and -5mCD. Volume: 400,000m³.
 - Stage 2A: An Anchor Trench for flap anchors to a level of -7mCD using a Backhoe Dredger (BHD). Volume: 30,000m³.
 - Stage 2B: Partial deepening of the Berthing pocket to a depth of -7mCD, using a hydraulic dredger. Volume: 320,000m³.
 - Stage 3: Approach Channel to -9mCD using a TSHD. Turning Area -9mCD using a hydraulic dredger. Volume: 720,000m³.
 - Stage 4: Dredging of the Berthing Pocket to levels of up to -11mCD. This work will be completed using a BHD. Volume: 400,000m³.
 - Stage 5: Completion of the Berthing Pocket to levels of up to -14.5mCD. This work will be completed using a BHD. Volume: 100,000m³.
- 10.3.90 Maintenance dredging of the berth pocket and approach would be required once the quay is operational.

Dredge Disposal Sites

- 10.3.91 The Humber 1A/Middle Shoal (HU080) disposal site is located immediately to the south of the Sunk Dredged Channel (SDC) in the Outer Humber Estuary (Figure 10-14). The site was first licensed in the early 1970s and has received nearly all of the maintenance material dredged from SDC. HU080 will receive erodible material from the AMEP dredging. HU082 is one of the SDC Window sites (Window Site C) (Figure 10-14) and will receive non-erodible material.

⁹ <https://www.gov.uk/government/publications/amep-marine-energy-park-variation-2>

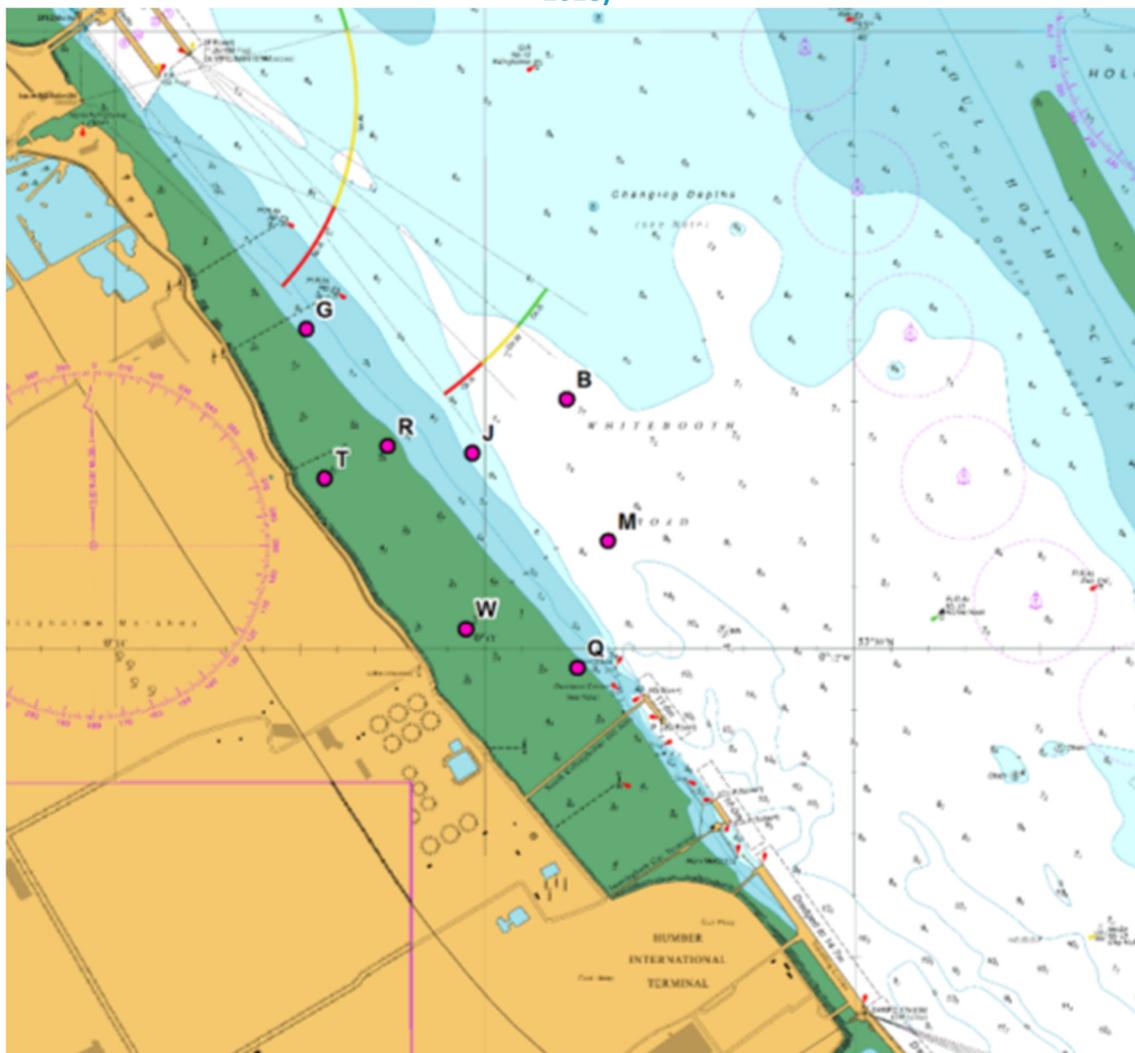
Figure 10-14: Humber Estuary Dredge Areas (Active – Green, Orange – Disused, Red - Closed). TIDE, 2013



Contaminant Levels around the Dredge Site

- 10.3.92 Sediment samples were originally collected in 2011 at intertidal and subtidal locations around the proposed AMEP development site. By agreement with the MMO, surface samples were re-taken in 2017 and 2020 (Figure 10-15) to assess the continued suitability of the dredged material for disposal at sea. These 2017 and 2020 data have been analysed for contaminant levels (metals, PAHs and PCBs), and these data are summarised in Table 10-3, Table 10-4 and Table 10-5 and present minimum and maximum values in the context of Cefas Level 1 and Level 2 Action Thresholds.
- 10.3.93 The data show that for metals, the highest contaminant levels recorded included species above Action Level 1, e.g. Arsenic (2017 & 2020), Cadmium (2020), Chromium (2017 & 2020), Copper (2017), Nickel (2017 & 2021), Lead (2017 & 2020), and Zinc (2017 & 2020) (Table 10-3). However, no values recorded from either survey were at or above the Cefas Action Level 2, and for the most part, concentration values fell far short of the Action Level 2 thresholds.
- 10.3.94 The metal contaminant data from the sampling sites show levels that are broadly comparable to sediment concentrations from other sites in the middle Humber e.g. levels recorded by the (then) National Rivers Authority between 1980 and 1990 (NRA, 1993).

Figure 10-15: Sediment Contamination Re-Sampling Locations around the AMEP Development Site (Allen, 2018)



- 10.3.95 For instance the NRA (1993) provides sediment concentration values from a sampling station at South Killingholme including levels of Cadmium 0.9mg/kg; Chromium 171mg/kg; Copper 71 mg/kg; Nickel 59mg/kg; Lead 158mg/kg and Zinc 352 mg/kg in the sediment, all above the highest levels recorded from the AMEP site in either 2017 or 2020.
- 10.3.96 Sediment contaminant levels were also sampled in 2008 to 2010 (ABP HES, 2012) including port dredge areas, and results indicated that metal concentrations within the Humber Estuary sediments are typically below Cefas Action Levels or slightly above Cefas Action Level 1. However, there were a few sediment samples that exceeded Cefas Action Level 2, these being for Zinc at West Dock, Goole and William Wright Dock, Hull and for Copper at South Dock, Goole.

Table 10-3: Metal Contaminant Levels 2017 & 2020 (Able UK Ltd)

Individual Action Levels	2017					2020				
	Lowest		Highest			Lowest		Highest		
	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2
Metals mg/kg dry weight (ppm)										
Arsenic (As)(Act 1 = 20) (Act 2 = 100)	16.1			34.2		15			30.6	
Cadmium (Cd)(Act 1 = 0.4) (Act 2 = 5)	0.08		0.38			0.16			0.46	
Chromium (Cr)(Act 1 = 40) (Act 2 = 400)	19.7			100		8.7			54.2	
Copper (Cu)(Act 1 = 40) (Act 2 = 400)	4.89			40.9		9.5		36.2		
Mercury (Hg)(Act 1 = 0.3) (Act 2 = 3)	0.19		0.28			0.11		0.24		
Nickel (Ni)(Act 1 = 20) (Act 2 = 200)	14.3			49.1		11.6			39.5	
Lead (Pb)(Act 1 = 50) (Act 2 = 500)		68		88.4		27.8			72.6	
Zinc (Zn)(Act 1 = 130) (Act 2 = 800)	97			218		63.3			176	
Dibutyltine (DBT)(Act 1 = 0.1)(Act 2 = 1)	no data		no data			LOD		LOD		
Tributyltin (TBT)(Act 1 = 0.1)(Act 2 = 1)	no data		no data			LOD		LOD		

10.3.97 In addition to metal contaminant levels, sites around the AMEP development were monitored in 2017 and 2020 for Polycyclic Aromatic Hydrocarbons (PAHs) (Table 10-4) and Polychlorinated Biphenyls (PCBs) (Table 10-5).

Table 10-4: PAH Contaminant Levels 2017 & 2020 (Able UK Ltd)

Action level 1 - 0.1ppm	2017					2020				
	Lowest		Highest			Lowest		Highest		
	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2
PAHs mg/kg dry weight (ppm)										
Total Hydrocarbon Content		10		1260			12		113	
Acenaphthene		0.11		18.50			11.70		226.00	
Acenaphthylene		0.98		94.40			5.13		368.00	
Anthracene		1.23		113.00			28.00		344.00	
Benz[a]anthracene		3.11		367.00			47.00		1230.00	
Benzo[a]pyrene		3.55		404.00			52.70		1180.00	
Benzo[b]fluoranthene		4.08		498.00			47.20		775.00	
Benzo[g,h,i]perylene		3.70		408.00			49.50		452.00	
Benzo[e]pyrene		3.52		455.00			58.20		696.00	
Benzo[k]fluoranthene		1.57		194.00			20.40		539.00	
C1-Napthalenes		10.80		2500.00			173.00		1030.00	
C1-Phenanthrenes		8.59		1590.00			159.00		655.00	
C2-Napthalenes		13.90		3530.00			168.00		801.00	
C3-Napthalenes		19.40		4500.00			33.80		693.00	
Chrysene		2.57		327.00			56.60		1100.00	
Dibenz[a,h]anthracene		0.71		77.10			8.41		114.00	
Fluoranthene		7.02		809.00			108.00		808.00	
Fluorene		1.41		197.00			17.60		153.00	
Indeno[123-c,d]pyrene		3.96		361.00			34.90		509.00	
Napthalene		2.95		694.00			59.70		356.00	
Perylene		1.46		158.00			29.10		298.00	
Phenanthrene		5.08		906.00			157.00		626.00	
Pyrene		7.23		697.00			133.00		858.00	

10.3.98 All PAH values were above the Cefas Action Level 1, with no threshold set for Action Level 2 (Table 10-4). However, as context, the NRA (1993) recorded a mean minimum Total Hydrocarbon concentration of 6mg/kg and a maximum of 885mg/kg for the Humber, with the values for the AMEP dredge stations being a minimum of 10mg/kg and 12mg/kg from the two surveys and a maximum of 1260mg/kg and 113mg/kg.

- 10.3.99 ABP HES (2012) concluded from sampling campaigns in 2008 and 2010 that sediments from many locations in the Humber estuary exceed Cefas Action Level 1 threshold for a range of PAH substances, with the Total Hydrocarbons concentration range varying largely from 164mg/kg to 1755mg/kg.
- 10.3.100 Of the 25 PCB congeners measured from the 2020 contaminant surveys of the AMEP dredge area, only 8 were recorded in excess of the Action 1 level, and none were recorded above an Action Level 2 threshold (Table 10-5).

Table 10-5: PCB Congener Contaminant Levels 2017 & 2020 (Able UK Ltd)

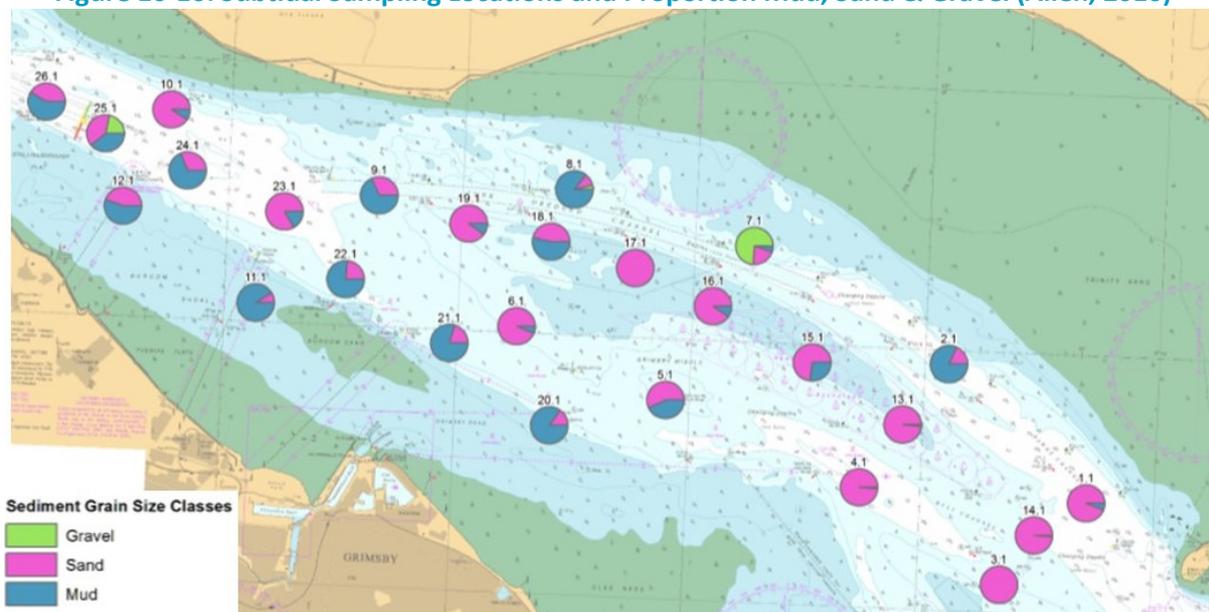
Action level 1 - 0.02ppm Action level 2 - 0.2ppm	2017					2020				
	Lowest		Highest			Lowest		Highest		
	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2	Below Action Level 1	Action Level 1	Below Action Level 1	Action Level 1	Action Level 2
PCBs mg/kg dry weight (ppm)										
CB101*						0.0001		0.0008		no act 2
CB105						0.0001		0.0002		
CB110						0.0006			0.0210	
CB118*						0.0004			0.0240	no act 2
CB128						LOD		0.0130		
CB138*						0.0005			0.0530	no act 2
CB141						LOD		0.0090		
CB149						LOD		0.0310		
CB151						0.0001		0.0090		
CB153*						0.0007			0.0580	no act 2
CB156						LOD		0.0060		
CB158						LOD		0.0020		
CB170			not tested in 2017			0.0003			0.0270	
CB18						LOD		0.0010		
CB180*						LOD			0.0600	no act 2
CB183						LOD		0.0100		
CB187						LOD			0.0370	
CB194						LOD			0.0400	
CB28*						0.0002		0.0008		no act 2
CB31						0.0002		0.0014		
CB44						0.0002		0.0015		
CB47						LOD		0.0027		
CB49						0.0002		0.0018		
CB52*						0.0002		0.0050		no act 2
CB66						LOD		0.0037		

- 10.3.101 ABP HES (2012) state that historically, PCB contamination levels within the Humber Estuary are relatively low, and as such, there has been little sampling undertaken in recent years. However, sampling was undertaken within Goole Docks during 2009, with data showing that the Cefas Action Level 2 was exceeded for CB no.47 (2,2',4,4'-Tetrachlorobiphenyl) and g-HCH (Lindane), CB no. 156 (2,3,3',4,4',5-Hexachlorobiphenyl) and CB no. 158 (2,3,3',4,4',6-Hexachlorobiphenyl) (TIDE, 2013).

Benthic Invertebrate Communities around the Proposed AMEP Dredge Disposal Locations (HU080 & HU082)

10.3.102 A survey of the seabed invertebrate fauna was conducted in 2016 (Allen, 2016) by Able UK Ltd with samples covering the areas of potential dredge spoil disposal (sites HU080 & HU082) (Figure 10-16).

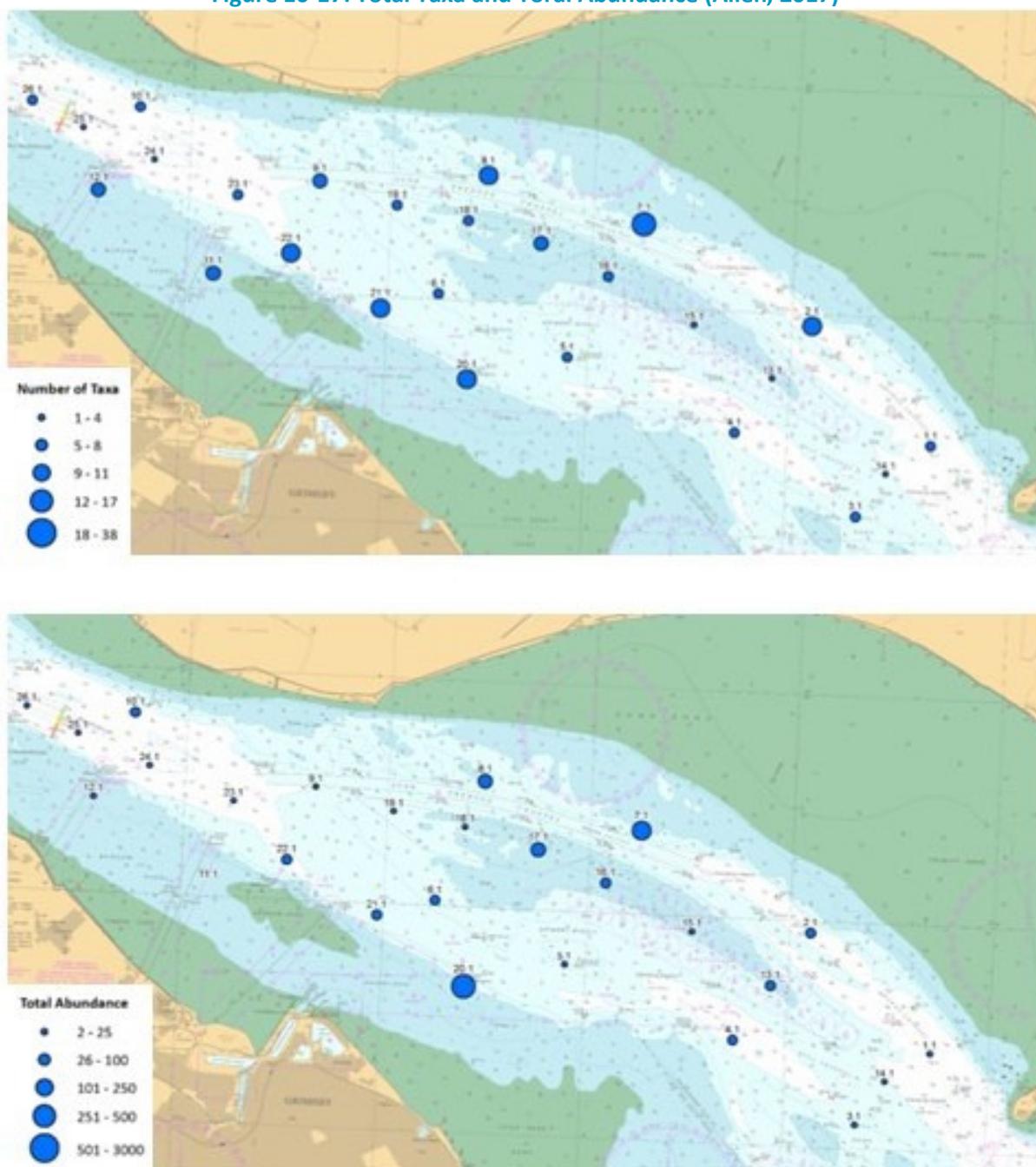
Figure 10-16: Subtidal Sampling Locations and Proportion Mud, Sand & Gravel (Allen, 2016)



10.3.103 Allen (2016) (Appendix U10-2) reports a total of 111 taxa recorded during the subtidal survey although many of these were in low densities or only recorded occasionally. The most dominant species was the polychaete *Aphelochaeta marioni* which accounted for 65% of the total abundance but this species occurred in only 19% of the samples (Figure 10-17).

10.3.104 Other taxa present in moderate numbers included *Tharyx killariensis*, *Scoloplos armiger*, *Phoronida* sp., *Tubificoides swirencoides*, *Bathyporeia pelagica*, Nematoda, *Tubificoides pseudogaster*, *Austrominius modestus*, Mysida (Larvae), *Pygospio elegans*, *Eurydice pulchra*, *Gastrosaccus spinifer*, *Tubificoides amplivasatus* and *Sabellaria spinulosa* collectively accounted for 90% of the total abundance but often occurred at relatively few sites (Allen, 2016).

Figure 10-17: Total Taxa and Total Abundance (Allen, 2017)

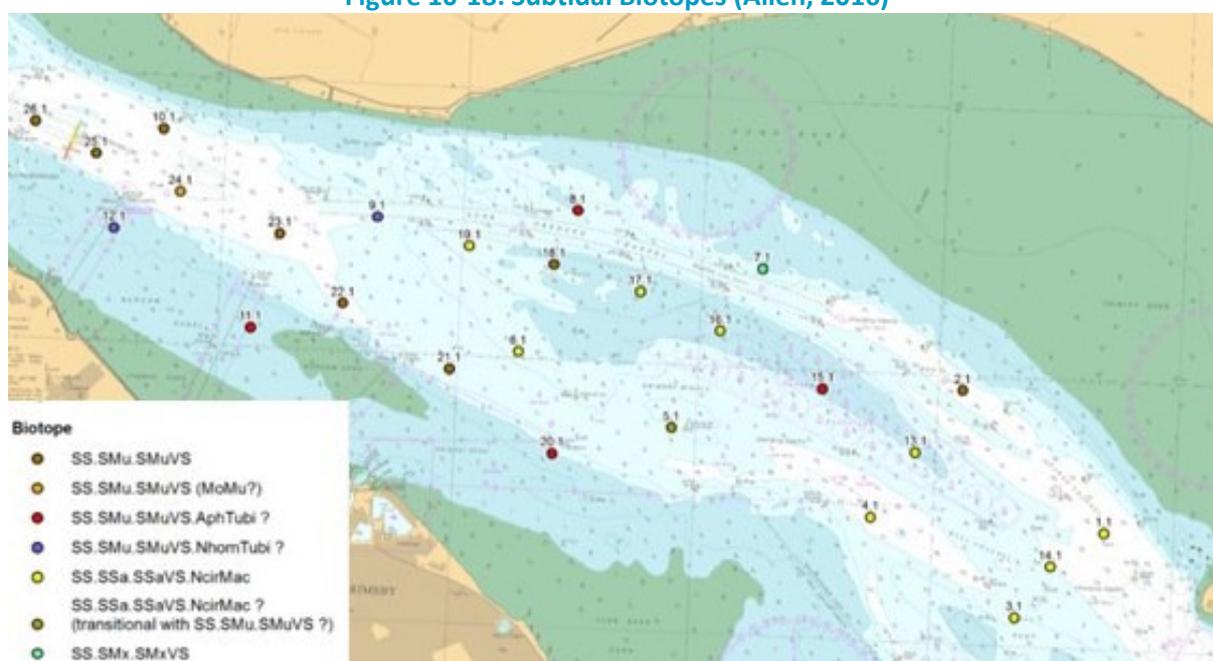


- 10.3.105 Both *S. spinulosa* and *S. alveolata* were present at some of the sites and these species can in some areas form biogenic reefs which are an Annex I habitat. However, both these taxa are commonly recorded off the mouth of the Humber where food and sediment supply conditions are suitable. From the 2015 survey they occurred in low numbers in mixed or muddy sediment and were considered unlikely to represent an established community and do not indicate the presence of Annex I reef by Allen (2016).
- 10.3.106 Allen (2016) summaries that biotopes recorded from the survey (Figure 10-18) were largely variants of the biotope complexes SS.SMu.SMuVS - Sublittoral mud in variable salinity (estuaries) and SS.SSa.SSaVS - Sublittoral sand in variable salinity (estuaries) including variants or transitional forms of biotopes such as SS.SMu.SMuVS.AphTubi (*Aphelocheata marioni* and *Tubificoides* spp. in variable

salinity infralittoral mud), SS.SSa.SSaVS.NcirMac (*Nephtys cirrosa* and *Macoma (Limecola) balthica* in variable salinity infralittoral mobile sand) and SS.SMu.SMuVS.NhomTubi (*Nephtys hombergii* and *Tubificoides* spp. in variable salinity infralittoral soft mud).

- 10.3.107 Allen (2016) concludes that the infaunal communities recorded during the 2015 subtidal survey were typical for dynamic mud, sand or mixed sediment subtidal sediments in the mid to outer Humber Estuary.
- 10.3.108 No communities of particular conservation importance were found although low numbers of the reef building polychaete *Sabellaria* were recorded (albeit not in reef form). Allen (2016) notes that whilst not particularly diverse these subtidal habitats can in some areas support quite high densities of benthic infauna but are also inherently variable reflecting the dynamic nature of the middle to outer estuary.

Figure 10-18: Subtidal Biotopes (Allen, 2016)



Fish Assemblage

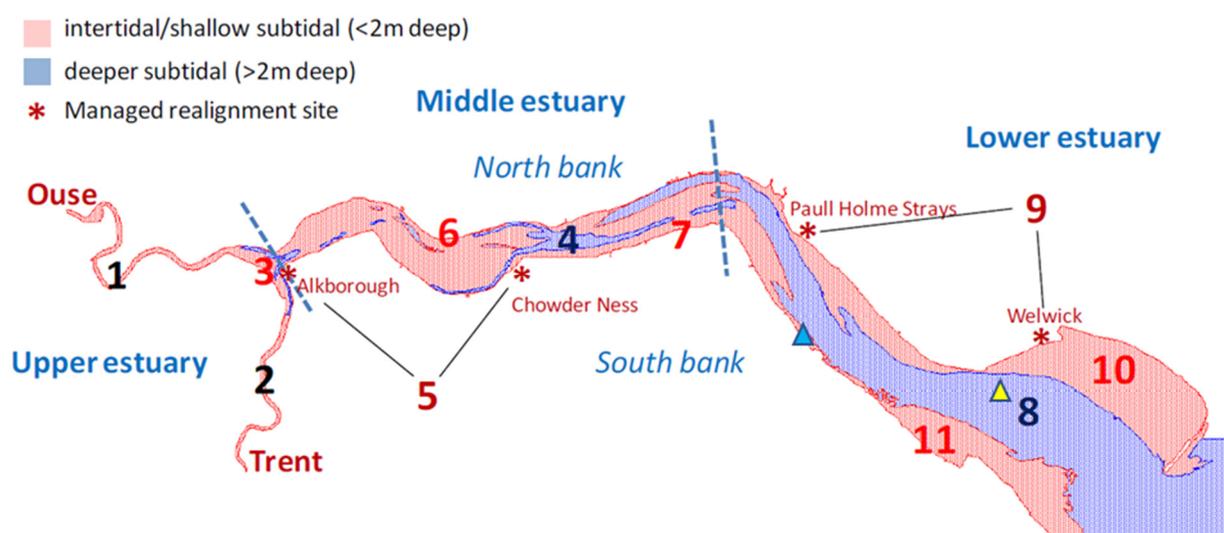
Overview of Fish Fauna in the Middle Estuary

- 10.3.109 A review of the fish population data in 2013 has updated the information on fish populations and communities dependent on the Humber Estuary and the fisheries in the Humber river basins (EA, 2013).
- 10.3.110 The 2013 review considered the spatial distribution of fish species across different areas of the estuary (Figure 10-19), also including the intertidal/shallow subtidal areas along the South Bank of the lower estuary (marked as '11' in the Figure) where the AMEP site is located, and the deeper subtidal areas of the lower estuary (marked as '8' in the Figure) where the dredge disposal sites (HU080 and HU082) are situated.
- 10.3.111 The Humber Estuary supports a fish assemblage characteristic of a southern North Sea macro-tidal estuary. With over 80 species of fish being recorded, the fish fauna in the estuary is particularly

diverse compared to other similar larger sized estuaries (Waugh et al. 2019). The fish assemblage comprises resident, nursery, seasonal and juvenile migratory species, typical of any estuarine fish community.

- 10.3.112 European flounder (*Platichthys flesus*) and sand goby (*Pomatoschistus minutus*) are the species occurring most frequently and with higher abundance in all areas of the estuary. The former species appears to have greatly increased in relative abundance in the catches from the estuary in recent decades compared to other species, although this might be also an effect of an increased sampling (fyke netting) of intertidal areas where the species is highly abundant. Other frequent species in the Humber Estuary are Dover sole (*Solea solea*), plaice (*Pleuronectes platessa*), whiting (*Melanogaster merlangus*), sprat (*Sprattus sprattus*), Atlantic herring (*Clupea harengus*), Atlantic cod (*Gadus morhua*), 3-spined stickleback (*Gasterosteus aculeatus*), common bream (*Abramis brama*) and smelt (*Osmerus eperlanus*).
- 10.3.113 Marine migrant and estuarine resident species are the most frequent and abundant groups in the estuary, their wide salinity tolerance range (euryhalinity) allowing them to colonise habitats along the whole estuarine salinity gradient. Their high abundance is partly due to the high numbers of juveniles of these species occurring in the estuary following reproduction/recruitment.
- 10.3.114 Marine migrant species are marine euryhaline species that spawn at sea and regularly enter estuaries in large numbers, thus having a temporary residence in the estuarine habitat, using it as nursery grounds or visiting them regularly at sub-adult and adult life stages. The main representative (for frequency and abundance) of these species in the Humber Estuary is the European flounder, which is found all year round throughout the estuary, but with higher abundance in late spring and summer, and in the intertidal and shallow subtidal areas of the estuary.
- 10.3.115 Other marine migrant flatfish species frequent in the Humber including Dover sole, plaice and dab *Limanda limanda*, albeit the latter occurring in a much lower frequency and abundance.

Figure 10-19: Humber Estuary areas (numbered) used in the EA 2013 fish population review. Indicative locations of the AMEP site (blue triangle) and the dredge disposal sites HU080/HU082 (yellow triangle) have been added (modified from EA, 2013)



- 10.3.116 Gadoids (whitefish) such as whiting and cod are also marine migrant fishes using the Humber Estuary, with smaller numbers of pouting (*Trisopterus luscus*) and pollack (*Pollachius pollachius*) also being found.
- 10.3.117 Other marine migrant fish using the Humber Estuary predominantly as juveniles or young individuals are the small pelagic clupeid species such as sprat (*Sprattus sprattus*) and herring (*Clupea harengus*), albeit their frequency and abundance is much lower than the species mentioned above. They are most frequent in the autumn (herring) and winter (sprat), and in the outer estuary, where they are found mainly in the seine net catches from shallow subtidal habitats, and from the fish impingement catches in the deeper areas.
- 10.3.118 Estuarine residents are highly euryhaline species (usually of marine origin) that can reproduce and complete their life cycle in the estuary. Small benthic gobies (*Pomatoschistus* spp.) are the most frequent and abundant representatives of this group in the Humber Estuary, often dominating sampling catches. They are frequent throughout the estuary, but normally found in higher numbers in the intertidal and subtidal areas of the middle and lower estuary.
- 10.3.119 Other estuarine resident species include the hooknose (*Agonus cataprachus*), lesser sandeel (*Ammodytes tobianus*), sculpin or fatherlasher (*Myoxocephalus scorpius*), tadpole fish (*Raniceps raninus*), sea snail (*Liparis liparis*), rock gunnel (*Pholis gunnellus*), pipefish (*Sygnathus acus* and *S. rostellatus*), and the viviparous blenny (*Zoarces viviparus*).
- 10.3.120 Diadromous species (commonly known as migratory fish) are also frequently found in the Humber Estuary, albeit occurring in the estuarine catches in very low abundance. These are species using the estuary as pathways of migration (for reproduction) between the river catchment and the sea, including catadromous species (reproducing at sea) such as European eel *Anguilla anguilla* and a grey mullet (*Chelon ramada*), and anadromous species (reproducing in rivers) such as salmonids (Atlantic salmon *Salmo salar*, sea trout *Salmo trutta*), lampreys (river lamprey *Lampretra fluviatilis*, sea lamprey *Petromyzon marinus*), shads (allis shad *Alosa alosa*, twaite shad *Alosa fallax*), 3-spined stickleback (*Gastoresteus aculeatus*), and smelt (*Osmerus eperlanus*).
- 10.3.121 The Atlantic salmon, sea trout, twaite shad, eel and smelt are migratory fish species of conservation importance within the Humber Estuary. Both the eel and the smelt are listed as a BAP priority species and the sea and river lamprey form part of the Humber Estuary SAC and SSSI designations. River lamprey is also frequently found, albeit in very low abundance. The Yorkshire Ouse catchment (including rivers Swale, Ure, Nidd, Wharfe and Yorkshire Derwent) is believed to support one of the most important river lamprey populations in the UK. Sea lamprey are also almost entirely restricted to the Ouse catchment, principally the Rivers Ouse, Swale, Ure and Wharfe, but they are seldom caught within the Humber Estuary
- 10.3.122 Salmonid species are mostly recorded in the upper reaches of the river catchment of the Humber Estuary (rivers Ouse, Ure, Trent) whereas they are infrequently caught in the estuary and mainly in its upper reaches. Shad species are only recorded in small numbers from the Humber catchment, and their catches in the estuary are also very sparse, mostly being obtained through fish impingement from the deeper areas of the outer estuary (Stallingborough power station intake).
- 10.3.123 Most of the fish species in the Humber rely on benthic food sources, in particular the benthic infauna and mysid shrimps. Larger species prey on brown shrimp and shellfish. Almost all fishes produce eggs, but there is a large degree of reproductive strategies. Eggs are released in open water where they become part of the plankton or are deposited on suitable substrates.

Fish Fauna around the AMEP Development

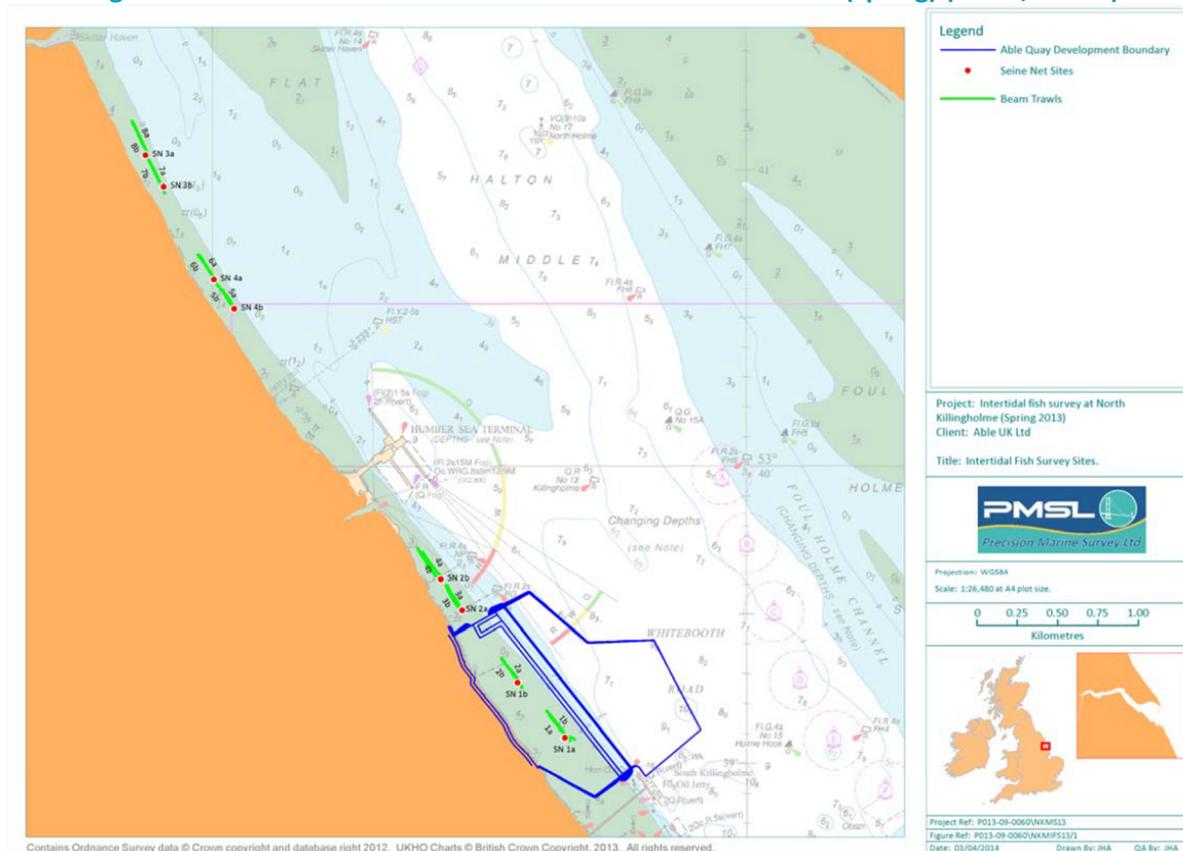
10.3.124 Since the original ES, additional fish surveys have been undertaken to characterise the fish fauna at the AMEP site and intertidal and subtidal areas nearby, including:

- Intertidal (beam trawl and seine net) fish surveys by Precision Marine Survey Ltd (PMSL) in June 2013 (PMSL, 2014a).
- Intertidal (beam trawl and seine net) and subtidal (otter trawl) fish by PMSL in October-December 2013 (PMSL, 2014b).
- Intertidal (fyke net) surveys at Killingholme Marshes by IECS in September 2016, December 2016 and April-May 2017 (IECS, 2017).

10.3.125 Details of these surveys are given in the relevant reports in Appendices U10-5, U10-6 and U10-7. The main findings of these surveys, relevant to updating the baseline for fish fauna are summarised below.

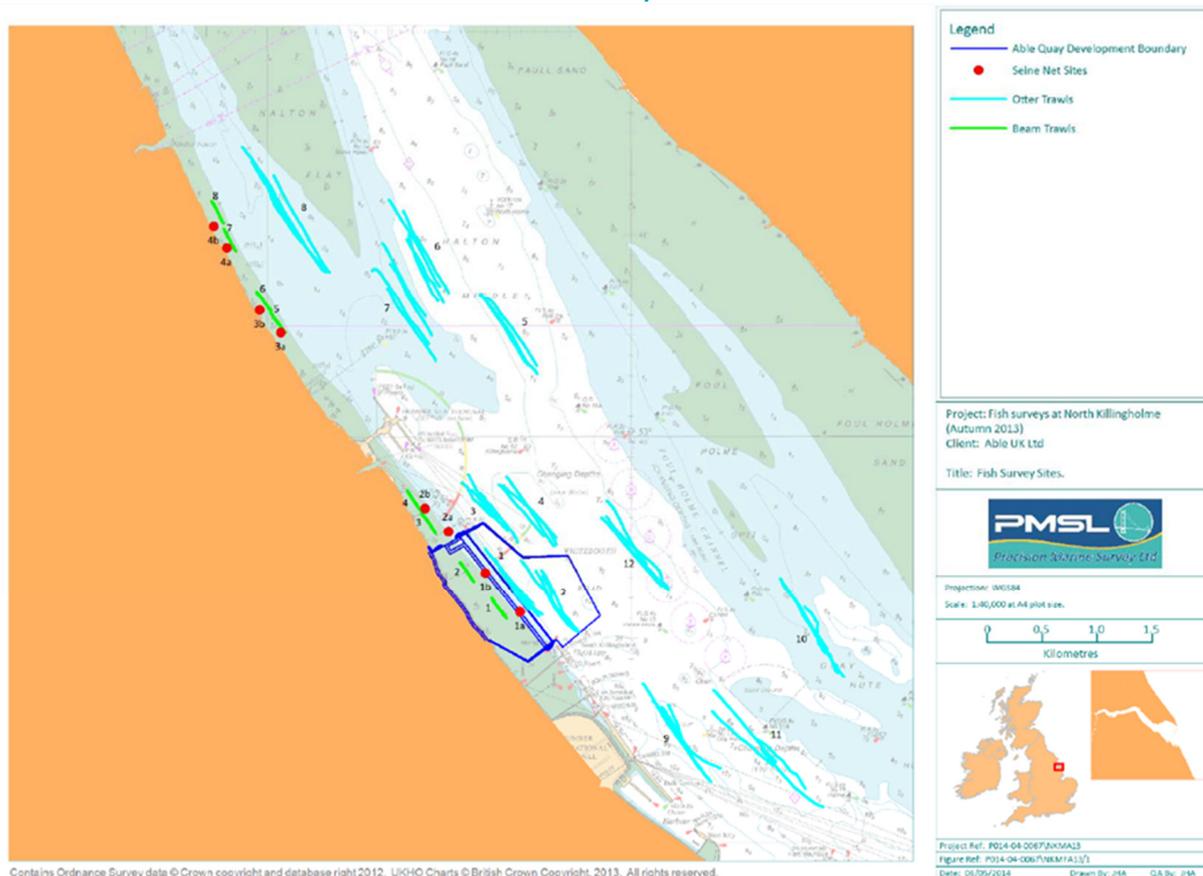
10.3.126 The 2013 intertidal fish surveys (beam trawling and seine netting; spring and autumn; PMSL 2014a, 2014b) were undertaken at locations within and immediately adjacent to the AMEP site and at control sites on the estuarine intertidal mudflats further upstream (see Figure 10-20 and Figure 10-21). Similarly, the 2013 subtidal fish survey (otter trawling; autumn only) was undertaken at locations within and immediately adjacent to the AMEP site and at control sites further upstream and downstream (see Figure 10-21).

Figure 10-20: Seine net and beam trawl locations – June 2013 (spring) (PMSL, 2014a)



- 10.3.127 The species abundance within each intertidal beam trawl sample for the June 2013 survey and the October 2013 survey is presented in Table 10-6 and Table 10-7 respectively.
- 10.3.128 The beam trawl catches in the intertidal areas were relatively diverse (more so in the autumn season), although the faunal abundance was only dominated by a few species.
- 10.3.129 The fish abundance was dominated by flatfish such as the Dover sole *Solea solea* and European flounder *Platichthys flesus*, in both seasons. These two species commonly occurred at all sampling stations, with higher numbers on the mudflats within and adjacent to the AMEP site (BT1-BT4) compared to the control sites to the North of the AMEP site (BT5-BT8). Most of the individuals of both species were year class 0+ (born in 2013) and 1+ (born the year before), which highlights the use of the mudflat as a flatfish nursery.
- 10.3.130 The estuarine common goby *Pomatoschistus microps* also dominated the fish assemblage, but in autumn only. The species was widespread across all the sampled areas, but with higher numbers on the mudflat at the AMEP site.

Figure 10-21: Seine net, beam trawl and otter trawl locations – October-December 2013 (autumn) (PMSL 2014b)



- 10.3.131 In autumn, gadoids such as cod *Gadus morhua* and whiting *Merlangius merlangus* also occurred frequently in the beam trawl catches, albeit with few individuals. The former species was mainly found at the AMEP site and adjacent mudflat, while the latter was only recorded at the control sites.
- 10.3.132 Invertebrates, mainly crustaceans, were also abundant in the intertidal beam trawl catches. These were mainly represented by the brown shrimp *Crangon crangon*, a common species in the mudflats of the Humber Estuary. In spring, mysid shrimps such as *Neomysis integer* were also particularly abundant. Mysids, together with juvenile brown shrimp, are common prey to juvenile flatfishes on the mudflats and managed realignments of the Humber Estuary, their abundance supporting the nursery function of these estuarine habitats.
- 10.3.133 There were no migratory fish occurring in the beam trawl catches from the AMEP area, the only specimen (one eel *Anguilla anguilla*) having been found on the mudflat at the control site further north (BT7), in autumn.

Table 10-6: Abundance data for the intertidal beam trawl survey – June 2013 (PMSL, 2014a)

Scientific Name	BT 1		BT 2		BT 3		BT 4		BT 5		BT 6		BT 7		BT 8	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Mysidacea sp. Indet	0	0	24	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Leptomysis gracilis</i>	0	0	0	0	0	0	10	0	1	0	7	0	0	0	0	0
<i>Neomysis integer</i>	131	59	365	225	121	101	277	94	33	0	302	2	86	176	124	217
<i>Praunus flexuosus</i>	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0
<i>Gammarus sp. Indet</i>	0	0	0	2	0	0	0	3	0	0	1	0	3	3	8	7
<i>Gammarus zaddachi</i>	4	2	0	1	0	1	1	8	3	0	12	0	21	23	18	27
<i>Corophium volutator</i>	3	2	6	4	0	0	3	1	14	39	5	16	0	0	1	0
<i>Eurydice pulchra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Crangon allmanni</i>	0	0	6	0	0	0	0	0	0	0	1	0	0	0	1	0
<i>Crangon crangon</i>	61	61	180	156	126	48	107	156	112	9	110	18	126	130	124	107
<i>Carcinus maenas</i>	0	2	1		2	1	0	0	0	1	0	0	1	0	0	0
<i>Macoma balthica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Sprattus sprattus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Syngnathus rostellatus</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
<i>Agonus cataphractus</i>	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1	1
<i>Liparis liparis</i>	0	0	0	0	0	0	0	0	1	0	4	0	2	3	0	2
<i>Liparis montagui</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
<i>Pomatoschistus microps</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pomatoschistus minutus</i>	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
<i>Pleuronectidae sp. Indet</i>	2	0	5	0	2	0	0	5	4	0	2	0	0	1	1	1
<i>Platichthys flesus</i>	8	6	3	3	2	1	16	4	8	3	5	7	1	0	1	1
<i>Pleuronectes platessa</i>	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
<i>Solea solea</i>	2	4	16	6	22	7	18	31	10	17	7	7	1	1	0	2
<i>Fucus spiralis</i>	0	0	P	0	0	0	0	P	P	0	0	P	0	0	0	0
No. of species	7	7	10	9	7	6	8	10	13	5	15	7	8	9	13	9
Abundance	211	136	606	399	276	159	433	303	192	69	460	51	241	339	283	365

Table 10-7: Abundance data for the intertidal beam trawl survey – October 2013 (Source: PMSL 2014b)

Scientific Name	BT 1		BT 2		BT 3		BT 4		BT 5		BT 6		BT 7		BT 8	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
<i>Nematoda</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sagartia</i> sp. Indet	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Hediste diversicolor</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Mysidacea</i> sp. Indet	3	0	0	0	0	1	2	1	1	0	1	0	0	1	0	1
<i>Gastrosaccus spinifer</i>	2	1	1	0	2	5	0	0	0	1	0	1	1	1	0	0
<i>Neomysis integer</i>	0	0	3	1	1	0	1	0	0	0	0	0	0	0	0	0
<i>Praunus flexuosus</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Gammarus</i> sp. Indet	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Corophium volutator</i>	6	0	1	0	1	3	3	2	0	1	3	1	0	1	0	0
<i>Diastylis rathkei</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
<i>Palaemonetes varians</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Pandalus montagui</i>	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
Juvenile <i>Crangonidae</i> sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Crangon allmanni</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
<i>Crangon crangon</i>	127	128	195	221	84	107	103	140	87	43	107	141	64	127	71	122
<i>Carcinus maenas</i>	1	0	3	2	0	1	3	1	1	0	4	4	0	1	2	1
<i>Macoma balthica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Gastropoda	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anguilla anguilla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Clupeidae</i> sp. indet	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Clupea harengus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Sprattus sprattus</i>	2	0	0	0	1	0	1	0	0	0	1	0	0	0	1	0
<i>Ciliata mustela</i>	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Gadus morhua</i>	1	0	3	3	1	2	1	0	0	0	0	2	0	0	0	0
<i>Merlangius merlangus</i>	0	0	0	0	0	0	0	0	1	4	0	0	1	0	0	1
<i>Agonus cataphractus</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Liparis liparis</i>	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0
<i>Zoarces viviparus</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Pomatoschistus</i> spp.	1	0	0	0	0	2	0	0	0	0	1	0	0	0	2	0
<i>Pomatoschistus microps</i>	29	31	31	22	8	9	6	8	9	17	3	9	9	12	2	8
<i>Pomatoschistus minutus</i>	0	1	0	0	0	0	1	2	1	3	1	0	0	0	0	0
<i>Psetta maxima</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Pleuronectidae</i> sp. Indet	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Limanda limanda</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
<i>Microstomus kitt</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Platichthys flesus</i>	8	12	18	10	6	1	8	1	2	0	3	3	10	5	1	5
<i>Pleuronectes platessa</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Solea solea</i>	3	1	20	4	5	4	7	5	3	0	4	3	2	2	1	0
Total abundance	185	178	280	268	111	136	141	163	105	70	132	167	87	153	83	143
Species Diversity	13	9	12	11	11	11	15	10	8	6	14	9	6	10	10	9

- 10.3.134 The species abundance within each intertidal seine net sample for the June 2013 survey and the November 2013 survey is shown in Table 10-8 and Table 10-9 respectively.
- 10.3.135 Fish catches in the seine net were generally sparse, particularly in the spring. In this season, 7 fish species were recorded on the studied mudflats, most of them occurring occasionally in the samples. Herring *Clupea harengus* was the fish species found in highest numbers, particularly at the control sites (SN3-SN4), whereas it was only occasionally present on the intertidal habitat at the AMEP site and adjacent mudflat. At the AMEP site (SN1), juvenile flatfish (*Pleuronectidae* sp. indet.) were also present.
- 10.3.136 In the autumn, low fish numbers were also detected in the seine net catches, but with a more notable dominance of the common goby *Pomatoschistus microps*, particularly at the AMEP site and adjacent mudflats compared to the control sites. This reflects the pattern of occurrence of this species as observed for the beam trawl catches.
- 10.3.137 There were no migratory fish occurring in the intertidal seine net catches. Several invertebrate species were present in the intertidal seine net catches with the brown shrimp *Crangon crangon* being dominant in all sampling sites and seasons, and the mysid shrimp *Neomysis integer* being also abundant but in the spring catches only.

Table 10-8: Abundance data for the intertidal seine net survey – June 2013 (PMSL, 2014a)

Scientific Name	SN 1A	SN 1B	SN 2A	SN 2B	SN 3A	SN 3B	SN 4A	SN 4B
<i>Pleuobranchia pileus</i>	0	1	0	2	5	2	2	0
<i>Hediste diversicolor</i>	0	0	1	1	0	0	0	0
<i>Neomysis integer</i>	11	64	20	7	54	8	28	47
<i>Gammarus</i> sp. Indet	0	0	1	1	2	2	1	0
<i>Gammarus salinus</i>	0	0	1	0	0	0	0	0
<i>Gammarus zaddachi</i>	0	4	0	0	4	2	4	2
<i>Corophium volutator</i>	1	1	2	1	3	2	0	3
<i>Crangon crangon</i>	11	30	31	16	53	26	21	42
<i>Radix auricularia</i>	0	0	0	0	0	0	0	1
<i>Clupea harengus</i>	0	0	1	1	0	4	11	28
<i>Sprattus sprattus</i>	0	2	0	0	0	0	3	0
<i>Gasterosteus aculeatus</i>	0	1	0	0	0	0	0	0
<i>Syngnathus rostellatus</i>	0	0	0	0	0	0	4	2
<i>Pleuronectidae</i> sp. Indet	0	7	1	0	0	0	1	1
<i>Platichthys flesus</i>	1	0	1	0	0	0	1	0
<i>Solea solea</i>	3	0	1	0	0	0	0	0
Number of taxa	5	8	10	7	6	7	10	8
Abundance	27	110	60	29	121	46	76	126

Table 10-9: Abundance data for the intertidal seine net survey – November 2013 (PMSL, 2014b)

Scientific Name	SN 1A	SN 1B	SN 2A	SN 2B	SN 3A	SN 3B	SN 4A	SN 4B
<i>Gastrosaccus spinifer</i>	3	0	0	0	0	0	0	0
<i>Neomysis integer</i>	2	0	0	0	0	0	0	0
<i>Gammarus zaddachi</i>	0	0	0	0	0	1	0	0
<i>Corophium volutator</i>	0	0	0	1	0	0	0	0
<i>Palaemonetes varians</i>	1	1	2	3	0	2	1	0
<i>Crangon crangon</i>	108	86	82	75	31	61	32	9
<i>Carcinus maenas</i>	0	0	1	0	0	0	0	0
<i>Clupea harengus</i>	0	0	0	1	2	0	0	1
<i>Sprattus sprattus</i>	0	0	0	0	1	0	1	2
<i>Gadus morhua</i>	0	1	1	0	0	0	0	0
<i>Gasterosteus aculeatus</i>	0	0	0	1	0	0	0	0
<i>Agonus cataphractus</i>	0	0	0	1	0	0	0	0
<i>Liparis liparis</i>	0	0	1	0	0	0	0	0
<i>Pomatoschistus</i> spp.	1	0	0	0	0	0	0	0
<i>Pomatoschistus microps</i>	12	19	21	15	5	3	5	4
<i>Pomatoschistus minutus</i>	0	1	3	1	1	0	0	0
<i>Platichthys flesus</i>	0	1	0	0	0	0	0	0
<i>Pleuronectes platessa</i>	0	0	0	0	1	0	0	0
<i>Solea solea</i>	0	0	1	0	0	0	0	0
<i>Alburnus alburnus</i>	0	0	0	0	0	0	1	0
<i>Perca fluviatilis</i>	0	0	0	0	0	1	0	0
Total Number of Taxa	6	6	8	8	6	5	5	4
Total Number of Individuals	127	109	112	98	41	67	39	16

- 10.3.138 The species abundance within each subtidal otter trawl sample for the November-December 2013 survey is presented in Table 10-10.
- 10.3.139 Overall, the number of fish species in the subtidal otter trawl catches was similar between the area near the AMEP site (OT1-OT4) and the control areas (OT4-OT8 upstream, OT9-OT12 downstream).
- 10.3.140 Although 18 species were recorded in the subtidal otter trawl catches, most of them were found occasionally and in low numbers, and only five species were consistently found in higher numbers. Sprat (*Sprattus sprattus*) and gobies (*Pomatoschistus* spp.) dominated the fish assemblage, the former species showing notably highest abundance at the south control stations and lowest at the north control stations, with intermediate-low numbers near the AMEP site.
- 10.3.141 Herring *Clupea harengus*, another small pelagic fish like sprat, was also recorded throughout the study area, albeit in much lower abundance than sprat.
- 10.3.142 All the above-mentioned fish species in the otter trawl catches were mostly present as young of the year (0+ year class), and occasionally as 1+ year class (e.g. herring), thus supporting the nursery function of the Humber Estuary.
- 10.3.143 The only migratory fish recorded by subtidal otter trawling was the river lamprey (*Lampetra*

fluviatilis), although only one individual was recorded from the control area north of the APEM site (OT8).

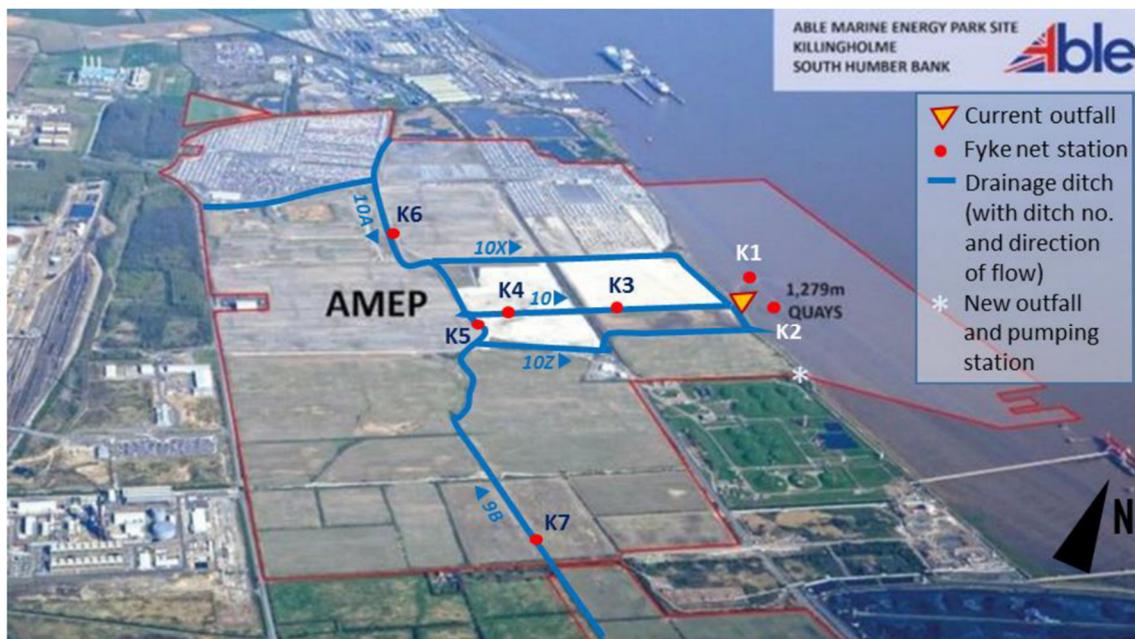
Table 10-10: Fish abundance data for the subtidal otter trawl survey – November-December 2013 (PMSL, 2014b)

Common names	OT1	OT2	OT3	OT4	OT5	OT6	OT7	OT8	OT9	OT10	OT11	OT12
River lamprey	0	0	0	0	0	0	0	1	0	0	0	0
Herring	0	4	3	3	0	0	1	1	45	4	12	10
Sprat	60	64	34	77	74	3	4	2	789	558	622	144
Pogge	8	4	0	1	2	0	3	0	0	3	0	6
3 Spined Stickleback	1	0	0	0	0	3	1	1	0	0	0	1
Nilssons pipefish	0	0	0	1	0	0	0	0	0	3	0	0
Common Seasnail	24	18	8	17	4	43	19	14	4	12	10	12
Montagu's Seasnail	1	0	0	0	0	0	0	0	0	0	2	0
Dab	1	0	0	0	0	0	0	0	0	3	0	1
Whiting	3	34	4	23	18	9	6	6	41	19	19	16
Sand gobies	10	0	0	41	0	0	3	0	0	0	17	0
Gobies	78	328	44	148	117	107	58	99	177	310	406	138
Codling	36	74	2	10	1	84	4	21	7	11	6	98
Five Bearded Rockling	23	11	1	1	0	0	0	1	1	2	7	1
Flounder	1	2	1	1	1	3	3	5	0	1	0	0
Plaice	2	4	0	2	5	2	1	13	0	22	0	0
Dover sole	4	1	0	0	0	10	3	5	0	5	0	0
Long rough dab	0	0	0	2	0	0	0	0	1	0	0	0
Total abundance	252	544	97	327	222	264	106	169	1065	953	1101	427
Total No. Species	14	11	8	13	8	9	12	12	8	13	9	10

- 10.3.144 More recently (2016-2017), intertidal fish surveys were undertaken at the North Killingholme Marshes to gather evidence on eel populations occurring in the ditch system and on the nearby estuarine mudflat, with fyke net locations distributed accordingly (see Figure 10-22; IECS 2017). Fish were sampled using fyke nets deployed at all sites in September 2016 (summer), December 2016 (autumn) and April-May 2017 (spring), with separate samples obtained on spring and neap tides.
- 10.3.145 The species abundance data from the fyke net surveys in 2016-2017 are presented in Table 10-11. Data from fyke nets K1 and K2 are particularly relevant to this baseline as these nets were located on the intertidal mudflat at the AMEP site.
- 10.3.146 The fyke net catches from the intertidal mudflat at the AMEP site (stations K1 and K2) were dominated by flounder *Platichthys flesus*, which consistently occurred in the samples in all seasons. These were mostly young fish (born in the year or the year before), thus supporting previous data suggesting the role of the mudflat as a nursery for the species.
- 10.3.147 Other fish species that were frequent in the catches were whiting *Merlangius merlangus*, Dover sole *Solea solea*, with also cod *Gadus morhua* being present.
- 10.3.148 The migratory eel *Anguilla anguilla*, which was targeted by the fyke net surveys in 2016/2017, was only found occasionally and in very low numbers in the ditch system at the AMEP site (station K7), but never on the mudflat. This confirmed the previous lack of evidence of eels on the mudflats in

front of Killingholme marshes and in the AMEP catchment area (IECS 2008a, 2008b, 2010, 2011, EA 2013, PMSL 2014a, 2014b).

Figure 10-22: Fyke net locations at Killingholme marshes – September 2016 (summer), December 2016 (autumn), April-May 2017 (spring) (IECS, 2017)



- 10.3.149 Contrary to previous baseline data (2010 fyke netting), the sand goby (*Pomatoschistus minutus*) was not recorded in the fyke nets in 2016/2017, but, as highlighted before, due to its small size, this fish is normally misrepresented in fyke net catches, hence its absence from the data is not to be taken as evidence of absence from the mudflat.
- 10.3.150 All the fish species recorded in the fyke net catches in 2016/2017 were also found in the 2010 catches obtained with the same type of net, also including cod, saithe (*Pollachius virens*) and 3-spined stickleback *Gasterosteus aculeatus*.
- 10.3.151 Overall, given the background information available for the Humber Estuary and adjacent coastal area, and considering the gear selectivity profile of the different sampling methods, the fish and shellfish assemblage found during the surveys was considered typical for muddy or sandy intertidal sediments and adjacent subtidal habitats in the mid to outer Humber Estuary.
- 10.3.152 Although the fish surveys did not specifically target invertebrates, the high abundance in the catches of small epibenthic crustaceans such as brown shrimp and mysid shrimps confirm the availability of important food resources for the fish using the intertidal and subtidal estuarine habitats.

Table 10-11: Faunal catches from the intertidal fyke net surveys undertaken at Killingholme Marshes in 2016 and 2017. Frequency indicates number of samples where a species occurred out of the total number of samples collected at each station and size range is given for fish (IECS, 2017)

Site and Station	Common Name	Species	Total count	Frequency	Size range (mm)
Killingholme Marshes					
K1	Flounder	<i>Platichthys flesus</i>	57	4/4	56-302
	Whiting	<i>Merlangius merlangus</i>	6	2/4	90-145
	Cod	<i>Gadus morhua</i>	2	1/4	140-154
	Saithe	<i>Pollachius virens</i>	1	1/4	123
	Dover sole	<i>Solea solea</i>	1	1/4	283
	Brown shrimp	<i>Crangon crangon</i>	22	3/4	-
	Moon jellyfish	<i>Aurelia aurita</i>	6	3/4	-
K2	Flounder	<i>Platichthys flesus</i>	107	4/4	55-271
	Whiting	<i>Merlangius merlangus</i>	8	3/4	90-146
	Dover sole	<i>Solea solea</i>	8	2/4	71-242
	Cod	<i>Gadus morhua</i>	5	2/4	98-204
	5 Bearded rockling	<i>Ciliata mustela</i>	1	1/4	162
	3 Spined stickleback	<i>Gasterosteus aculeatus</i>	1	1/4	66
	Brown shrimp	<i>Crangon crangon</i>	29	3/4	-
	Moon jellyfish	<i>Aurelia aurita</i>	11	3/4	-
	Shore crab	<i>Carcinus maenas</i>	2	1/4	-
	Ditch shrimp	<i>Palaemon varians</i>	1	1/4	-
K3	3 Spined stickleback	<i>Gasterosteus aculeatus</i>	3	1/6	35-46
	Common toad	<i>Bufo bufo</i>	1	1/6	-
K4	<i>No fauna in the nets</i>				
K5	Common frog	<i>Rana temporaria</i>	1	1/6	-
K6	<i>No fauna in the nets</i>				
K7	European eel	<i>Anguilla anguilla</i>	2	2/6	350-605
	3 Spined stickleback	<i>Gasterosteus aculeatus</i>	9	4/6	53-85
	Common toad	<i>Bufo bufo</i>	3	1/6	-
	Giant diving beetle	<i>Dytiscus marginalis</i>	2	2/6	-

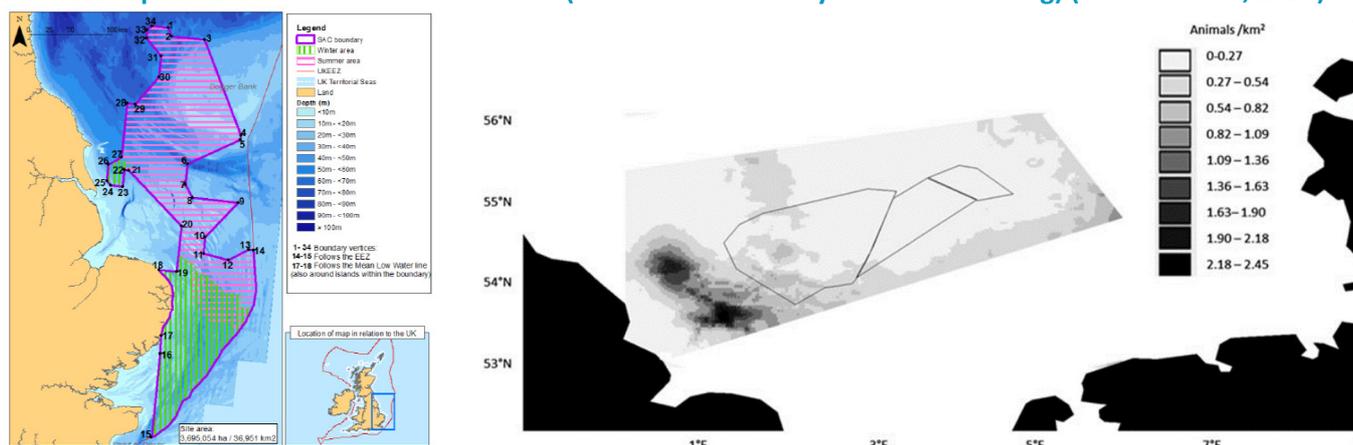
Marine Mammals

Overview of Marine Mammals in the Middle Estuary

HARBOUR PORPOISE

- 10.3.153 The Southern North Sea SAC has been identified as an area of importance for harbour porpoise (IAMMWG, 2015). It supports an estimated 17.5% of the UK North Sea Management Unit (MU) population (JNCC, 2019). Whilst the species is distributed across much of the Southern North Sea MPA in the summer, there are concentrations off the Yorkshire coast in winter (Figure 10-23).
- 10.3.154 From the data search for this PEIR there would appear to be no recent new assessments of the status of the species in the Humber Estuary, but it would be expected that a similar distribution and density described in the original ES - Aquatic Ecology Chapter (paragraphs 10.5.57 *et seq*) from the DCO.
- 10.3.155 The establishment of the Southern North Sea MPA and SAC for Harbour Porpoise since the original ES should however be accounted for.

Figure 10-23: Harbour Porpoise Distribution around the UK (JNCC, 2019) (left) and the predicted density of Harbour Porpoise across the central North Sea (created from density surface modelling) (Cucknell et al, 2016)



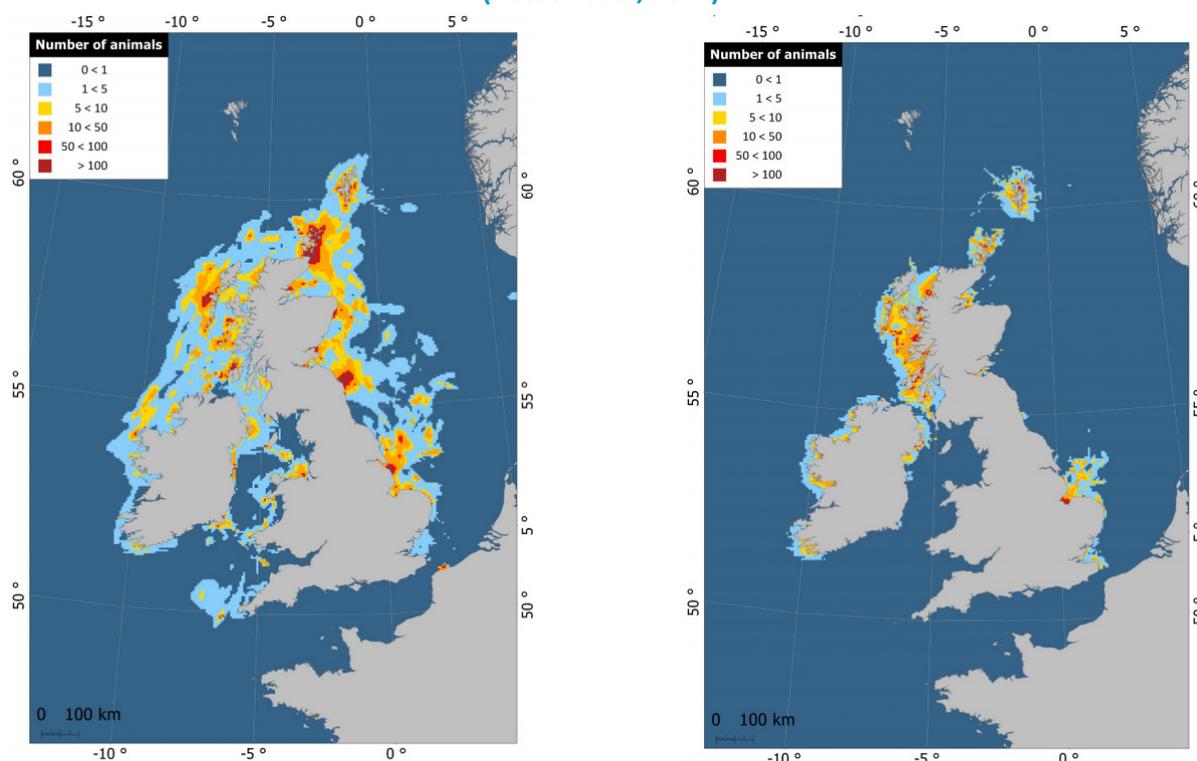
GREY SEAL

- 10.3.156 Figure 10-24 shows the importance of the waters at the mouth of the Humber for the species in the context of the wider UK population (Russell et al, 2017).
- 10.3.157 The original ES makes reference to the breeding colony at Dona Nook (paragraphs 10.5.61 *et seq*), and this site remains active. Russell et al (2019) describe a large increase in the colony from 194 (around 30 pups in 1984 to almost 2,000 in 2016), although the authors state that there is a lack of ecological understanding as to the underlying drivers of colony-specific dynamics.
- 10.3.158 Data from the most recent breeding season (winter 2020/2021) for the site recorded 2,214 pups with peak weekly counts of 1,539 cows (27th November 2020) and 568 bulls (4th December 2020) (Yorkshire Wildlife Trust, online access 15th March 2021). Productivity was increased from the winter 2019/2020 when 2,186 pups were produced (Lincolnshire Wildlife Trust online accessed 15-03-21).

COMMON SEAL

- 10.3.159 Figure 10-24 shows the Common Seal to have a more restricted range on the east coast of England (Russell et al, 2017), with the majority of usage arising from The Wash and adjacent north Norfolk and Lincolnshire coastlines. The species is less commonly recorded than the Grey Seal on the east coast of England, and has been in decline in Scottish waters (Hanson et al, 2015).
- 10.3.160 Despite the majority of records from further down the east coast, Donna Nook remains a haul out area as described in the original ES, with some pupping during the summer.

Figure 10-24: Grey Seal (left) and Common Seal (right) Predicted Mean Total Distribution around the UK (Russell et al, 2017)



Marine Mammals around the AMEP Development

HARBOUR PORPOISE

- 10.3.161 No dedicated surveys of Harbour Porpoise distribution have been conducted around the AMEP development site since the time of the original ES when they were considered to be only occasional visitors of the middle estuary (paragraph 10.6.50 of the original ES). However, in the absence of substantive changes in the ecology of the seabed and water column (see Invertebrate and Fish Community Sections of this Chapter), a similar distribution would be expected in the water column surrounding the site.

GREY SEAL

- 10.3.162 No dedicated surveys of Grey Seal distribution have been conducted around the AMEP development site since the time of the original ES when they were considered to be only occasional visitors of the middle estuary (paragraph 10.6.50 of the original ES). However, in the absence of substantive changes in the ecology of the seabed and water column (see Invertebrate and Fish Community Sections of this Chapter), a similar distribution would be expected in the water column surrounding the site.

COMMON SEAL

- 10.3.163 No dedicated surveys of Common Seal distribution have been conducted around the AMEP development site since the time of the original ES - Aquatic Ecology Chapter from the DCO when it was only considered 'possible' that may be found in the vicinity of the AMEP site (paragraph 10.5.64 of the original ES). However, in the absence of substantive changes in the ecology of the seabed and water column (see Invertebrate and Fish Community Sections of this Chapter), a similar distribution would be expected in the water column surrounding the site.

Changes in Baseline

Saltmarsh Communities

- 10.3.164 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.
- 10.3.165 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).
- 10.3.166 A clear expansion in the extent of saltmarsh communities e.g. as surveyed in 2020 & 2021, has occurred on the intertidal frontage of the proposed AMEP development site since the original ES baseline work of the DCO.

Aquatic Invertebrate Communities

- 10.3.167 As described above, the increase in intertidal elevation and colonisation by saltmarsh communities 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 more muddy areas, the 2015 and 2016 surveys recorded a broadly similar assemblage to that recorded in the baseline of 2010 for the original ES.
- 10.3.168 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.
- 10.3.169 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.
- 10.3.170 It is considered likely that the increase in elevation and saltmarsh colonisation seen in 2015 & 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.
- 10.3.171 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 original ES and supporting documentation e.g. Appendices U10-3 and

U10.4), 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*.

- 10.3.172 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.
- 10.3.173 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.

Fish Assemblage

- 10.3.174 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.
- 10.3.175 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.
- 10.3.176 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 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 (e.g. eel), confirming earlier observations.
- 10.3.177 It is noted that following the requirements of the DCO and DML, the issue of potential underwater noise and vibration generated during the works (specifically from piling) was addressed through timing constraints to the works, thus avoiding sensitivity periods for receptors.
- 10.3.178 Noise from dredging and vessel movement (construction & operation) was considered unlikely to affect fish & mammals, and therefore noise impact assessment during construction only referred to piling noise (see paragraph 10.6.32 and 10.6.92 of original ES).
- 10.3.179 The requirements to adequately address and mitigate any construction issues relating to underwater noise to fish was provided in the Environment Agency Written Response 10015552¹⁰, where, speaking on behalf of all Defra Agencies a series of Conditions were identified to mitigate the effects of underwater noise on fish.
- 10.3.180 These Conditions (DCO, Schedule 8, paragraphs 37 *et seq*) provide for a very precautionary approach by providing extensive periods of ‘no piling time’. As a consequence the assessment of underwater noise levels pursuant to marine piling is academic and does not inform the mitigation in any way at all. There is therefore considered no requirement to further amend this mitigation as a result of the

¹⁰<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001544-WR-018%20TR030001%20Written%20Representation%20by%20Annette%20Hewinson%20for%20The%20Environment%20Agency.pdf>

change on the quay alignment given construction activities generating potential under water noise impacts will remain the same, and with no substantive alteration to the assemblage characteristics or functional attributes of the fish community receptors around the development having occurred from the original ES baseline.

Marine Mammals

- 10.3.181 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.
- 10.3.182 The general composition of potential prey communities around the AMEP have not substantially altered between the original ES and this time, nor has the wider status of the species, and as such, there is no expectation of a significant change in the baseline conditions.
- 10.3.183 However, reference is made to the establishment of the Southern North Sea SAC for Harbour Porpoise, and the apparent trend in the reduction in the population of Common Seal at some colonies at a UK level.
- 10.3.184 In the extant Marine License for the AMEP development, the issue of potential underwater noise and vibration generated during the works was addressed through required impact mitigation measures for Harbour Porpoise¹¹ and Seal spp.¹². This included the requirement for a certified Marine Mammal Observer (MMO) to be at the site during construction phases which could generate noise and vibration at a level likely to cause a detrimental impact to marine mammal receptors using the estuary around the AMEP development site.
- 10.3.185 DCO Schedule 8 paragraph 37(d) will continue to be applied to the proposed works as they continue to be valid given there are no alterations planned to the work techniques occurring from the material change above and beyond those described in Appendix U10-8 (MMO, 18-05-18), whereby existing mitigation measures were deemed suitable for an increase in pile diameter.

¹¹ EX10.5. Porpoise Note re Mitigation Requirements.

¹² EX10.7. Soft Start & Seals re Mitigation Requirements.

10.4.0 Assessment of Effects

10.4.1 The following Assessment of Effects sequentially addresses the key receptor groups identified in the Scoping Report (Fairhurst, 2021) and characterised in the Baseline Section earlier in this Chapter. The Scoping Report identified the following approach to assess impacts to the Aquatic Ecology of the Humber Estuary from the proposed material amendment to the AMEP development:

*'In relation to the potential **direct and indirect effects on habitats, benthic communities, and fish** that could occur as a result of the **changes to capital dredging and disposal requirements**, an updated assessment will be undertaken. Similarly, any potential effect **on habitat as a result of changes to water quality** (specifically around the E.ON outfall) will be assessed. This will be an update to the assessment presented in the DCO ES, undertaken via a **qualitative review of the impacts to ascertain whether or not there is any increase in the predicted magnitude of effect.***

*Where **direct effects are predicted** in relation to the **loss of habitat and benthic communities associated with the increased reclamation area**, the **quantum of habitat loss will be assessed and compared to the consented scheme**. A review will then be undertaken **to assess whether or not there is any increase in the predicted magnitude of effect.***

*In the event that the ES concludes that the **hydrodynamic and morphodynamic effects of the proposed scheme do result in a noticeable change**, then an assessment will be undertaken of the **potential indirect impacts to habitats from project-induced changes** (amended quay layout). This will be an **update to the assessment** presented in the DCO ES, undertaken via a **qualitative review of the updated modelling** to ascertain whether or not there is any increase in the predicted magnitude of effect.*

*Potential **changes to adjacent waterbodies was also scoped in** due to the likelihood of **changes in the hydrodynamic regime**. The findings of the potential impacts on the hydrodynamic and sedimentary regime will be qualitatively reviewed, to determine whether there is likely to be any change to the tidal flows or sedimentary transport pathways beyond those previously assessed, to materially alter the conclusions drawn in the DCO ES for the impacts on adjacent waterbodies.'*

10.4.2 In response to the Scoping Report, the Inspector's Scoping Opinion addressed further points relating to Aquatic Ecology, including additional considerations for inclusion in the ES. These are summarised in Table 10-1, which also sign-posts where the text responses to these considerations are within this ES document.

Additional Construction Phase Effects

10.4.3 The potential activities and consequential impacts on the estuarine environment and aquatic ecology receptors during the construction phase of the AMEP quay as a result of the proposed material changes to the AMEP marine development are:

DREDGING

- Habitat change from substrate removal;
- Habitat and benthic communities disturbance from the sediment plume;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and

- Disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

DREDGE DISPOSAL

- Loss of subtidal habitat and benthic communities from dredge spoil disposal;
- Habitat and benthic communities disturbance from the sediment plume;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and
- Disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

QUAY CONSTRUCTION

- Loss of habitat (intertidal and subtidal) and benthic communities from land take required for the quay;
- Creation of new hard substrata habitat;
- Habitat disturbance from water quality changes in the vicinity of outfalls;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes (scoped in only if there is noticeable change to the hydrodynamic and morphodynamic regimes then indirect changes to habitats will be scoped out of the ES); and
- Changes to aquatic environment in adjacent water bodies.

10.4.4 The potential changes in the effects on baseline Aquatic Ecology data are addressed sequentially below by main receptor groups: Saltmarsh Vegetation Communities; Intertidal and Subtidal Invertebrate Communities; Fish Assemblage; Marine Mammals.

Impacts to Saltmarsh Vegetation Communities

Changes in Impact Prediction – New Effects

10.4.5 Saltmarsh vegetation communities were assessed as part of the original ES from the DCO, although they were not present in the vicinity of the footprint of the quay and thus at the time of the original ES from the DCO unlikely to be impacted either directly or indirectly by the development. Where present, they were assessed as a loss and compensated for at a ratio of 1:1 at Cherry Cobb Sands.

Changes in Impact Prediction – New Receptors

10.4.6 The potential for increases in elevation of the shore profile in the vicinity of the proposed quay were however identified (Examining Authorities Report (2013)), and the associated potential for colonisation by saltmarsh vegetation.

10.4.7 The development of the saltmarsh communities in the vicinity of the AMEP development between the original baseline and the current baseline for the material change assessment, means that the direct and indirect impacts of the quay development on the community should be assessed.

Changes in Impact Prediction – Characterisation of Effects

- 10.4.8 Given the above considerations, changes to the significance of the potential impacts on saltmarsh communities will occur, leading to a loss of community extent under the footprint of the quay.
- 10.4.9 However, as the receptor (saltmarsh) was not present nor thus assessed at the time of the original ES from the DCO, then effectively no net loss in the resource has occurred arising from the material amendment as it would have been lost purely by implementing the consented scheme and the extant DCO. Effectively, the material amendment is not causing the loss, the loss would have occurred under the DCO.
- 10.4.10 Further information on expected alterations to habitat type and extent arising from the material amendment are detailed in Appendix U11-2.

CHANGES IN DIRECT IMPACTS

- 10.4.11 The development of the AMEP quay in the light of the new baseline carried out for the material amendment will lead to a loss of area of saltmarsh communities under the footprint of the quay. The most commonly recorded community within the intertidal footprint of the AMEP site is SM6 *Spartina anglica*, which is present in dense patches from the upper shore, but more patchily in the mid shore. *Spartina anglica* (Common Cord-grass) is a commonly recorded species from the lower and middle Humber, colonising large areas of intertidal habitat.
- 10.4.12 This and other saltmarsh NVC communities recorded within the AMEP footprint are commonly recorded from the Humber estuary, and similar have developed in accretionary environments within managed realignment sites in the middle and lower Humber e.g. Cutts, 2019.
- 10.4.13 However, importantly the loss of intertidal area under the footprint was assessed in the original ES with the likelihood of ongoing accretion and colonisation by saltmarsh acknowledged in the Examining Authorities Report (2013).
- 10.4.14 As such, potential alteration to habitat type and extent under the AMEP quay footprint were anticipated and taken into account in the original decision by the Examiner.
- 10.4.15 The material amendment to the quay footprint do not create any further loss of saltmarsh (intertidal area) to that already expected and accommodated, with the compensation site also expected to create saltmarsh.
- 10.4.16 No change to the direct impacts to the saltmarsh communities under the AMEP footprint will occur against the baseline conditions and those anticipated through natural change over time and incorporated in the Examining Authorities Report (2013).

CHANGES IN INDIRECT IMPACTS

- 10.4.17 There is the potential for the small amendment to quay design to affect hydrodynamics to the upstream and downstream of the quay.
- 10.4.18 The changes in quay design and hydrodynamic modification implications have been modelled to assess changes to the dispersion of the adjacent thermal plume from the Uniper (formerly E.ON) power station discharge (Appendix U9-5). This modelling has shown no significant change to the hydrodynamics in the vicinity of the discharge immediately upstream of the quay, with the thermal plume behaving largely in the same way as was considered for the original ES from the DCO.
- 10.4.19 Of course, impacts will occur to the hydrodynamics directly either side of the quay development as

the quay has the potential to modify the hydrodynamic regime of the immediate area in terms of changes to flow patterns and wave energy.

- 10.4.20 As identified at the time of the original Application, the construction of the quay will create a lower energy embayment immediately downstream, with the potential for accretion to occur and further colonisation by saltmarsh communities, and this potential was incorporated in the Examining Authorities Report (2013).
- 10.4.21 No significant alteration to the hydrodynamics operating around the quay are expected from the modelling, from those predicted at the time of the original ES, refer to Chapter 8 of the PEIR.
- 10.4.22 On this basis and in the context of the dynamic nature of saltmarsh extent in the area of the development, there will be localised alteration to saltmarsh community extent reflecting changes to hydrodynamic conditions.
- 10.4.23 However, these will be of small scale, and were accommodated within the Examining Authorities Report (2013). The material amendment to quay design will have no significant effect on these conclusions.

Impacts to Invertebrate Communities

Changes in Impact Prediction – New Effects

- 10.4.24 Importantly, these effects (detailed in the text below) are substantially similar in nature to those considered in the original ES, and therefore no new effects have been identified.
- 10.4.25 This includes generically, the changes in intertidal extent from the development footprint, modification to the subtidal environment from dredging and the alteration to the subtidal environment from dredge disposal on the licensed deposit grounds HU080 and HU082.

Changes in Impact Prediction – New Receptors

- 10.4.26 The baseline for invertebrate fauna has shown that there are no materially different receptors for this ecological component in the aquatic environment at and surrounding the AMEP site than those identified in the original ES from the DCO.
- 10.4.27 The intertidal and subtidal communities in the vicinity of the AMEP development are characteristic of the middle to lower Humber Estuary, reflecting the dynamic nature of the estuarine system and the environmental rigors including high current flows, variable salinities and exposure to air.
- 10.4.28 No new data collection has been undertaken of the invertebrate communities within the deposit grounds HU080 and HU082 on the basis that as licensed deposit grounds, the invertebrate communities are already modified to reflect ongoing dredge disposal on them e.g. community structure is already anthropogenically modified by the receipt of dredge arisings.

Changes in Impact Prediction – Characterisation of Effects

- 10.4.29 The expectation will be that no significant effects will occur to the invertebrate fauna in the vicinity of the quay arising from the material amendment to the design and dredging operations.
- 10.4.30 The alterations to the dredge disposal sites and material deposited may have an impact on the invertebrate infaunal communities of the bed within the disposal grounds. However, these grounds

are active disposal sites, and as such already would be expected to feature a modified and environmentally stressed infaunal community.

- 10.4.31 As such, within the wider ecology of the Humber and associated site conservation designations, then any additive alteration to the community structure within the designated licenced disposal grounds would not be a material consideration as an impact of the conservation objectives.
- 10.4.32 The subtidal invertebrate communities of the mid to outer estuary have been identified as being typical for dynamic mud, sand or mixed sediment subtidal sediments (Allen, 2016), and as such adapted to tolerate the environmental rigors of the area including high current flows and high suspended loads. On this basis, and given the existing use of the licensed dredge disposal grounds for erodible material, any sediment plume effects from the disposal operations would not be expected to be different to existing conditions arising from the disposal ground operations.

CHANGES IN DIRECT IMPACTS

- 10.4.33 No significant changes to the direct impacts to the intertidal or subtidal invertebrate communities have been identified resulting from the material amendment to the proposed development. This conclusion has been derived based on the following:
- 10.4.34 As identified in the original ES, the quay construction will lead to a permanent loss of intertidal and shallow subtidal habitat. The proposed changes to the quay layout will lead to a slight reduction in the area of intertidal and shallow subtidal habitat lost under the quay footprint, from approximately 45.0ha to 43.1ha, out of a total of 26,180ha of the available intertidal and subtidal area in the lower and middle estuary.
- 10.4.35 This minor change in the area of estuarine aquatic habitat permanently lost to the quay footprint represents a 4% reduction in the area of habitat estimated to be lost from the original ES. This represents a 0.0001% reduction in the area of habitat lost compared to the total area of intertidal and shallow subtidal habitat in the middle and lower estuary.
- 10.4.36 Further information on expected alterations to habitat type and extent, and thus also invertebrate communities, arising from the material amendment are detailed in Appendix U11-2.
- 10.4.37 Material removed from the quay footprint and berth pocket will be deposited in existing licenced spoil disposal grounds in the Humber. These sites will already have a modified invertebrate infaunal community reflecting the environmental stressors.
- 10.4.38 The nature of the effects will also not change, and as described above, the direct impacts to the subtidal infaunal communities of the licenced spoil grounds from the placement of dredge material will have a limited impact due to the already stressed conditions caused by ongoing disposal in these areas, and in any case are accommodated within the wider estuary conservation objectives and site management through the licensing of the disposal grounds themselves.
- 10.4.39 On this basis, and given natural variations in relative habitat extent due to natural dynamics in the estuarine system, therefore, the impact on estuarine invertebrate communities through the direct loss of intertidal and subtidal habitat and placement of dredged material in licensed disposal areas is not expected to change significantly compared to that ascribed in the original ES.

CHANGES IN INDIRECT IMPACTS

- 10.4.40 Potential changes in the indirect impacts to invertebrate fauna may occur from alteration to the dredging and dredge disposal plans. As mentioned above, the invertebrate community receptors remain the same as identified in the original ES from the DCO being characteristic of the middle to lower Humber Estuary and associated ecosystem rigors. Therefore, potential changes in the magnitude of the effects on invertebrate fauna would solely be responsible for changes in the significance of the effects. These are assessed below.
- 10.4.41 Dredging and dredge disposal operations will lead to the resuspension of sediments in the water column (sediment plume), with possible physiological effects on components of the invertebrate communities due to the increase in water turbidity, as considered in the original ES from the DCO. The proposed changes in quay layout at the AMEP site combined with natural changes in the estuarine bathymetry will lead to a small increase in the dredging activity overall, with an increase in the total volume of dredged material at the AMEP site. There will be no increase in capital dredging from the material amendment, but with a potential for a small alteration in plume behaviour and the deposition of sediment on the estuary bed.
- 10.4.42 Increased sediment loadings from alluvium dredging activity will for the large part be within natural variations in bed loads (HRW, 2021a) except potentially on short duration occasions of overflowing. Predicted increases in suspended sediment concentration at the Killingholme Power Station B intake from back-hoe dredging of the glacial till are to a maximum of 70mg/l (near bed) and for trailing suction hopper dredging (TSHD) of the alluvium, an increase in suspended sediment concentrations at the southern intake of up to 45mg/l (near bed) for a period of around a three weeks HRW (2021a).
- 10.4.43 The proposed dredging of sand/gravel by TSHD will cause increases in suspended sediment concentrations at the southern intake of Killingholme Power Station of up to 450mg/l (near bed) for a period of up to a week. Whilst this may represent a significant increase in the background levels of suspended sediment concentration it is noted that this increase will occur for a limited period of time.
- 10.4.44 With the exception of the dredging location, the predicted increase in suspended sediment concentration caused by the dredging activity is small compared with the natural variation in suspended sediment concentrations which has been measured to be up to 1600mg/l near the surface on spring tides.
- 10.4.45 However, if overflowing is utilised during the dredging of alluvium, then the predicted increases in suspended sediment concentration above background and the deposition of fine sediment arising from this will be considerably larger. Overflowing for ten minutes on every load would result in increases in suspended sediment concentration of up to 630mg/l (near bed) for a period of up to three weeks (HRW, 2021a).
- 10.4.46 As such, HRW (2021a) conclude that overall, the proposed dredging will not cause any significant impact to the sediment transport in the Humber Estuary although temporary and significant rises in background concentrations may potentially occur if overflowing occurs and during the dredging of sand/gravel over the course of a week (or less).
- 10.4.47 The potential for increased sediment suspension from the dredging activity is expected to be within natural fluctuations in loads recorded from the Humber estuary, as well as being restricted in terms of effect to close around the works. However, there is also the potential for deposition of this material on the bed, and a smothering effect to the invertebrate community of the area around the

development.

- 10.4.48 Accretion (deposition) from the sediment material released into the water column by the dredging activity assessed by HRW (2021a) at being up to <1mm of sediment at the outfall c. 100m from the development on a spring tide and <0.5mm on a neap tide.
- 10.4.49 Potentially this will marginally exacerbate the impact to invertebrate communities in the path of the plume. However, the invertebrate communities present around the proposed development area, both in intertidal and subtidal environments are already modified by the environmental rigors of the highly turbid, high suspended sediment load present in the Humber Estuary (Eggleton *et al*, 2011).
- 10.4.50 The invertebrate communities of the soft sediment intertidal and subtidal habitats around the development area are capable of with withstanding relatively prolonged high rates of accretion in the Humber Estuary e.g. Mazik, 2004 recorded 0.1–0.4mm per day accretion on intertidal habitats of the outer estuary and Boyes & Allen 2007 recorded an increase in mudflat elevation in a newly created embayment of 200mm per annum. On this basis it is not anticipated that there will be any measurable alteration in the potential indirect effects of dredging on the benthic communities around the AMEP site than those identified in the original ES.
- 10.4.51 It is further likely that the infauna within and immediately surrounding the dredge disposal areas have adapted to elevated occasional suspended sediment events (see paragraph to para 10.6.21 of the original ES), having received material from dredge spoil deposition over time. As such, for the erodible deposition there is an expectation of a degree of community tolerance within the wider site, albeit, with a likelihood that the community within the disposal area is already impacted by high deposition rates. The erodible nature of the deposited material would in principle allow for recolonisation over time, at a same rate as occurs to other material deposition within the disposal area.
- 10.4.52 The deposition of non-erodible material will have a greater potential impact, with a loss of community *in situ* and a greater period for any recolonisation, although given the nature of the material potentially a different community could develop over time. However any impact should be considered in the context of the site being an active dredge disposal ground.
- 10.4.53 On this basis, there is no expectation of substantial additional impacts to the invertebrate communities around the development, any impacts would be small scale and short-term. Some potential longer-term impacts will occur within the deposit grounds, and in particular from the release of non-erodible material. However, given these are already active dredge disposal grounds, then an impacted receiving community is expected in any case.

Impacts to the Fish Assemblage

Changes in Impact Prediction – New Effects

- 10.4.54 Importantly, these effects (detailed in the text below) are substantially similar in nature to those considered in the original ES, and therefore no new effects have been identified.

Changes in Impact Prediction – New Receptors

- 10.4.55 The baseline for fish fauna has shown that there are no materially different receptors for this ecological component in the aquatic environment at and surrounding the AMEP site.

Changes in Impact Prediction – Characterisation of Effects

- 10.4.56 As the fish receptors have not changed since the original ES, the sensitivities relevant to this assessment remain the same as identified before. Therefore, any possible change in the significance of the effects of the proposed AMEP development could only be due to a significant change in the magnitude of the impacts on the fish fauna.
- 10.4.57 Possible changes in the magnitude of impacts and the resulting significance of the effects on fish fauna are considered below, in relation to direct impacts (i.e. due to underwater noise) and indirect impacts (i.e. due to loss and/or disturbance of habitat) on fish.

CHANGES IN DIRECT IMPACTS

- 10.4.58 No changes to the direct impacts to the fish community have been identified resulting from the material amendment to the proposed development. Direct impacts to fish species through underwater noise generated during construction activities will be addressed fully by existing timing restrictions specified in the extant Marine License.
- 10.4.59 Whilst the effects of the adjacent E.ON cooling water abstraction and discharge were addressed in the original AMEP ES, and would also have been addressed in detail in the planning application for the power station's construction and operation, modification to hydrodynamics from the AMEP quay in this area has the *potential* to modify environmental conditions, and potentially reduce dispersion and dilution with increases in temperature and TRO loadings in the CW immediately around the outfall, with a concomitant potential to affect fish utilisation and even entrainment.
- 10.4.60 However, modelling of the hydrodynamics around the quay (HRW, 2021b) have shown no significant alteration to the E.ON thermal plume, indicating no change in the water quality conditions around the E.ON outfall, and thus no potential change to the conditions for fish (either avoidance, impingement or mortality).
- 10.4.61 The proposed change to the disposal operations (change in the deposit site for 1.1M tonnes of dredge arisings from the berthing pocket to Site No. HU082) in the Humber Estuary will generate additional vessel traffic during construction.
- 10.4.62 The additional dredging vessel movements would not impact on the peak number of movements (estimated as 700 per month in the original ES), but only the total (estimated as around 4,000 dredging vessel movements), as the same number of vessels will be operating during construction, but over longer periods. Vessel movements generate a certain amount of underwater noise, which can impact fish distribution and behaviour. Much of the vessel noise results from propeller cavitation, but onboard machinery and turbulence around the hull can also result in underwater noise being transmitted. The exact underwater noise characteristics of vessels depend on various factors including for example the ship type, size, mode of propulsion, operational characteristics and speed.
- 10.4.63 Dredging vessels that will be used in the Humber Estuary will be mostly medium sized vessels (50-100m length), and typical noise characteristics of vessel of such size include source levels range from 165 to 180dB re 1µPa at 1m (below 1kHz) (Götz et al. 2009). This is within the range of the general shipping noise that is likely to exist the Humber Estuary.
- 10.4.64 Furthermore, the Humber Estuary is an important industrial area and a very busy trade gateway, with an average of 40,000 ship movements per year (Humber Nature Partnership, accessed 2021) hence it can be expected that underwater noise from vessel traffic is, in any event, already

widespread throughout the estuary. Therefore, it is unlikely that the increased vessel movements arising from the proposed changed disposal operations during construction will significantly affect the availability of fish foraging areas or migration routes. Furthermore, the increase in vessel traffic will be temporary and intermittent during the 2 ¾ year construction period.

- 10.4.65 Therefore, there are no changes to the direct impacts on fish arising from construction operations compared to the original ES.

CHANGES IN INDIRECT IMPACTS

- 10.4.66 Changes in the indirect impacts to fish may occur as a result of loss of habitat under the footprint of the quay and habitat disturbance from dredging and dredge disposal. As mentioned above, the fish receptors remain the same as identified in the original ES and the nature of the effects will not change. Therefore, potential changes in the magnitude of the effects on fish fauna would solely be responsible for changes in the significance of the effects. These are assessed below.
- 10.4.67 As identified in the original ES, the quay construction will lead to a permanent loss of intertidal and shallow subtidal habitat. This habitat functions as a nursery area to fish, including commercial fish species caught in the North Sea such as common sole and whiting, and therefore its loss may lead to a recruitment loss to commercial fish stocks and marine and coastal fisheries, although the actual number of adult fish potentially lost as a result of loss of nursery area is not easily quantifiable.
- 10.4.68 Considering the natural changes occurred along the foreshore in the development area, the proposed changes to the quay layout will lead to a slight reduction in the area of intertidal and shallow subtidal habitat lost (including both the reclaimed area under the quay footprint and the functional loss of mudflat to the south of the reclamation site), from approximately 56.6ha to 49.4ha (Appendix U11-2) out of a total of over 26,000ha of the available intertidal and subtidal area in the lower and middle estuary.
- 10.4.69 Despite this reduction in the magnitude of this effect, this is a minor change in the area of estuarine aquatic habitat permanently lost (13% of habitat area gained compared to the loss estimated in the original ES, 0.0003% gain compared to the total area of intertidal and shallow subtidal habitat in the middle and lower estuary).
- 10.4.70 Therefore, the impact on commercial fish species through loss of estuarine nursery area for juvenile fish is not expected to change compared to the original ES.
- 10.4.71 Dredging and dredge disposal operations will lead to the resuspension of sediments in the water column (sediment plume), with possible physiological effects on fish due to the increase in water turbidity and decrease in dissolved oxygen levels in the water column in the sediment plume (compared to background values), and behavioural effects (avoidance) that may influence fish migration through the estuary, as considered in the original ES. The proposed changes in quay layout at the AMEP site combined with natural changes in the estuarine bathymetry will lead to a small increase in the capital dredging activity overall, with an increase in the total volume of dredged material at the AMEP site.
- 10.4.72 Fish in the Humber Estuary are likely to be adapted to high turbidity levels, given the naturally high background concentrations of suspended sediments in this estuary. The updated modelling of the sediment plume dispersion from capital dredging predicts temporary increases in suspended sediment concentrations, with peak values ranging 10 to 500mg/l (Technical Appendix U10.11). These conditions are similar to those originally predicted in the original ES and remain within the range of natural variability reported for the Humber Estuary and well below levels having a

physiological effect on fish (e.g. clogging of the gills of adult fish with suspended solid concentrations above 14 g/l; Marshall and Elliott, 1998). The predicted increases will be localised and of temporary nature, and fish will be able to avoid any area affected by such disturbance and to return once the disturbance has ceased.

10.4.73 A temporary reduction in dissolved oxygen in the water column (sediment plume) may affect fish growth and cause mortality. It is unlikely that the conditions of exposure to such an effect will change compared to those considered in the original ES and related to short-term and localised effect on oxygen demand, ability of fish to avoid the area affected, good background DO concentrations and strong tidal currents in the middle section of the Humber Estuary (see paragraph 10.6.61 of the original ES - Aquatic Ecology Chapter).

10.4.74 Therefore, the impact on fish through habitat disturbance originating from dredging and dredge disposal is not expected to change compared to the original ES.

10.4.75 Given the above assessment, there are no changes to the construction effects on fish compared to the original ES.

Impacts Marine Mammals

Changes in Impact Prediction – New Effects

10.4.76 Importantly, these effects are substantially similar in nature to those considered in the original ES, and therefore no new effects have been identified other than a potential increase in vessel movements during the dredging work.

Changes in Impact Prediction – New Receptors

10.4.77 The baseline for marine mammals has shown that there are no materially different receptors for this ecological component in the aquatic environment at and surrounding the AMEP site.

Changes in Impact Prediction – Characterisation of Effects

10.4.78 Given the above considerations, any changes to the significance of the potential impacts on marine mammals would be solely ascribed to a change in the magnitude of the effects, as determined by intensity, frequency and by the effect extent in space and time.

CHANGES IN DIRECT IMPACTS

10.4.79 It should be noted that following the requirements of the DCO, the issue of potential underwater noise and vibration generated during the works was addressed through required impact mitigation measures for Harbour Porpoise¹³ and Seal spp.¹⁴ including the requirement for a certified Marine Mammal Observer (MMO) to be at the site during construction phases which could generate noise and vibration at a level likely to cause a detrimental impact to marine mammal receptors using the estuary around the AMEP development site.

10.4.80 The MMO deployment requirements of the DCO will continue to be applied to the proposed works as they continue to be valid given there are no alterations planned to the work techniques occurring from the material change above and beyond those described in Appendix U10-8 (MMO, 18-05-18),

¹³ EX10.5. Porpoise Note re Mitigation Requirements..

¹⁴ EX10.7. Soft Start & Seals re Mitigation Requirements.

whereby existing mitigation measures were deemed suitable for an increase in pile diameter, and with no substantive alteration to the assemblage characteristics or functional attributes of marine mammal receptors around the development having occurred from the original ES baseline.

- 10.4.81 On this basis, no changes to the direct impacts to the marine mammal community have been identified resulting from the material amendment to the proposed development.

CHANGES IN INDIRECT IMPACTS

- 10.4.82 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 marine mammals through changes to prey composition and availability.

- 10.4.83 However, as noted above, the invertebrate and fish community composition remain the same as identified in the original ES from the DCO and thus the nature of the effects will not change. Therefore, potential changes in the magnitude of the effects on marine mammals would solely be responsible for changes in the significance of the effects.

- 10.4.84 However, on the basis of the assessments undertaken above relating to invertebrate community and fish assemblage effects, then any additive implications for marine mammal status would not be measurable in the context of natural variability.

- 10.4.85 On this basis, no changes to the indirect impacts to the marine mammal community have been identified resulting from the material amendment to the proposed development.

Impacts to Adjacent Waterbodies

- 10.4.86 The extremely localised and small scale alterations to the hydrodynamic and sedimentary regime around the quay and dredge disposal locations have been described above.

- 10.4.87 As such, it is not expected that there would be any additive effect to adjacent waterbodies as assessed in the original ES from the DCO.

Additional Operational Phase Effects

- 10.4.88 No changes to potential operational impacts relevant to the Aquatic Ecology components have been identified by the scoping opinion, and therefore there are no differences in the operational effects on marine mammals from the original ES.

Additional Cumulative Effects

- 10.4.89 No substantive deleterious cumulative impacts have been identified from multiple developments in the ZoI from those addressed in the original ES e.g. dredge disposal is ongoing from ports activity in the Humber, power station cooling water abstraction and discharge.

- 10.4.90 Based on the assessment of impacts from the material amendment, and plans and projects in the ZoI, it has been concluded that there are no additional significant cumulative effects arising from the development.

Consideration of DCO

- 10.4.91 As described above, baseline aquatic ecological conditions are not considered to have significantly changed from the original ES, and any changes are considered natural artefacts of a dynamic ecosystem. Furthermore, the material amendment are not considered to have generated any significant or measurable new impacts to the existing aquatic ecological receptors, although with some small potential alterations to the spatial or temporal extent e.g. very localised alteration to current and wave dynamics; dredge plume extent and duration, vessel traffic.

10.5.0 Requirement for Additional Mitigation

10.5.1 The review of revised baseline data, where available and/or appropriate, in the context of the material amendment have not identified any significant new impacts and as such, no additional mitigation is considered necessary.

DCO Mitigation

10.5.2 On the basis of the above, it is considered that the mitigation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:

- provisions for mitigatory and compensatory habitat identified in the CEMMP, including spatial extent values for different habitats (with associated functional attributes) to be created at the Cherry Cobb Sands compensation site in order to address losses in the intertidal and subtidal habitat and function in and around the AMEP quay;
- provisions under the MEMMP to ensure functional aspects of the Humber Estuary SAC are maintained, including constraints on aspects of works timing to avoid barrier effects to fishes from underwater noise and vibration from piling work, provision of a MMO to ensure no impacts to marine mammals present in the vicinity of the construction works.
- controls on marine pling including soft start and the provision of a Marine Mammal Observer (MMO).

10.5.3 Further detail on the agreed mitigation measures pertaining to the development are provided in the Aquatic Ecology Chapter from the original ES and the DCO (2014).

Alternate or Additional Mitigation

10.5.4 No additional mitigation is required for impacts to the Aquatic Ecology as there are no changes in the effects on the ecological components to those identified in the original ES and provided from within the extant DCO.

10.6.0 Residual Effects

- 10.6.1 The review of revised baseline data where available and/or appropriate, in the context of the material amendment have not identified any significant new impacts and as such, no additional mitigation is considered necessary.

Consideration of DCO

- 10.6.2 The residual effects on the Aquatic Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO.

10.7.0 Other Environmental Issues

- 10.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 10.7.2 Please see Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 10.7.3 The proposed material amendment will not raise any impacts upon infrastructure with regard to the consideration of Aquatic Ecology beyond those considered within the original ES.

Waste

- 10.7.4 The proposed material amendment will not raise any impacts upon waste with regard to the consideration of Aquatic Ecology beyond those considered within the original ES.

Population and Human Health

- 10.7.5 The proposed material amendment will not raise any impacts upon population and human health with regard to the consideration of Aquatic Ecology beyond those considered within the original ES.

Climate and Carbon Balance

- 10.7.6 The proposed material amendment will not raise any impacts upon climate and carbon balance with regard to the consideration of Aquatic Ecology beyond those considered within the original ES.

Risks of Major Accidents and/or Disasters

- 10.7.7 The proposed material amendment will not result in any risks of major accidents and/or disasters with regard to the consideration of Aquatic Ecology beyond those considered within the original ES.

Summary

- 10.7.8 No other environmental issues of relevance to Aquatic Ecology have been identified.

10.8.0 Summary of Effects

- 10.8.1 The *potential* pathways for environmental effects from the proposed material amendment arise from:
- Construction of the quay entailing: Loss of habitat (intertidal and subtidal) and benthic communities from the reclamation of ground required for the quay; underwater noise and vibration from piling; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and changes to aquatic environment in adjacent water bodies.
 - Dredging of the quay, berth pocket and approaches entailing: Habitat change from substrate removal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.
 - Dredge Disposal entailing: Loss of subtidal habitat and benthic communities from dredge spoil disposal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.
- 10.8.2 The actual likelihood of any significant effects to occur to the aquatic ecology of the area from the material amendment have been discounted, with it being concluded that the effects as identified in the original ES from the DCO remain valid.
- 10.8.3 Only very small scale localised alterations to these are expected, these not measurable against the background natural variability of the estuarine system.

10.9.0 Conclusions

- 10.9.1 Where appropriate, new baseline conditions have been characterised and assessed against those described in the original ES. No significant changes have been identified outwith those described in the original ES for the DCO (2014) and the Examining Authorities Report (2013).
- 10.9.2 Based on the above assessment of potential changes to the aquatic ecology of the area against conditions identified in the original ES baseline, and from the assessment of the material amendment, no significant effects have been identified other than those assessed in the original ES from the DCO.
- 10.9.3 Mitigation measures provided in the Aquatic Ecology ES from the DCO and the DCO (2014) are considered to remain valid, with no significant residual impacts to the aquatic ecology of the Humber Estuary expected following their discharge.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 11: TERRESTRIAL ECOLOGY AND NATURE CONSERVATION

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

11.1.0 INTRODUCTION	11-1
Development Consent Order Context.....	11-1
Consideration of the Material Amendment.....	11-2
Purpose and Structure of Chapter	11-3
11.2.0 METHODOLOGY.....	11-4
Changes in Legislation, Guidance and Planning Policy.....	11-4
Scoping Opinion	11-4
Assessment Methodology	11-6
11.3.0 CHANGES IN BASELINE CONDITIONS.....	11-8
DCO Baseline	11-8
DCO Future Baseline.....	11-10
Current Baseline	11-11
Desk Study Results	11-27
Phase 1 Survey Results	11-30
Changes in Baseline	11-34
11.4.0 ASSESSMENT OF EFFECTS	11-37
Additional Construction Phase Effects	11-38
Additional Operational Phase Effects.....	11-39
Additional Cumulative Effects	11-40
Comparison of Original Terrestrial Ecological Impact Assessment with PEIR.....	11-40
11.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	11-42
DCO Mitigation and Compensation.....	11-42
Alternate or Additional Mitigation	11-42
11.6.0 RESIDUAL EFFECTS	11-43
11.7.0 OTHER ENVIRONMENTAL ISSUES.....	11-45
Other Environmental Issues of Relevance	11-45
Summary	11-45
11.8.0 SUMMARY OF EFFECTS	11-46
11.9.0 CONCLUSIONS	11-47

DOCUMENT REFERENCES

TABLES

Table 11-1: Scoping Opinion.....	11-5
Table 11-2: Five-year BTO WeBS core high tide mean peak count for the Killingholme Marshes Foreshore sector and for the whole Humber Estuary, 2014-15 - 2018-19, and for 2004-08 (as referenced in the original ES).	11-12
Table 11-3: 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 - 2018-19, and for 2004-08 (as referenced in the original ES).	11-13
Table 11-4: BTO Low Tide Count totals for the Killingholme Marshes Foreshore sector (CH017), 2011-12.	11-14
Table 11-5: BTO Low Tide Count totals for the North Killingholme Haven Pits sector (CH066), 2011-12.....	11-15
Table 11-6: Monthly peak counts from Killingholme Marshes Foreshore, September 2017- May 2018 (Source: JBA 2019).	11-16
Table 11-7: Monthly peak counts from North Killingholme Haven Pits, September 2017- May 2018 (Source: JBA 2019).	11-17
Table 11-8: ABP Survey Data for Killingholme Marshes Foreshore sector, October-March 2018-19 and 2019-20: monthly peak counts and annual peaks.	11-18
Table 11-9: 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).	11-19
Table 11-10: Overall peak waterbird counts for the Killingholme Marshes Foreshore.	11-21
Table 11-11: Overall peak waterbird counts for the North Killingholme Haven Pits.....	11-23
Table 11-12: Priority Habitats within 2km of the AMEP site.....	11-30
Table 11-13: Phase 1 habitats recorded in the Able Marine Energy Park study area (site plus buffer). ..	11-31
Table 11-14: Habitat loss from the consented and the updated Projects	11-38
Table 11-15: Comparison of Original ES to PEIR.....	11-40

APPENDICES

Appendix U11-1: Preliminary Ecological Appraisal Report for the Able Marine Energy Park (AMEP) Project: Material Change 2.

Appendix U11-2: AMEP Material Change 2: Change in Habitat Losses Within the Designated Site.

Appendix U11-3: Analysis of ABP Ornithological Monitoring Data for the Killingholme Marshes Foreshore, 2018-19 and 2019-20.

11.1.0 Introduction

Development Consent Order Context

- 11.1.1 The Able Marine Energy Park Development Consent Order (the DCO) for the site approved a harbour development with associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 11.1.2 The associated development consented through the DCO includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 11.1.3 A description of the consented Project is set out in Chapter 4¹ of the Environmental Statement (ES) submitted by the Applicant with the original application in December 2011 ('the original ES').
- 11.1.4 Documents, relevant to this chapter, that formed part of the original ES include:
- Environmental Statement Chapter 11: Terrestrial Ecology and Birds² (AMEP site);
 - Environmental Statement Chapter 35³: Terrestrial Ecology and Birds (Compensation site);
 - Appendices to ES Chapter 11:
 - 11.1. Extended Phase 1 and Scoping Report;
 - 11.2. South Killingholme Phase 1 Ecology;
 - 11.2.1. South Killingholme Southern Extension Area;
 - 11.3. South Killingholme Protected Species;
 - 11.4. Spring Passage and Breeding Birds Survey;
 - 11.5. Breeding Birds Survey;

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000309-04%20-%20Description%20of%20Development.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000315-11%20-%20Ecology%20and%20Nature%20Conservation.pdf>

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000340-35%20-%20Ecology%20and%20Nature%20Conservation.pdf>

- 11.6. Coastal Bird Survey;
- 11.7. Winter Farmland Birds;
- 11.8. AMEP Protected Species;
- 11.9. AMEP Bird Survey Results April 2010-April 2011;
- 11.10. Breeding Birds Report 2011;
- 11.11. Noise Contour Maps;
- 11.12. Hedgerow and Ditch Losses;
- EX11.19. AMEP Bat Surveys: Supplementary Note;
- EX11.20. Draft Great Crested Newts Licence Application - acknowledgement of receipt;
- EX11.22. The impact of SPMT and Cranes on the Operational Buffer;
- EX11.23. Immediate Habitat Losses within the Designated Site;
- EX11.24. Medium and Long Term Losses within the Designated Site;
- EX11.2.6 Pumping Station;
- EX11.27. Killingholme Phase 2 Survey;
- EX11.28. Great Crested Newt Survey (2006);
- EX11.29. Water Vole Survey (2006);
- EX11.30. Location of Replacement Ponds for Great Crested Newts;
- EX11.31. M456 Invertebrate Survey; and
- APPENDIX WR22.1. Great Crested Newts.

Consideration of the Material Amendment

11.1.5 The material amendment will need to be addressed in the context of any changes to expected potential impacts arising from the material amendment compared to the original assessment, and the effectiveness of existing mitigation measures and any different residual impacts if and when they occur. The full details of the proposed material amendment is given in Chapter 4 of the PEIR and is summarised below. The proposed material amendment would primarily affect the works on the new quay (Work No. 1):

- 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.

11.1.6 Though the net effect of the proposed 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.

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

11.1.8 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.

11.1.9 Additionally, the material change also includes a proposed minor alteration to the FP50 footpath diversion at the northern end of the site, 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 220 m beyond the consented location.

Purpose and Structure of Chapter

11.1.10 This chapter of the Preliminary Environmental Information Report (PEIR) reports on any change in the findings of the original ES in respect of Terrestrial Ecology and Nature Conservation, including ornithology, pursuant either to the proposed material amendment or consequential to any natural changes since the original environmental impact assessment was undertaken. Aspect considered were based on the outcomes of the Scoping Opinion (Appendix U5-2). Consideration is given to:

- changes in legislation, policy and guidance relating to Terrestrial Ecology and Nature Conservation since the DCO application;
- changes in the baseline conditions at the site relating to Terrestrial Ecology and Nature Conservation, including:
 - Terrestrial Habitats;
 - Statutory Protected Nature Conservation Sites;
 - Waterbird populations; and,
 - Other protected species including great crested newt, water vole, badger and breeding birds.
- the proposed material amendment to the scheme.

11.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

Habitats Regulations 2017

- 11.2.1 The Conservation of Habitats and Species Regulations (2010) was updated in 2017, and then again in 2019 to make them operable from 1 January 2021, with functions transferred to ministers from the European Commission. The Conservation of Habitats and Species Regulations 2017 Regulations are one of the pieces of domestic law that transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives). The changes are made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. This does not, however, make any material change to the assessment process adopted in this chapter as the assessment complies with the updated regulations.

Ecological Impact Assessment Guidelines

- 11.2.2 The guidelines for Ecological Impact Assessment in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM, 2006) were updated in 2018, but this did not make any material change to the assessment methodology used in this chapter.

The National Planning Policy Framework

- 11.2.3 The previous assessments reference Planning Policy Statement 9 Biodiversity and Geological Conservation (ODPM 2005). This was superseded by the National Planning Policy Framework (NPPF), published in 2014 and updated in 2019. The NPPF now provides the framework for assessing the impact of certain developments on Terrestrial Ecology. It does not, however, make any material change to the assessment process adopted in this chapter.

Scoping Opinion

- 11.2.4 A Scoping Report was submitted to the Planning Inspectorate by the Applicant (Appendix U5-1)⁴ in January 2021. Table 11-1 summarises the key aspects of the subsequent scoping opinion (Appendix U5-2) as relevant to Terrestrial Ecology and Nature Conservation. This incorporates comments from the Natural England and North Lincolnshire Council. In response to the Scoping Report, the Inspector's Scoping Opinion addressed further points relating to terrestrial ecology, including additional considerations for inclusion in the ES. Table 11-1 also sign-posts where the text responses to these considerations are within this PEIR document.

⁴<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030006/TR030006-000009-TR030006%20-%20Scoping%20Report.pdf>

Table 11-1: Scoping Opinion

Topic	Scoping Opinion	Response
Terrestrial Habitat and Species	The Scoping Report explains that no changes are proposed to the terrestrial works which would have any direct impact on terrestrial habitats and species beyond that which has already been assessed and as such can be scoped out. The Inspectorate does not agree to this approach, noting that the baseline position for terrestrial habitats and species may have changed from the position presented in the original ES, and as the terrestrial works include the diversion of a footpath, the updated ES should include information to support the original assessment.	Baseline has been updated and incorporated into the assessment, including habitat survey and updated ornithological data.
Noise	The Scoping Report states that as the installation operations would be the same, that the change will not result in any new or different noise impacts on ecology and nature conservation interests in terms of noise or vibration. It explains that as a worst-case scenario has been considered and as the quay would be constructed in accordance with the requirements and conditions set out in the DCO and marine licence no new or different impacts are predicted. The Inspectorate does not agree to this approach, it considers that as there may have been natural changes to habitats, bird distribution and waterbird assemblage, and that it remains unclear whether the alterations in piling activities would result in additional noise impacts due to changes in extent, intensity or duration. The updated ES should therefore include evidence to support any conclusions made. The Applicant should also make effort to agree the sufficiency of existing mitigation measures with relevant consultation bodies.	Noise impacts considered in light of updated baseline and sufficiency of mitigation assessed (consultation ongoing)
Ornithological Impacts	The Scoping Report explains that the proposed changes may affect the hydrodynamic and morphodynamic regimes which in turn may result on indirect changes to habitats. Where this has potential to affect designated estuary habitat, there could potentially be subsequent or consequential impacts to bird species and assemblage including SPA qualifying features. The updated ES should include assessment of impacts to ornithological features resultant from these changes where significance effects are likely to occur. The Applicant should make effort to agree the approach to the assessment with relevant consultation bodies.	Ornithological assessment has been updated in light of updated baseline and all predicted effects. Consultation is ongoing.
Cherry Cobb Sands	The Scoping Report explains that since the making of the original DCO, the estuary has undergone physical changes through development, and through changes in the marine environment. It is considered that the proposal may lead to changes to hydrodynamic and morphodynamic regime and potentially to indirect changes to habitats. The Inspectorate considers that as the impact of the quay may be affected by natural changes, and has potential to affect habitats and bird distribution, that the updated ES should assess whether the effects on designated site features are such that they would introduce new or different significant effects. The Inspectorate notes that there is no change proposed to the compensation provision being provided. The Cherry Cobb Sands compensation proposal was established on the basis of the anticipated harm to the SPA. The updated assessment should therefore consider whether the original impacts of the proposed development to qualifying features are likely to change and confirm if the compensation proposed remains appropriate in these circumstances.	Assessment of effects on designated site features has been updated, including new HRA and Appropriate Assessment. Consideration has also been given to adequacy of compensation scheme at Cherry Cobb Sands. Consultation is ongoing on draft LSE and AA reports.
	If new or different effects are found, the Applicant should assess the sufficiency of the existing compensation requirements and provide evidence of any agreement reached with relevant consultation bodies. The Applicant should seek and provide evidence of agreement with the relevant consultation bodies regarding the extent of the study area and matters to be included in the ES.	

- 11.2.5 Consultation has been undertaken 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 agreement that assessment should focus on features that have changed, informed by baseline bird data update and updated Preliminary Ecological Appraisal of the current ecological conditions at the site.

Assessment Methodology

- 11.2.6 The assessment in this chapter for the material change used the same methodology as for the original ES.
- 11.2.7 Impacts are defined as a change (which can be positive or negative) that occurs as a consequence of an activity. Assessing these impacts involved:
- identifying the source of the impact;
 - identifying what environmental elements/features are affected;
 - predicting the magnitude of the impact;
 - considering the need and effectiveness of mitigation measures;
 - evaluating the significance of the impacts;
 - reporting the residual impacts; and
 - evaluating any cumulative or in-combination impacts.
- 11.2.8 The Construction Phase impact prediction was essentially an objective exercise in determining what could happen to an environmental receptor as a consequence of the intended activity inclusive of mitigation measures inherent to design. Impact prediction for this ecological assessment has relied on a quantitative element wherever this is possible. Where quantification has not been possible, past experience and professional judgement was applied. The magnitude of impact is determined as being of negligible, small, medium or large magnitude by encompassing the following:
- the nature of the change (what is affected and how);
 - the type of impact;
 - its size, scale or intensity;
 - its geographical extent and distribution;
 - its timing, duration, frequency, reversibility; and
 - where relevant, the probability of the impact occurring as a result of accidental or unplanned events.

- 11.2.9 Evaluation of the impact takes the magnitude of impact and explains what it means in terms of its importance to society and the environment. The Operational Phase impacts were assessed using the same approach.
- 11.2.10 Sensitive Receptors were identified as those associated with the adjacent Humber Estuary SPA, SAC, Ramsar site and SSSI and North Killingholme Haven Pits SSSI (which is also part of the Humber Estuary SPA, Ramsar site), together with species and habitats associated with non-statutory designated sites such as Local Wildlife Sites, and European and nationally protected species are present on or in the vicinity of the site and could also be affected by the proposed development, including:
- great crested newt (European protected species (EPS));
 - bat species (EPS);
 - water voles (nationally protected);
 - breeding birds (nationally protected)
 - badger (nationally protected); and
 - Biodiversity Action Plan (BAP) species and habitats.
- 11.2.11 Significance Criteria for the Ecological Impact Assessment were based on the potential for ecological and nature conservation impacts in the light of the habitats and species that are likely to be affected by the proposed material amendment. As part of the assessment the significance of potential ecological impacts has been evaluated taking into account the following factors:
- the magnitude of both positive and negative effects, as determined by intensity, frequency and by their extent in space and time;
 - the vulnerability of the habitat or species to the changes likely to arise from the development;
 - the ability of the habitat, species or ecosystem to recover, considering both fragility and resilience;
 - the viability of component ecological elements and the integrity of ecosystem function, processes and favourable condition;
 - value within a defined geographic frame of reference (e.g. UK, national, regional or district);
 - the biodiversity value of affected species, populations, communities, habitats and ecosystems, considering aspects such as rarity, distinct sub-populations of a species, habitat diversity and connectivity, species-rich assemblages, and species distribution and extent; and
 - designated site and protected species status, and Priority Biodiversity Action Plan (BAP) or Habitat Action Plan (HAP) status.
- 11.2.12 Significance was determined by the interaction of these criteria. The value of the affected feature is used to determine the geographical scale at which the impact is significant (e.g. international, national, regional and local levels). The determination of significance is based on whether the

impact will affect the integrity or conservation status of the species, habitat, site or ecosystem within a given geographical frame of reference. For the most part, the revised baseline description, impact assessment coverage and approach follows that undertaken in the original ES. However, where reflecting the proposed material changes, then additional information has been collected, collated and assessed using the standard methodology outlined below.

Study Area

- 11.2.13 The study area used in this assessment update was the same one as used for the original ES.

11.3.0 Changes in Baseline Conditions

DCO Baseline

Overview of the Humber Estuary

- 11.3.1 As set out in Chapter 11 of the original ES, the AMEP site lies on the southern bank of the Humber Estuary. It is within the middle estuary and located between C.Ro Port Killingholme (the former Humber Sea Terminal [HST]) and Immingham Port, operated by Associated British Ports (ABP). The Prax (formerly TOTAL) Lindsey Oil Refinery is located on the landward side of the site, along with a gas fired power station operated by Uniper. The site is in effect surrounded by landward heavy industry which generally extends from East Halton to Grimsby and is part of an area known as the South Humber Gateway.
- 11.3.2 The whole of the Humber Estuary is covered by several wildlife protection designations. The estuary is designated as a Special Protection Area (SPA) for its waterbird community, and as a Special Area of Conservation (SAC) for habitats, several species of fish and the Grey Seal.
- 11.3.3 The Humber Estuary is one of the largest estuaries in the UK comprising extensive wetland and coastal habitats. Its input of freshwater into the North Sea is the largest in Britain draining a catchment of some 24,240 km², and it has the second-highest tidal range in Britain (7.2 m). At low tide approximately one-third of the estuary is exposed as mud or sandflats. There are extensive areas of reedbed with areas of mature and developing saltmarsh in the inner estuary, with grazing marsh in the middle and outer estuary. Behind the saltmarsh, there are low sand dunes with marshy slacks and brackish pools. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the autumn migration periods and in winter, and important breeding populations of terns and raptors over the summer months. The estuary's assemblage of over-wintering and passage birds are attracted by the wide expanse of mudflat that is exposed within the estuary at low tide and which provide feeding grounds rich in invertebrates. At high tide the assemblage is forced to roost outside of the SPA. Some flocks roost in adjacent fields whilst others fly several kilometres inland. Other protected species present in the estuary include grey seals, river and sea lamprey.

Overview of 2011 Baseline Bird Populations

- 11.3.4 It was concluded in the original ES (paragraphs 11.6.13 *et seq*) that AMEP has the potential to cause significant adverse impacts both in terms of habitats and species. That included 45 ha of estuary reclamation for the new quay, habitat that is an important resource for eight species of the resident bird assemblage, including:

- bar-tailed godwit (maximum of 2.1 percent of Humber population);
- black-tailed godwit (66 percent);
- curlew (3.6 percent);
- dunlin (4.8 percent);
- lapwing (1.6 percent);
- redshank (9.9 percent);
- ringed plover (9.7 percent); and
- shelduck (2 percent).

11.3.5 It was also concluded that the development of AMEP would result in the removal of fields currently in arable use which provide feeding and roosting habitat for estuary birds which may also use the intertidal habitat, including redshank, curlew, dunlin and lapwing throughout the winter period, shelduck intermittently throughout the autumn and winter, black-tailed godwit in autumn and over the winter, and bar-tailed godwits in spring (original ES paragraphs 11.6.20 *et seq*). Although the land was not, and is not now, actually part of the SPA it was considered to be functionally linked to it ('functionally linked land' or 'FLL').

11.3.6 During the construction of AMEP, noise generated by piling has the potential to disturb birds that would otherwise use the Killingholme Marshes foreshore and North Killigholme Have Pits.

Overview of Protected Species Populations

11.3.7 Protected species reports for the AMEP site were originally undertaken in September 2010⁵ and May 2011⁶.

11.3.8 The impact of the development on protected species is recorded in Chapter 11 of the original ES (footnote 2), and in Chapter 15 the Statement of Common Ground between the Applicant and Natural England, the Marine Management Organisation and the Environment Agency⁷.

11.3.9 The following protected species were identified in the original ES:

- **Great Crested Newt:** several ponds were present within the AMEP site, three of which supported populations of Great Crested Newts, a European protected species. The three GCN ponds within the AMEP site have now been lost, and six new ones created in mitigation area B (see below).
- **Water voles:** recorded on most of the major ditches running through the AMEP site during ES

⁵ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000387-11.3%20-%20South%20Killingholme%20Protected%20Species.pdf>

⁶ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000393-11.8%20-%20AMEP%20Protected%20Species.pdf>

⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001599-SOCG007%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20The%20Environment%20Agency,%20MMO%20and%20Natural%20England.pdf>

surveys. The ES surveys concluded that water vole was present almost continuously between NKHP to Rosper Road Pool and it is clear the AMEP land provides a valuable resource for this species. Mitigation was implemented to deliver a net gain to this species (see below).

- **Bats:** surveys for the ES found bat activity was limited and centred on the Station Road and Old Copse area, and also around the NKHP. These habitats were considered likely to provide ideal foraging and commuting habitat and the Pits in particular would provide insect feeding resource for bats. No evidence was found of any bat roosts within site. Six species were recorded:
 - Common pipistrelle (*Pipistrellus pipistrellus*);
 - Noctule or Leisler's bat (*Nyctalus sp.*);
 - *Myotis sp.*;
 - Soprano pipistrelle (*Pipistrellus pygmaeus*); and
 - Brown Long-eared Bat (*Plecotus auritus*).
 - Nathusius' pipistrelle
- **Badger:** some use of AMEP is made by foraging badgers, though it was not considered to permanently inhabit any part of AMEP.
- **Reptiles:** no evidence was found that reptiles make use of the AMEP site.
- **Breeding birds:** 48 species were identified that could potentially lose their breeding sites as a result of the works. These include 15 BAP species 15 and 12 that are red-listed or are specifically mentioned on the Humber Estuary SSSI citation, including; skylark, yellowhammer, song thrush, linnet, tree sparrow, turtle dove, cuckoo, grey partridge, willow tit, reed bunting, lapwing and yellow wagtail. Little ringed plover was the only Schedule 1 species recorded as breeding on the AMEP site (with two pairs present in the car storage compound). Barn owl was the only other Schedule 1 species recorded on site and while this species has historically bred outside of the AMEP site no breeding has been recorded within AMEP and as such impacts to this species was considered to be unlikely. Marsh harrier and avocet on the North Killingholme Haven Pits (both SPA qualifying species), and the Rosper Road Pools held a regionally important breeding waterfowl community.

DCO Future Baseline

11.3.10 The estuarine ecosystem was identified as dynamic and subject to natural change. In particular, the Panel's Findings and Recommendations to the Secretary of State⁸ following completion of the examination of the original application in 2012 recorded:

'1. That the Humber estuary is highly dynamic, both as a result of the natural characteristics of an estuary with a high tidal range and the added consequences of rising sea levels associated with climate change.

⁸ <https://infrastructure.planninginspectorate.gov.uk/document/TR030001-002249>

2. *That the habitats affected by the proposal are found extensively throughout the estuary and that they are subject to continuous change through natural and man-induced processes of erosion, including dredging, and deposition.*
3. *That the combined effect of rising sea level and fixed flood defences results in the estuary as a whole being subject to “coastal squeeze” with pressure particularly on salt marsh habitat.*
4. *That as a response to coastal squeeze the Environment Agency has promoted a policy of selective managed retreat of flood defences to re-establish estuarine habitat on land reclaimed for agriculture in historical times.*
5. *That this policy has been implemented in association with schemes of habitat compensation carried out as part of harbour works on the Humber, including ABP’s works at Welwick, Chowderness and Alkborough associated with the Immingham Outer Harbour and at Green Port Hull.*
6. *That the character of the foreshore at both the main application site and Cherry Cobb Sands has changed in living memory, that the changes are measurable and can be expected to continue to evolve.*
7. *That conditions favourable to the formation of extensive areas of very gently sloping inter-tidal mudflat at the North Killingholme Marshes have been reinforced by the creation of the Immingham Outer Harbour but that the general pattern is that accreting shorelines will develop into salt marsh as has happened observably at Cherry Cobb Sands and in some locations on the Killingholme shore adjacent to the floodwall’, (Examiner’s Report, paragraph 10.79)*

Current Baseline

Ornithology

11.3.11 Ornithological data to update the baseline for this PEIR Chapter have been obtained from a range of sources, including the following:

- BTO Wetland Bird Survey (WeBS) high tide (core) counts (2014-15 to 2018-19) - 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.

BTO WeBS Data

11.3.12 Tables 11-2 and 11-3 summarises the five-year mean peak count from the Killingholme Marshes Foreshore and North Killingholme Haven Pits (NKHP) sectors and that from the whole Humber Estuary for the same time periods for comparison.

Table 11-2: Five-year BTO WeBS core high tide mean peak count for the Killingholme Marshes Foreshore sector and for the whole Humber Estuary, 2014-15 - 2018-19, and for 2004-08 (as referenced in the original ES).

Species	SPA species	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (14-18)	% SPA mean peak in sector ES	% SPA mean peak in sector update
Mute swan		3	2	1.0%	1.3%
Shelduck	Q	9	67	0.2%	1.4%
Shoveler		11	34	8.9%	20.0%
Gadwall		4	9	2.9%	4.5%
Mallard	A	13	27	0.6%	2.3%
Teal	A	13	0	0.5%	0.0%
Pochard	A	1	0	0.3%	0.0%
Tufted duck		4	1	1.0%	0.6%
Smew		1	0	50.0%	0.0%
Little grebe		2	0	2.2%	0.4%
Grey heron		1	0	2.3%	0.0%
Little egret		0	2	0.0%	0.8%
Cormorant		0	1	0.0%	0.2%
Water rail		0	0.2	0.0%	1.3%
Moorhen		4	3	2.7%	5.9%
Coot		31	35	2.7%	10.9%
Oystercatcher	A	1	3	0.0%	0.1%
Avocet	Q	0	23	0.0%	1.1%
Lapwing	A	15	0	0.1%	0.0%
Ringed plover		0	64	0.0%	8.0%
Little ringed plover		0	1	0.0%	13.0%
Curlew	A	61	73	1.4%	2.7%

Species	SPA species	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (14-18)	% SPA mean peak in sector ES	% SPA mean peak in sector update
Bar-tailed godwit	Q	0	1	0.0%	0.1%
Black-tailed godwit	Q	50	1051	1.3%	28.7%
Turnstone	A	1	3	0.2%	1.2%
Knot	Q	1	0	0.0%	0.0%
Ruff	Q	0	0.2	0.0%	0.3%
Dunlin	Q	87	160	0.5%	1.1%
Snipe		0	1	0.0%	1.1%
Common sandpiper		0	0	0.0%	0.8%
Redshank	Q	83	128	1.6%	4.2%

Table 11-3: 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 - 2018-19, and for 2004-08 (as referenced in the original ES).

Species	SPA species	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (14-18)	% 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%	0.8%
Shelduck	Q	7	8	0.2%	0.2%
Shoveler		29	8	23.5%	4.7%
Mallard	A	71	11	3.4%	0.9%
Teal	A	30	0	1.1%	0.0%
Tufted duck		1	0	0.2%	0.0%
Little grebe		1	0	1.1%	0.0%
Grey heron		3	0	6.8%	0.0%
Little egret		0	5	0.0%	2.4%
Cormorant		1	0	0.7%	0.1%
Water rail		0	0.4	0.0%	2.5%
Moorhen		2	0	1.4%	0.4%
Coot		3	0	0.3%	0.0%
Oystercatcher	A	2	1	0.1%	0.0%
Avocet	Q	27	13	5.3%	0.6%

Species	SPA species	Sector 5-year mean peak ES (04-08)	Sector 5-year mean peak update (14-18)	% SPA mean peak in sector ES	% SPA mean peak in sector update
Lapwing	A	276	0	1.6%	0.0%
Ringed plover		1	0	0.1%	0.0%
Curlew	A	12	3	0.3%	0.1%
Black-tailed godwit	Q	3338	2256	85.9%	61.6%
Ruff	Q	1	1	1.6%	1.9%
Dunlin	Q	380	73	2.1%	0.5%
Snipe		4	12	3.4%	9.5%
Common sandpiper		0	0.2	0.0%	0.8%
Redshank	Q	215	191	4.2%	6.2%

11.3.13 The BTO Low Tide Counts from 2011-12 are summarised in Tables 11-4 and 11-5. These show lower peak count than WeBS core counts for the NKHP sector probably reflect 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 11-4: BTO Low Tide Count totals for the Killingholme Marshes Foreshore 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
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

Table 11-5: BTO Low Tide Count totals for the North Killingholme Haven Pits 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	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 2017/18 Data

11.3.14 The results of the 2017-18 JBA surveys are summarised in Table 11-6 for the Killingholme Marshes Foreshore (KMFS) and North Killingholme Haven Pits (NKHP) in Table 11-7. Each Table gives peak count recorded each month at each site.

Table 11-6: 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
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

Table 11-7: 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
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

ABP DATA 2018-19 and 2019-20

- 11.3.15 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 11-8 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. Further analysis of the use of KMFS by these three particular species is presented in Appendix U11-3. The recent increased use of the site by these species is likely to have been influenced by recent changes in intertidal habitat whereby accretion has resulted in saltmarsh colonisation of the site, enabling birds to feed for longer through the tidal cycle and providing roosting habitat even through higher 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, though mainly in autumn.
- 11.3.16 In relation to the compensatory habitat at Cherry Cobb Sands, the existing scheme is based on provision of habitat to compensate for that lost by the quay, both directly and indirectly. Specifically, it has been designed to compensate for the direct loss of 45ha of intertidal and subtidal habitat and a further indirect loss of 11.6ha. of functional habitat loss through disturbance (plus 2 ha of saltmarsh at Cherry Cobb Sands that will become intertidal mudflat). As the compensation provision is based on providing like for like habitat to replace the losses, there is no reason why it would not still be adequate to provide alternative habitat for these recently increased bird numbers using the KMFS site. The change in habitat losses are further detailed in Appendix U11-2.

Table 11-8: 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

Species	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2018-19	Peak 2019-20
Black-tailed godwit	2183	22	220	162	372	271	2070	2183
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

AMEP Monitoring Data 2020-21

11.3.17 The data collected by Nick Cutts for Able UK during December 2020 – March 2021 from the KMFS are summarised in Table 11-9, where the total counts from each survey are presented.

Table 11-9: 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

Killingholme Fields

11.3.18 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. They 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 individuals (equivalent to 2.4% of the Humber Estuary population). Redshank, black-tailed godwit, lapwing, redshank, whimbrel, and shelduck were also recorded during the ES

baseline surveys but in numbers below 1% of the Humber Estuary population.

- 11.3.19 A further survey in autumn 2016 (Cutts and Hemingway 2017) found reduced curlew numbers present in the AMEP fields than previously (peak 15), possibly because of their less favourable condition (with a longer sward developed as arable/improved grassland fields have reverted to neutral grassland). That study reported a higher use (peak 110 curlew) of the adjacent Tank Farm grassland (outside the AMEP site), over both high and low tide periods.
- 11.3.20 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 U11-1). Overall, use of this part of the AMEP site by curlew was expected to change and mitigation was included with the consented development.
- 11.3.21 Furthermore, curlew use of the KMFS has not increased since the original ES (see Table 1 above), so this part of the SPA is no more important to curlew now than it was previously.

Summary of 2021 Baseline Survey Data

- 11.3.22 The data sources on waterbird numbers within the area that could be affected by the proposed development, including the material amendment, are summarised in Tables 11-10 and 11-11, 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.
- 11.3.23 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 original ES baseline.

Table 11-10: Overall peak waterbird counts for the Killingholme Marshes Foreshore.

Species	SPA status	ES TTTC	ES WeBS	% Humber ES	WeBS 14-18	WeBS Low	JBA 17-18	ABP 18-19	ABP 19-20	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	2.8%
Shelduck	Q	109	9	2.4%	67	138	168	76	56	34	3.6%
Shoveler		0	11	8.9%	34	0	4	0	0	0	20.0%
Gadwall		0	4	2.9%	9	2	0	0	0	0	4.5%
Wigeon	A	24	0	0.7%	0	0	125	0	4	0	4.7%
Mallard	A	14	13	0.7%	27	10	3	22	10	14	2.3%
Teal	A	12	13	0.5%	0	6	310	1064	828	1466	41.2%
Pochard	A	0	1	0.3%	0	0	0	0	0	0	0.0%
Tufted duck		0	4	1.0%	1	0	0	0	0	0	0.6%
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	3.8%
Little grebe		0	2	2.2%	0	0	0	0	0	0	0.4%
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	2.8%
Little egret		0	0	0.0%	2	0	2	1	0	0	1.0%
Cormorant		2	0	1.4%	1	2	3	0	4	0	1.4%

Species	SPA status	ES TTTC	ES WeBS	% Humber ES	WeBS 14-18	WeBS Low	JBA 17-18	ABP 18-19	ABP 19-20	NC 2021	% Humber update
Water rail		0	0	0.0%	0	0	0	0	0	0	1.3%
Moorhen		0	4	2.7%	3	0	0	0	0	0	5.9%
Coot		2	31	2.7%	35	0	0	0	0	0	10.9%
Oystercatcher	A	12	1	0.4%	3	12	7	8	4	13	0.2%
Avocet	Q	0	0	0.0%	23	8	36	104	251	205	11.5%
Lapwing	A	325	15	1.8%	0	3	665	2374	1254	1121	15.2%
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%	64	4	39	19	24	2	8.0%
Little ringed plover		0	0	0.0%	1	0	0	0	0	0	13.0%
Whimbrel	A	2	0	2.8%	0	0	0	0	0	0	0.0%
Curlew	A	158	61	3.7%	73	109	136	68	96	29	5.0%
Bar-tailed godwit	Q	123	0	4.4%	1	35	5	2	14	0	2.7%
Black-tailed godwit	Q	2566	50	66.0%	1051	816	538	2070	2183	170	59.6%
Turnstone	A	0	1	0.2%	3	1	26	17	37	0	13.7%
Knot	Q	0	1	0.0%	0	0	67	0	0	0	0.3%
Ruff	Q	1	0	1.6%	0	0	0	0	0	0	0.3%
Sanderling	A	0	0	0.0%	0	0	0	0	2	0	0.4%
Dunlin	Q	1029	87	5.7%	160	289	503	680	512	232	4.6%
Little stint		0	0	0.0%	0	0	3	0	0	0	42.9%
Snipe		0	0	0.0%	1	0	5	4	15	0	11.5%
Common sandpiper		3	0	12.0%	0	2	0	0	0	0	8.2%
Redshank	Q	540	83	10.5%	128	38	806	204	140	71	26.4%

Species	SPA status	ES TTTC	ES WeBS	% Humber ES	WeBS 14-18	WeBS Low	JBA 17-18	ABP 18-19	ABP 19-20	NC 2021	% Humber update
Greenshank	A	0	0	0.0%	0	0	2	0	0	0	5.0%
Black-headed gull		252	0	6.7%	0	203	0	0	0	0	2.4%
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	2.3%
Herring gull		7	0	7.3%	0	8	0	0	0	0	0.9%
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	5.5%
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 11-11: Overall peak waterbird counts for the North Killingholme Haven Pits.

Species	SPA status	ES TTTC	WeBS Core ES	% Humber ES	WeBS Core 14-18	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	0.7%
Mute swan		1	1	0.3%	1	0	1	0.8%
Shelduck	Q	9	7	0.2%	8	12	8	0.3%
Shoveler		61	29	49.5%	8	0	4	4.7%
Gadwall		0	0	0.0%	0	0	2	1.0%
Wigeon	A	0	0	0.0%	0	0	0	0.0%

Species	SPA status	ES TTTC	WeBS Core ES	% Humber ES	WeBS Core 14-18	WeBS Low 11-12	JBA 17-18	% Humber update
Mallard	A	34	71	3.4%	11	7	40	3.4%
Teal	A	46	30	1.7%	0	11	104	2.9%
Pochard	A	0	0	0.0%	0	0	4	3.7%
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%
Little grebe		0	1	1.1%	0	0	5	9.0%
Bittern	Q	0	0	0.0%	0	0	0	0.0%
Grey heron		3	3	6.8%	0	2	2	5.6%
Little egret		1	0	2.6%	5	2	10	4.8%
Cormorant		1	1	0.7%	0	2	3	1.1%
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	1.8%
Coot		2	3	0.3%	0	0	0	0.0%
Oystercatcher	A	4	2	0.1%	1	2	2	0.0%
Avocet	Q	16	27	5.3%	13	5	44	2.0%
Lapwing	A	5	276	1.6%	0	0	269	1.7%
Golden plover	Q	1	0	0.0%	0	0	0	0.0%
Grey plover	A	0	0	0.0%	0	0	0	0.0%

Species	SPA status	ES TTTC	WeBS Core ES	% Humber ES	WeBS Core 14-18	WeBS Low 11-12	JBA 17-18	% Humber update
Ringed plover		0	1	0.1%	0	0	0	0.0%
Little ringed plover		2	0	52.6%	0	1	0	21.7%
Whimbrel	A	0	0	0.0%	0	0	0	0.0%
Curlew	A	7	12	0.3%	3	4	4	0.1%
Bar-tailed godwit	Q	1	0	0.0%	0	0	2	0.2%
Black-tailed godwit	Q	3800	3338	97.8%	2256	2000	655	61.6%
Turnstone	A	0	0	0.0%	0	0	0	0.0%
Knot	Q	12	0	0.0%	0	0	0	0.0%
Ruff	Q	0	1	1.6%	1	0	2	2.7%
Sanderling	A	0	0	0.0%	0	0	12	2.4%
Dunlin	Q	270	380	2.1%	73	0	450	3.0%
Little stint		0	0	0.0%	0	0	0	0.0%
Snipe		6	4	5.1%	12	0	26	19.9%
Common sandpiper		0	0	0.0%	0	0	0	0.8%
Redshank	Q	249	215	4.8%	191	1	450	14.7%
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%

Species	SPA status	ES TTTC	WeBS Core ES	% Humber ES	WeBS Core 14-18	WeBS Low 11-12	JBA 17-18	% Humber update
Common tern		0	0	0.0%	0	1	0	0.3%
Little tern	Q	0	0	0.0%	0	0	0	0.0%

Terrestrial Ecology

Desk Study Update

11.3.24 A desk study was carried out in February and March 2021 to determine the protected nature conservation sites in the area (using a search radius of 20km for internationally important sites, 5km for nationally important sites, and 2km for other sites), and collate available records of key species from the site and its surrounds. Information was collated from the following sources:

- Natural England, JNCC and Magic Map web site - statutory protected area site boundaries and citation details, protected species records and distribution of priority habitats; and
- Lincolnshire Environmental Records Centre (LERC) - protected and notable species records found within a 2km search area around the site, and further information on statutory and non-statutory sites and priority habitats.

Ecology Field Survey: Extended Phase 1 Survey

11.3.25 An extended Phase 1 survey was carried out, including identification and mapping of the vegetation communities present within the study area. The study area boundary for this work included a 100m buffer outside the site boundary (where access/viewing was possible). This Extended Phase 1 survey was undertaken during site visits on 25 and 30 March 2021.

11.3.26 The survey also included a check on the current habitat suitability assessment for protected species, including bats, badgers, water voles, otters, reptiles, amphibians and breeding birds (to inform the need for any further surveys).

Desk Study Results

Statutory Designations: International and Nationally Important Sites

11.3.27 There are five statutory designated internationally/nationally important nature conservation sites in the search area around the proposed wind farm extension (5 km for nationally important SSSIs, 20 km for internationally important European Protected SPAs, SACs and Ramsar Sites). Their locations within 2km of the Project site are shown in Appendix U11-1 Figure 1. The first four of these are unchanged from the original ES assessment. The fifth (the Greater Wash SPA) was designated as an SPA in March 2018.

- **Humber Estuary SPA/SSSI** - overlaps the eastern edge of the AMEP site - an internationally important site designated for its wintering, passage and breeding waterbird populations, including shelduck, redshank, knot, dunlin, avocet, ruff, golden plover, bar-tailed godwit, black-tailed godwit, common tern, little tern, bittern, hen harrier, marsh harrier and its internationally important wintering waterbird assemblage.
- **North Killingholme Haven Pits SSSI** - part of the SPA/Ramsar but notified as an SSSI in its own right, of particular importance for its roosting waterbirds at high tide (especially black-tailed godwit) and its breeding waterbirds. (including avocet) It is also a Lincolnshire Wildlife Trust reserve.
- **Humber Estuary Ramsar site** - largely synonymous with the SPA, and the Project lies 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.
- **Humber Estuary SAC** – designated for the following Annex 1 habitats:
 - Estuaries – habitats include Atlantic salt meadows, a range of sand dune types, subtidal sandbanks, extensive intertidal mudflats, glasswort *Salicornia* beds and coastal lagoons.
 - Mudflats and sandflats not covered by seawater at low tide
 - The site additionally supports several Annex II species present as a qualifying feature, but not a primary reason for site selection - Sea lamprey, River lamprey and Grey seal.
- **Greater Wash SPA** - this marine SPA lies 18km from the project at its nearest point. Its qualifying features comprise two breeding bird species (Sandwich tern, common tern and little tern) and three non-breeding species (red-throated diver, little gull and common scoter). 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 would not be likely to be affected by the material change to the development, so it is not considered further in this chapter.

Other Sites/Priority Habitats

Local Wildlife Sites

11.3.28 Thirteen Local Wildlife Sites (LWS) are located within 2km of the Project site (their locations are shown in ES Figure 11.2 and Appendix U11-1 Figure 2). Ten of these were identified in the original ES, with an additional three (Mayflower Wood Meadow, Churchside Fields and Homestead Park Pond) included here (though none of those would be affected by the development or the material change):

- **Station Road Field** - within the AMEP site - a site that had been neutral grassland, maintained by heavy rotational grazing by horses. It also included wet ditch, hard standing colonised by plants typical of previously developed land and two ponds with GCNs and elm hedge. However, this site has now been lost pursuant to planning permission PA/2019/497 and mitigation put in place at Halton Marshes Wet grassland.
- **Chase Hill Wood Wildlife Site** - adjacent to the AMEP site. Designated for its botanical interests. Woodland in two distinct sections- the northern section is far older and more open with a large population of early-purple orchid (*Orchis mascula*).
- **Burkinshaw's Covert Wildlife Site** - adjacent to the AMEP site. Designated for its botanical assemblage. Large plantation of Lombardy poplar (*Populus nigra*) with an area of ash

(*Fraxinus excelsior*), silver birch (*Betula pendula*) and sycamore (*Acer pseudoplatanus*). This plantation supports an interesting flora including common spotted orchid (*Dactylorhiza fuchsii*), agrimony (*Agrimonia* sp.), wild angelica (*Angelica sylvestris*), lords-and-ladies (*Arum maculatum*), wood sedge (*Carex sylvatica*), enchanter's- nightshade (*Circaea lutetiana*) and others.

- **Rosper Road Pool** - 300m from the AMEP Site. Designated for its bird interests: Consisting of great ornithological interest in recent years. Ninety bird species have been recorded. Teal, which are abundant in winter often stay late into spring. Pintail and garganey are frequent visitors. The site is particularly good for wading birds, the greatest variety of which are seen in autumn when muddy margins suitable for feeding are exposed. Snipe, little stint, wood and green sandpiper, spotted redshank, greenshank have been recorded. Up to 70 ruff have been recorded in winter, and in some years a few remain to display in spring, along with migrant black-tailed godwits. Lapwing sometimes nest in the marshy grassland. Water vole are also present in adjacent ditches.
- **East Halton Disused Railway Wildlife Site** - 1 km from the AMEP site. A disused railway rich in plant species but subject to encroachment by scrub and in need of management to keep open the grassland element.
- **Halton Marsh Clay Pits** - 1.1 km from the AMEP site. Much used by anglers but contains some areas of scrub and reed beds, deeper water areas and some small pools. Plants are typical of marshy and waste ground, with breeding waterbirds present.
- **Houltons Covert Wildlife Site** - 1.2 km from the AMEP site. Designated for its ancient woodland and scrub flora.
- **Swinster Lane Field** - 1.3 km from the AMEP site - Lying to the north of Swinster Lane, this site contains several wet areas and two ponds. The damp areas are of most interest with a diversity of plant species.
- **Eastfield Road Railway Embankment** - 1.4 km from AMEP site - The grassland of this reserve represents a type of habitat with specialist plant species that is now scarce. Plants of interest include bee orchid (*Ophrys apifera*), yellow wort (*Blackstonia perfoliata*) and rest harrow (*Ononis repens*), and over 50 species have been recorded.
- **Scrub Lane East Fields** - 1.5 km from AMEP site - (also known as 'East Halton') - a field supporting ridge and furrow with several wet areas. The area is relatively herb-rich and is surrounded by old hedgerows with mature trees.
- **Mayflower Wood Meadow** - 1.6km SW from the AMEP site - a small ridge-and-furrow neutral grassland field with unimproved neutral grassland, and coarse grassland, and semi-natural woodland. An additional site not included in the original ES assessment but would be unaffected.
- **Churchside Fields** - 1.7 km from AMEP site - Part 1 is an old hay meadow supporting ridge and furrow and floods at times. Herb-rich, but over-grazed. Part 2 is a small field between two roads. The field is fairly herb-rich, whilst a muddy ditch in one corner supports some plants of local interest. An additional site not included in the original ES assessment but would be unaffected.

- **Homestead Park Pond** - 1.8km south from the AMEP site - scattered/dense scrub, semi-improved neutral grassland and standing water - a large angling pond surrounded by scrubby embankments. An additional site not included in the original ES assessment but would be unaffected.

Ancient Woodland

11.3.29 As in 2011, there are no sites on the Ancient Woodland Register within 2km of the AMEP site, so none would be affected by the proposed development.

Other Priority Habitats

11.3.30 The priority habitats within 2km of the AMEP site were provided by LERC and are shown in Table 11-12. It should be noted that these data were from prior to the commencement of the AMEP development, and that there has been loss of deciduous woodland and grazing marsh since then (see March 2021 Phase 1 habitat survey results below).

Table 11-12: Priority Habitats within 2km of the AMEP site.

Priority Habitat	Minimum distance to AMEP (km)	Area (ha.)
Coastal and floodplain grazing marsh	0	140.1
Coastal saltmarsh	0	4.5
Deciduous woodland	0	87.3
Good quality semi-improved grassland	0	10.2
Lowland calcareous grassland	1.48	1.7
Mudflats	0	175.3
Saline lagoons	0.01	17.2
Traditional orchard	0.05	0.4

11.3.31 Priority habitat within the site that is being lost to the AMEP development is being mitigated through the provision of enhanced habitats, and through specific mitigation for Great Crested Newt at Mitigation Area B. The principal ecological mitigation site, Mitigation Area A (refer to the draft application drawings), is currently subject to an un-determined application to the Secretary of State, to relocate it from within the Order Limits to Halton Marshes.

Phase 1 Survey Results

Extended Phase 1 Survey 2021

11.3.32 The Extended Phase 1 survey map is shown in Appendix U11-1 Figure 3. Each of the Phase 1 habitats that were recorded at the site during the site visit are described in Table 11-13.

Table 11-13: Phase 1 habitats recorded in the Able Marine Energy Park study area (site plus buffer).

Phase 1 code	Phase 1 Habitat	Area ES (ha.)	Area March 2021 (ha.)	Change in area (ha.)	Notes on changes
A1.1.1	Broad-leaved semi-natural woodland	21.0	19.7	-1.2	Loss due to removal of Old Copse during site construction.
A1.1.2	Broad-leaved plantation woodland	22.2	22.2	0.0	
A2.1	Scrub (dense)	8.2	8.2	0.0	
A2.2	Scrub (scattered)	7.8	7.8	0.0	
B2.1	Neutral grassland	26.8	98.0	+71.2	Some lost to development but also gain from arable where taken out of production in south of site
B2.2	Neutral grassland (semi-improved)	14.4	1.5	-12.9	
B4	Improved grassland	58.4	28.2	-30.2	Lost to development and also left to naturally restore to neutral grassland
B5	Marshy grassland	0	0.12	+0.12	Gain from arable where taken out of production in south of site on wetter ground
C3.1	Tall ruderal	9.0	0	-9.0	
F1	Swamp	3.7	3.7	0	Reed dominant with some reedmace. Most extensive around NKHP but also in many drains.
F2.1	Swamp (marginal)	2.7	2.7	0	
G1.2	Standing water	6.0	6.0	0	

Phase 1 code	Phase 1 Habitat	Area ES (ha.)	Area March 2021 (ha.)	Change in area (ha.)	Notes on changes
G1.6	Standing water (brackish)	14.7	14.7	0	Includes (NKHP) part of the Humber Estuary SPA (key SPA habitat: coastal lagoon).
G2.6	River Humber (sub-tidal)	209.3	209.3	0	Part of the Humber Estuary SPA (key SPA habitat: water column).
H1.1	Intertidal mud	65.0	39.8	-25.2	Part of the Humber Estuary SPA (key SPA habitat: intertidal sand and mudflats). Currently being lost to saltmarsh through accretion.
H2.4	Saltmarsh (scattered)	0	17.7	+17.7	Part of the Humber Estuary SPA (key SPA habitat: <i>Salicornia</i> and other annuals colonising mud and sand). Increasing onto mudflats.
H2.6	Saltmarsh (dense)	1.8	9.4	+7.6	Part of the Humber Estuary SPA (key SPA habitat: saltmarsh). Increasing onto mudflats.
J1.1	Arable	88.8	4.1	-84.6	Lost to development and taken out of production.
J1.2	Amenity grassland	33.2	31.2	-2.1	

Phase 1 code	Phase 1 Habitat	Area ES (ha.)	Area March 2021 (ha.)	Change in area (ha.)	Notes on changes
J3.6	Buildings	0.3	0.3	0	
J4	Bare ground	130.9	199.7	+68.8	Mainly sealed tarmac to north of the site and gravel to the south.

11.3.33 Table 11-13 also provides information on the extent of each Phase 1 habitat during the original ES surveys and during the March 2021 survey, and quantifies the changes that have occurred. The main changes have been:

- Losses associated with the implementation of the consented development albeit under separate planning permissions obtained from the Local Planning Authority (loss of woodland, semi-improved neutral grassland, arable and improved grassland);
- Changes on the intertidal associated with accretion of the shore and subsequent colonisation of open mudflat by saltmarsh vegetation (thought to be primarily influenced by the construction of the ABP Humber International Terminal in 2000 and its extension in 2005); and
- Conversion of arable and improved grassland to neutral grassland (and a smaller patch of wetter marshy grassland) in the southern part of the site where development land has been taken out of production and left to restore naturally (and has not yet been developed).

11.3.34 Additionally, approximately 4.8km of hedgerow have also been removed pursuant to enabling works planning consents granted by North Lincolnshire Council.

11.3.35 Though the drainage system across the AMEP site has been realigned, this has been designed to deliver a net gain of wetland habitat suitable for species such as water vole (with an increase of approximately 450 m of drains/ditches).

Protected Species Records and Current Habitat Suitability Assessment

11.3.36 Protected species reports for the AMEP site were originally undertaken in September 2010⁹ and May 2011¹⁰.

11.3.37 The impact of the development on protected species is recorded in Chapter 11 of the original ES (footnote 2), and in the Statement of Common Ground between the Applicant and Natural England, the Marine Management Organisation and the Environment Agency¹¹.

11.3.38 **Bats:** since the original application, there has been loss of potential bat habitat within the site as

⁹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000387-11.3%20-%20South%20Killingholme%20Protected%20Species.pdf>

¹⁰ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000393-11.8%20-%20AMEP%20Protected%20Species.pdf>

¹¹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001599-SOCG007%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20The%20Environment%20Agency,%20MMO%20and%20Natural%20England.pdf>

part of the implementation of the consented development. A copse has been removed and there has been loss of hedgerow and ditch bat foraging habitats across much of the AMEP site. As a result, the quality of bat habitat on the site has reduced since the ES. Bats would not be affected by the proposed material change to the development.

- 11.3.39 **Water Vole:** the central drainage feature within the site, the main area used by this species, has been realigned and re-engineered by Able in the same way as the drains in the northern part of the site had been in 2005 (which subsequently held higher numbers of water voles, as reported in the ES). A new realigned ditch system within the AMEP site has been created that links in with unaffected parts of the existing north-south watercourse. The net result has been a net increase of habitat created for water voles of approximately 450 m of drains/ditches. It would not be affected by the proposed material change to the development.
- 11.3.40 **Badger:** no evidence of badger activity was found within the AMEP site during the ES surveys, and none that would be affected by the development as a whole. A badger sett is located in proximity to the proposed footpath diversion, but this is near to the existing agreed diversion rather than the proposed new route for the diversion.
- 11.3.41 **Great Crested Newt:** there are no recent records from within site (LERC). The three GCN ponds within the AMEP site have now been lost, and six new ones created in mitigation area B. It would not be affected by the proposed material change to the development.
- 11.3.42 **Otter:** there are records of otter to the north of site but not within the site itself. It may use the re-engineered drainage system but would not be affected by the proposed material change to the development.
- 11.3.43 **Breeding birds:** the original ES baseline surveys reported a typical range of breeding birds across the site, including marsh harrier and avocet on the North Killingholme Haven Pits (both SPA qualifying species), two pairs of little ringed plover on the AMEP site (a species specially protected from disturbance during breeding under Schedule 1 of the 1981 Wildlife and Countryside Act) as well as 15 biodiversity priority species. Barn owl was also recorded in the area (another Schedule 1 species). The species present on the AMEP site were generally those associated with woodland edge habitat, hedgerows and farmland. The Rosper Road Pools held a regionally important breeding waterfowl community. There would be no effect of the proposed material change to the development on breeding birds as no changes to terrestrial development, other than a minor footpath diversion, are proposed. In the interim period since 2011, habitat suitable for breeding birds within the site has been reduced.
- 11.3.44 **Other protected species:** this is now an industrial site with little natural habitat within the potential impact zone of the Project, so there are unlikely to be any further protected species affected by the proposed material change, taking into account the current baseline.

Changes in Baseline

Bird Populations

- 11.3.45 No major changes in the site's bird populations are apparent, though there have been some recent increases in species using saltmarsh fringe on the Killingholme Marshes foreshore, including by teal, avocet and lapwing.
- 11.3.46 There have been some periods of lower use of North Killingholme Haven Pits by several species,

notable black-tailed godwit, associated with periods of higher water levels in the pits, though that site continues to be a very important high-water roost for this species.

11.3.47 Overall, the bird populations of importance at the site in 2021 are broadly similar to those documented in original ES baseline.

11.3.48 There are ongoing changes occurring across the Humber Estuary that affect the bird populations using the site. A recent BTO study (Woodward et al 2018) concluded the following:

- *“Populations of most wader species have shown short-term increases across the Humber Estuary as a whole, and in particular on the middle and outer parts of the southern shore of the Humber Estuary, reversing or partially reversing the declines in these areas noted in the previous reports.*
- *However, recent declines have occurred across almost all sectors on the northern shore, and in many sectors within the inner part of the southern shore.*
- *Population trends of other waterbird species were variable. There were mixed results amongst dabbling ducks but decreases for all three diving ducks for which trends could be produced, and increases for all geese species and for Little Egret.*
- *Continuing the pattern described by the previous Humber reports, many of these population changes found in this report were in line with regional trends. However, the Humber had decreased in importance in terms of the proportion of the region’s species held for Knot and Bar-tailed Godwit, and slightly for Shelduck and Curlew, indicating factors affecting Humber populations that are absent or less severe more widely in eastern England. In contrast, the proportion supported has recently increased for Oystercatcher, Ringed Plover (slightly) and Grey Plover, in all cases reversing or partially reversing previous decreases and suggesting that factors on the Humber which previously affected these three species on the Humber may have since improved.”*

Terrestrial Habitats

11.3.49 As described above, at Table 11-13, there have been changes to the terrestrial habitats present at the site since the original ES baseline surveys. These include losses associated with the implementation of the consented development (loss of woodland, semi-improved neutral grassland, arable and improved grassland); and conversion of arable and improved grassland to neutral grassland (and a smaller area of marshy grassland) in the southern part of the site where development land has been taken out of production and left to restore naturally (and has not yet been developed). There has also been a loss of approximately 4.8km of hedgerow removed for the development as permitted by the DCO or other planning permissions to enable the DCO.

Other Protected Terrestrial Species

Great Crested Newt

11.3.50 Great crested newts were removed from the development site under licence and translocated to Mitigation Area B (where six new ponds replaced the three that were lost). Monitoring of the mitigation has shown that the scheme has been successful to date, with an increasing population of great crested newt at the mitigation site and their favourable conservation status has been maintained (Strawson 2018). The proposed material change would have no impact on the

population of great crested newt at the mitigation site

Water Vole

- 11.3.51 The central drainage feature within the site has been realigned and re-engineered by Able in the same way as the drains in the northern part of the site had been in 2005 (which subsequently held higher numbers of water voles, as reported in the ES). A new realigned ditch system within the AMEP site has been created that links in with unaffected parts of the existing north-south watercourse. The net result has been a net increase of habitat created for water voles of approximately 450 m of drains/ditches. The proposed material change would have no impact on the population of water voles and would not impede the new realigned ditch system

Bats

- 11.3.52 There has been reduction in suitable bat habitat within the site as part of the implementation of the consented development. The Old Copse has been removed pursuant to planning permission PA/2014/0512 and there has been loss of hedgerow and ditch bat foraging habitats across much of the AMEP site. As a result, the quality of bat habitat on the site has reduced since the ES.

Badgers

- 11.3.53 No significant evidence of present or past badger activity has been found within the AMEP site during the ES or update surveys, and none that would be affected by the proposed material change.
- 11.3.54 A badger sett is located in proximity to the proposed footpath diversion, but this is near to the existing agreed diversion rather than the proposed new route for the diversion, so any effects would not change as a result of the alteration of the diversion as part of the proposed material change .

11.4.0 Assessment of Effects

11.4.1 The assessment of Terrestrial Ecology and Nature Conservation prepared for the DCO application in 2012 highlighted the following potential effects:

- Construction Phase:
 - direct loss of estuary habitat both intertidal and sub-tidal;
 - in-direct losses or gains of intertidal and subtidal habitat;
 - changes to sediment distribution in the estuary;
 - changes to hydrodynamics and the sediment regime of the estuary;
 - loss of habitat for feeding and roosting waterbirds;
 - loss or reduction in value of roosting and loafing opportunities for waterbirds;
 - loss of staging site for roosting wetland birds;
 - loss of habitat for nesting birds;
 - loss of habitat for great crested newts;
 - loss of habitat for water voles;
 - loss of neutral grassland and hedgerow of local value;
 - loss of bat foraging habitat;
 - noise and visual impacts during construction could cause disturbance or displacement to waders roosting/loafing within NKHP and using any remaining Killingholme Marshes intertidal mudflat for feeding; disturbance could be caused by visual and noise sources including:
 - people on site and undertaking the construction works;
 - plant movement including ships, vehicles and cranes;
 - lighting;
 - piling activity;
 - rainbowing of dredge material into new quay;
 - dredging; and
 - disturbance or displacement of breeding birds including Schedule 1 species.
- Operational Phase: once constructed the main impacts from the development will be likely to result from operational activity causing disturbance or displacement to species including

the prevention of access for foraging or roosting sites. Operational activities with the potential to give rise to noise and visual impacts will include

- movement of turbine structures;
- crane movement;
- boat movement to and from the new quay;
- train movements along railway line through NKHP;
- human activity;
- heavy plant noise from turbine assembly; and
- lighting across the site.

11.4.2 A number of these areas of potential impact have however already been screened out of this review as they are either not of relevance to the proposed material amendment or they could be reasonably be altered by the changes proposed. The proposed material change would not introduce any new terrestrial ecology impacts that were not assessed in the original ES.

Additional Construction Phase Effects

Change in Habitat Loss Through Quay Design Update

11.4.3 The proposed material changes to the quay construction would result in the changes to the habitat loss from the development set out in Table 11-14. More details of the habitat losses are given in Appendix U11-2. There would be a small reduction in the loss of sub-tidal and intertidal mudflat habitat, and a small increase in the loss of saltmarsh habitats (as a result of ongoing colonisation of the site by saltmarsh communities).

Table 11-14: 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	Mudflat/sandflat not covered by seawater at low tide	31.5	31.3	Within the reclamation site - supports a range of waterfowl.
	1310/1330	Salicornia and other mud and sand colonizing annuals/saltmarsh	0	1.9	New loss as has recently colonised this area.
Indirect functional loss through disturbance	1140	Mudflat/sandflat not covered by seawater at low tide	11.6	5.5	To the south of the reclamation site - potentially disturbed by operational activity on the quay following completion of construction (275m disturbance zone)
	1310/1330	Salicornia and other mud and sand colonizing	0	2.2	New loss as has recently colonised this area.

Loss	Habitat Type	Description	Area (ES)	Area (update)	Notes
		annuals			
	1310/1330	Saltmarsh	0	4.7	New loss as has recently colonised this area.
Compensation Area Changes	1310/1330	Salicornia and other mud and sand colonizing annuals	1.8	2.0	At Cherry Cobb Sands to form the channel across the foreshore from the existing flood defence to Cherry Cobb Sans Creek - this habitat would become mudflat offsetting the loss of Habitat type 1140.

11.4.4 Though the net effect of the change in habitat loss is that marginally less land would be reclaimed from the estuary (43.6ha cf. 45ha in the consented scheme), no changes are proposed to the compensation measures already agreed for the loss of intertidal and estuarine habitat.

11.4.5 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 (PEIR, Chapter 16: Noise). There would also be no change in any of the other potential sources of disturbance identified previously.

Effect of Change in Ornithological Baseline

11.4.6 Whilst there have been some minor changes in the bird populations recorded at the site and within the potential impact zone of the development, none of these were of a scale that would change any of the conclusions reached in the original ES assessment.

Effect of Change in Terrestrial Habitats Baseline

11.4.7 Whilst there have been some minor changes in the extent of the terrestrial habitats at the site and within the potential impact zone of the development, none of these were of a scale that would change any of the conclusions reached in the original ES assessment. There has been ongoing loss of grassland, woodland, ponds and hedgerow as consented development is implemented, and reversion of arable land and improved grassland to neutral/marshy grassland, but none of these changes would affect the outcome of the ecological impact assessment.

Effect of Change in Protected Species Baseline

11.4.8 The translocation and habitat creation works for great crested newts has been successfully completed, so this species is no longer present on site, so will not be affected by the proposed material change to the DCO.

11.4.9 The material change includes a minor diversion of a public footpath. There is a badger sett in proximity to the footpath diversion, and a potential for disturbance by walkers on the path. However, there is no change from the original ES as the section of footpath passing closest to that sett does not form part of the proposed material change.

Additional Operational Phase Effects

11.4.10 No additional operational effects have been identified in the PEIR that would lead to any change to

the conclusions reached previously in relation to Terrestrial Ecology and Nature Conservation.

Additional Cumulative Effects

- 11.4.11 No additional cumulative effects have been identified in the PEIR that would lead to any change to the conclusions reached previously in relation to Terrestrial Ecology and Nature Conservation.

Comparison of Original Terrestrial Ecological Impact Assessment with PEIR

- 11.4.12 Table 11-15 below provides a summary of the findings of this PEIR in comparison to the Terrestrial Ecology and Nature Conservation Chapter of the ES to the DCO.

Table 11-15: Comparison of Original ES to PEIR

Receptor	DCO	PEIR	Summary
Humber Estuary SPA/SAC/Ramsar site	Significant impacts from habitat loss and disturbance on birds and estuarine habitats. Compensation scheme agreed (Cherry Cobb Sands).	Small reduction in habitat loss from development Change in baseline habitat affected - increase saltmarsh, reduced intertidal mudflat. Change in baseline for some bird species, including increased teal, avocet and lapwing.	Minor reduction in magnitude of habitat loss but compensation scheme maintained at agreed level for DCO. No significant effect of material change.
Terrestrial habitats (including inland feeding fields for SPA species such as curlew)	Significant habitat loss mitigated by provision of alternative/enhanced habitat in Mitigation Area A	Habitat loss associated with the implementation of the consented development (loss of woodland, hedgerow, semi-improved neutral grassland, arable and improved grassland) has reduced overall habitat quality on site. Reversion of arable and improved grassland to neutral/marshy grassland in Mitigation Area A.	Unaffected by material change
Great Crested Newt	Significant loss of breeding ponds, mitigated by translocation to Mitigation Area B	Mitigation has been successfully implemented (Strawson 2018)	Unaffected by material change
Water Vole	Potential for significant effect on habitat avoided through mitigation	Mitigation is being successfully implemented (ongoing through construction)	Unaffected by material change
Badger	No significant impact predicted	Sett in proximity to footpath diversion but no change from DCO	No effect of material change
Bats	Some loss of habitat (Old	Habitat suitability on site	Unaffected by material

Receptor	DCO	PEIR	Summary
	Copse and hedgerow) but mitigated by provision of alternative/enhanced habitat in Mitigation Area A	now much reduced, but mitigation provided to offset losses.	change
Breeding birds	Risk of disturbance and nest destruction during construction requiring mitigation.	Habitat suitability on site now much reduced, but mitigation provided to offset losses. Ongoing mitigation in place to avoid impacts on breeding birds during construction	Unaffected by material change

11.5.0 Requirement for Additional Mitigation

11.5.1 This section of the PEIR Chapter provides details of the monitoring and mitigation to be brought forward under the original ES to the DCO and also identifies whether any alternate or additional mitigation is required as a result of the proposed material amendment.

DCO Mitigation and Compensation

11.5.2 The mitigation and compensation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:

- provisions for mitigatory and compensatory habitat, including habitats (with associated functional attributes) to be created at the Cherry Cobb Sands compensation site in order to address losses in the intertidal and subtidal habitat and function in and around the AMEP quay.
- 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 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.

11.5.3 Further detail on the agreed mitigation measures pertaining to the development are provided in the original Terrestrial Ecology and Nature Conservation Chapter of the original ES and the original DCO (Technical Appendix U1-1). Measures will be secured through the approval of various plans and method statements as specified in Schedule 8 and 11 of the extant DCO.

Alternate or Additional Mitigation

11.5.4 A proposal for a non-material change to the DCO has been submitted to move Mitigation Area A to an alternative location at Halton Marshes, which is currently being considered by the Secretary of State.

11.5.5 No additional mitigation is required for impacts to the Terrestrial Ecology as there are no changes in the effects on the ecological components to those identified in the original ES.

11.5.6 Following this review, it is concluded that no further mitigation is required, over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Terrestrial Ecology and Nature Conservation relating to the proposed scheme.

11.6.0 Residual Effects

- 11.6.1 Given that effects on the Terrestrial Ecology components have not changed compared to the original ES, and no additional mitigation is required, the residual effects on the Terrestrial Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO (section 11.8).
- 11.6.2 The residual effects of the AMEP development were set out in the original ES section 11.8. That assessment found there would be a direct and indirect loss of the Humber Estuary European Marine Site designated as an SAC, Ramsar Site and SSSI, agreed to represent a direct loss of 31.5ha of intertidal mudflat, an additional loss of 11.6ha of functional mudflat habitat, a direct loss of 13.5ha of estuarine habitat (all from Killingholme Marshes foreshore) and a permanent loss of 2ha of saltmarsh (which would become mudflat) from Cherry Cobb Sands due to the breach of the sea wall for the compensation site, (SoCG between the Applicant and MMO/NE¹², Table 3.2 and paragraphs 3.5.1 -3.5.2). It was noted that these losses cannot be mitigated and therefore residual impacts to the Killingholme Marshes intertidal and sub-tidal habitats will be significant and likely to affect the integrity of the site. As a consequence, it was concluded that compensation would be required to offset this impact. A compensation scheme was developed and consented by the Secretary of State.
- 11.6.3 As a result of the proposed material changes (and habitat changes that have occurred since the consent was issued, specifically colonisation of intertidal mudflat by saltmarsh), that loss of habitat would reduce from 58.6 to 58.0 ha. The agreed compensation scheme would, however, be unchanged; compensation ratios for the habitat that will be lost are reviewed in Technical Appendix U11-2.
- 11.6.4 Residual effects on wetland birds during construction, will include (1) the direct loss of feeding, staging and loafing habitat at Killingholme Marshes Foreshore intertidal mudflat and feeding/roosting resource of wetland birds on the Killingholme Fields; and (2) disturbance and displacement of wetland birds utilising the remaining Killingholme Marshes Foreshore intertidal mudflat and the Killingholme Fields. Indirect impacts associated with the loss of the Killingholme Marshes Foreshore intertidal mudflat may also have the potential to affect the usage of NKHP as a roost site. A significant residual impact was predicted in the original ES and that remains the case for the proposed material change. However, compensation habitat provided on the northern bank is expected to provide suitable foraging and roost sites for these species. Further information is provided in the Habitats Regulations Assessment.
- 11.6.5 There will be a loss of 100.3 ha of terrestrial semi-natural habitat within the AMEP site. This will include loss of the Station Road Fields LWS is of local value for the AMEP site. However, with the mitigation measures being implemented, there will be no significant residual impacts associated with terrestrial habitat loss.
- 11.6.6 The existing mitigation plans for great crested newt and water voles will reduce impacts on these protected species to a negligible level (and water vole mitigation may in fact enhance habitat in the long term), so there will be no significant residual effects on these species.

¹²<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>

11.6.7 Overall, there are no changes to the residual effects identified within the Chapter 11 of the original ES.

11.7.0 Other Environmental Issues

- 11.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 11.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 11.7.3 The risks associated with Infrastructure are not of relevance to this Chapter.

Waste

- 11.7.4 Aside from the disposal of dredge materials, which is already considered, the risks associated with Waste are not of relevance to this Chapter.

Population and Human Health

- 11.7.5 The risks associated with population and human health are not of relevance to this Chapter.

Climate and Carbon Balance

- 11.7.6 The risks associated with climate and carbon balance are not of relevance to this Chapter.

Risks of Major Accidents and/or Disasters

- 11.7.7 The risk associated with major accidents and / or disasters is not of relevance to this Chapter.

Summary

- 11.7.8 With regards to the EIA regulations 2017, in terms of Terrestrial Ecology and Nature Conservation, there are not considered to be any likely significant effects with regards to Other Environmental Issues.

11.8.0 Summary of Effects

- 11.8.1 Given that effects on the Terrestrial Ecology components have not changed compared to the original ES, and no additional mitigation is required, the residual effects on the Terrestrial Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO (section 11.8).
- 11.8.2 There would be a direct and indirect loss of the Humber Estuary European Marine Site designated as an SAC, Ramsar Site and SSSI. These losses cannot be mitigated and therefore residual impacts to the Killingholme Marshes intertidal and sub-tidal habitats will be significant and likely to affect the integrity of the site. As a consequence, it was concluded in the original ES that compensation would be required to offset this impact. A compensation scheme was developed and consented by the Secretary of State.
- 11.8.3 As a result of the proposed material changes (and habitat changes that have occurred since the consent was issued, specifically colonisation of intertidal mudflat by saltmarsh), that loss of habitat would reduce from 58.6 to 58.0 ha. The agreed compensation scheme would, however, be unchanged; compensation ratios for the habitat that will be lost are reviewed in Technical Appendix U11-2.
- 11.8.4 The AMEP development will result in a loss of 100.3 ha of terrestrial semi-natural habitat, including Station Road Fields LWS (which has already been cleared for development). Mitigation measures are being implemented to ensure that there will be no significant residual impacts associated with terrestrial habitat loss.
- 11.8.5 Additional mitigation plans for great crested newt and water voles will reduce impacts on these protected species to a negligible level (and water vole mitigation may in fact enhance habitat in the long term), so there will be no significant residual effects on these species.

11.9.0 Conclusions

- 11.9.1 Where appropriate, new baseline conditions have been characterised and assessed against those described in the original ES. No significant changes have been identified outwith those described in the original ES and considered in the Examining Authorities Report (2013).
- 11.9.2 Based on the above assessment of potential changes to the terrestrial ecology and nature conservation of the area against conditions identified in the original ES baseline, and from the assessment of the material amendment, no significant effects have been identified other than those assessed in the original ES from the DCO.
- 11.9.3 Mitigation measures provided in the original ES and secured in the DCO (principally by the requirement to obtain approvals for a series of Environmental Management and Monitoring Plans) are considered to remain valid.
- 11.9.4 Overall, there are no changes to the residual effects identified within the original ES and the approved compensatory habitat will remain suitable to offset effects that cannot be mitigated.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 12: COMMERCIAL AND RECREATIONAL FISHERIES

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

12.1.0 INTRODUCTION	12-1
Development Consent Order Context.....	12-1
Relevant Findings of the 2012 Examination.....	12-1
Consideration of Material Amendment	12-2
Purpose and Structure of Chapter	12-2
12.2.0 METHODOLOGY	12-3
Changes in Legislation, Guidance and Planning Policy.....	12-3
Scoping Opinion	12-5
Additional Consultation.....	12-7
Assessment Methodology	12-7
12.3.0 CHANGES IN BASELINE CONDITIONS	12-9
DCO Baseline	12-9
DCO Future Baseline.....	12-11
Current Baseline for the Area around the AMEP Development	12-11
Changes in Baseline.....	12-18
12.4.0 ASSESSMENT OF EFFECTS	12-19
Additional Construction Phase Effects (from the Material Amendment).....	12-19
Impacts to Commercial and Recreational Fisheries.....	12-21
Additional Operational Phase Effects.....	12-23
Additional Cumulative Effects	12-23
Consideration of DCO	12-24
12.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	12-25
DCO Mitigation.....	12-25
Alternate or Additional Mitigation	12-25
12.6.0 RESIDUAL EFFECTS	12-26
Consideration of DCO	12-26
12.7.0 OTHER ENVIRONMENTAL ISSUES	12-27
Other Environmental Issues of Relevance	12-27
Summary	12-27

12.8.0	SUMMARY OF EFFECTS	12-28
12.9.0	CONCLUSIONS	12-29

DOCUMENT REFERENCES

TABLES

Table 12-1: Scoping Opinion	12-6
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FIGURES

Figure 12-1: Relative Importance and Value of the main Humber Fisheries Compared against Neighbouring Reporting Areas (Environment Agency, 2013)	12-17
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12.1.0 Introduction

Development Consent Order Context

12.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

The associated development that was consented through the DCO includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

12.1.2 An assessment of the impacts of the development on commercial fishing was included in Chapter 12 of the Environmental Statement (ES) that supported the DCO application in 2012 (the original ES).¹

- ES Chapter:
 - Able Marine Energy Park Environmental Statement. Chapter 12, Commercial Fisheries. 2012

Relevant Findings of the 2012 Examination

12.1.3 Commercial fisheries were not a significant issue in the original ES application with Paragraph 12.3.12 of the original ES noting that:

'Overall, current fishing effort is much diminished from historical levels or has shifted to more profitable fisheries in the North Sea. The number of vessels conducting commercial fishing is small and the few vessels still fishing commercially take up alternative fisheries in different areas and seasons to maximize catch rates and profits. Therefore, the potential for direct impacts of the reclamation on commercial fisheries as a whole is considered to be relatively low', (paragraph 12.3.12).

12.1.4 The Panels' findings and recommendations to the Secretary of State following the public hearings held in 2012 contained no mention of commercial fisheries. However, aspects of Commercial Fisheries were identified to be addressed in the Planning Inspectorate's Scoping Opinion (Appendix

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000317-12%20-%20Commercial%20Fisheries.pdf>

U5-2) in relation to the proposed material amendment² as considered within this PEIR.

Consideration of Material Amendment

12.1.5 The proposed material amendment as considered within this PEIR is described in Chapter 4: Description of Changes to Development. On this basis, the following consequential issues will need to be addressed in the context of their potential impacts on commercial fishing and where appropriate, mitigation measures reviewed and revised.

12.1.6 Change in quay layout leading to:

- alteration to the fish and shellfish assemblage;
- alteration to potential commercial resource exploitation;
- restriction to access of fish and shellfish resources for commercial and recreational fisheries.

12.1.7 Changes to dredge disposal leading to:

- alteration to the fish and shellfish assemblage;
- alteration to potential commercial resource exploitation.

Purpose and Structure of Chapter

12.1.8 A considerable volume of reports was produced for the original Application. A signposting document detailing the Applicant's Environment Information produced for the original application is available³.

12.1.9 This Chapter of the PEIR reports on any change in the findings of the original ES in respect of commercial fisheries pursuant either to the material amendment or consequential to any natural changes since the original EIA. Aspects addressed include:

- Commercial and Recreational Fishing Activity;
- Fish Community in the Vicinity of the AMEP Development; and
- Based on the updated characterisation of the above baseline conditions, any changes to expected potential impacts arising from the material amendment compared to the original assessment, the effectiveness of existing mitigation measures and any different residual impacts if and when they occur.

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030006/TR030006-000036-TR030006%20E2%80%93%20Scoping%20Opinion.pdf>

³ [Signposting Document for the Applicant's Environmental Information \(TR030001-001645-120924\)](#)

12.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

- 12.2.1 Although some aspects of UK legislation have altered with the UK's withdrawal from the EU, the majority of agencies and cover remain as identified in the original ES.
- 12.2.2 Much of the various nature conservation designations within the Humber Estuary and the relevant environmental legislation are covered in earlier chapters and will not be repeated here. As described in the original ES, fisheries regulation is enacted in the form of national law and Byelaws and their enforcement in the Humber Estuary comes into the remit of The Marine Management Organisation (MMO), North Eastern Inshore Fisheries and Conservation Authority (NEIFCA) covering the Holderness coast and Humber Estuary, the Eastern Inshore Fisheries and Conservation Authority (EIFCA) covering the Lincolnshire coast and the Environment Agency.

Overview of Relevant Legislation

- 12.2.3 UK marine fisheries are regulated by (not exclusively) The Sea Fish (Conservation) Act 1967, amended by SI2019/746 Fisheries Act 2020 Schedule 4; The Sea Fisheries (Shellfish) Act 1967; The Sea Fisheries Act 1968, amended by the Fisheries Act 2020 Schedule 4; The Marine and Coastal Access Act 2009 Amended by: SI 2019/746, Fisheries Act 2020 Schedule 10, Fisheries Act 2020 Schedule 4; Fisheries Act 2020, with the EC Shellfish Waters Directive (2006/113/EC).also of relevance, being designed to protect the integrity of shellfish fisheries by means of designating waters for quality protection.
- 12.2.4 There is also relevant legislation concerning the salmon and freshwater fisheries and local byelaws administered by the Environment Agency (e.g. the Yorkshire byelaw area) e.g. for rod and line fishing for salmon, trout, coarse fish, eels, smelt and lamprey and which includes a close season for salmon (1st November to 5th April), sea trout (1st November to 2nd April) and all non-migratory trout in rivers, streams, drains and canals, and for brown trout in all waters other than enclosed stillwaters from 1st October to 24th March. This is not a definitive list of all relevant byelaws, but an indication of requirements particularly in tributaries.
- 12.2.5 The UK Marine Policy Statement (HM Govt. 2011) identifies port development as a national need, but also highlights that such development can have both benefits and disbenefits to fishing activities.

UK Fisheries Act

- 12.2.6 The UK Fisheries Act replaces provisions under EU law and will provide the legislative framework for future fisheries management in the UK. The Fisheries Act, 2020 has eight objectives:
- Sustainability
 - Precautionary
 - Ecosystem
 - Scientific Evidence

- Bycatch
- Equal Access
- National Benefit
- Climate Change

12.2.7 The UK's national fisheries policy authorities are tasked with meeting these objectives through a Joint Fisheries Statement (JFS) and will cover aspects of policy including quota allocation, fisheries management plans and actions to maintain or restore stock to a level capable of producing a sustainable yield. The JFS has not yet been published.

12.2.8 The Act requires any British fishing vessel to be licensed apart from in a few specific circumstances and foreign fishing vessels can only enter UK waters if fishing with a relevant licence or under a recognised international agreement.

12.2.9 Quota is broken down into quantity of fish caught by British vessels and maximum days at sea for British vessels.

12.2.10 There are also a number of measures specific to England including the potential for a charging scheme for unauthorised catches and financial assistance provided for initiatives to promote environmental conservation, restoration and development of fisheries activities.

Shellfish Waters Directive

12.2.11 The Shellfish Waters Directive which aimed to protect shellfish growth and contribute to a high quality product for human consumption was repealed in 2013 and led by the Water Framework Directive.

Water Framework Directive

12.2.12 The Water Framework Directive is designed to protect the ecological health of the water body, and as a result, the shellfish growing within it. Technical advice from the UK technical advisory group for the implementation of the Water Framework Directive, and the European Commission, indicate that the physical and chemical parameters set down within the WFD for protecting water quality are equivalent or better than the requirements which were set in the Shellfish Waters Directive. These measures are currently enacted by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

Other Measures

12.2.13 In addition to the Fisheries Act, 2020, a number of conservation designations relate to the Humber estuary, these centred around the Conservation of Habitats and Species Regulations 2017 (as amended) in 2019 to make them operable from 1 January 2021.

12.2.14 The changes cover England and Wales including their inshore waters up to 12 nautical miles and details are not provided here, but have relevance in protecting habitats and species within the Humber Estuary Special Area of Conservation (SAC), including some fishes of commercial and recreational importance.

12.2.15 The Eels Regulations, 2009 give powers to the regulators e.g. the Environment Agency and Natural Resources Wales, to implement recovery measures in all freshwater and estuarine waters in England and Wales, to achieve 40 per cent escapement of adult eels relative to escapement levels under pristine conditions.

12.2.16 The regulations include measures to reduce fishing pressures, improve access and habitat quality and reduce the impact of entrainment; provide for screening at water intakes and outfalls; and ease passage at obstructions to migration.

Guidance

12.2.17 The JFS will inform the fisheries policy authorities how to make use of fisheries management plans (FMPs) in achieving the fisheries objectives and will include a series of measures and guidance.

Policy

12.2.18 The UK Marine Policy Statement is the framework for preparing Marine Plans and taking decisions affecting the marine environment. It will contribute to the achievement of sustainable development in the United Kingdom marine area. It has been prepared and adopted for the purposes of Section 44 of the Marine and Coastal Access Act 2009. The aim of the MPS has been to:

- Promote sustainable economic development;
- Enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects;
- Ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets; and
- Contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.

12.2.19 The Guidance to the UK Marine Policy Statement from 1 January 2020 document⁴ explains how references to EU law in the UK MPS should be interpreted from 1 January 2021 following the UK's withdrawal from the EU.

Scoping Opinion

12.2.20 A Scoping Report was submitted by the Applicant (Fairhurst, 2021)⁵, which addressed the material amendment and associated potential impacts including components requiring additional characterisation and assessment. In response, the Scoping Opinion identified, in addition to the initial Scoped-in components as described in Fairhurst (2021), the following additional matters in relation to commercial fisheries (Table 12-1).

⁴<https://www.gov.uk/government/publications/uk-marine-policy-statement/guidance-to-the-uk-marine-policy-statement-from-1-january-2021>

⁵<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030006/TR030006-000009-TR030006%20-%20Scoping%20Report.pdf>

Table 12-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 49, Table 7	The ES reported impacts on commercial fisheries to be of minor to negligible significance (ES Table 12.2), primarily due to low fishing effort in the area. This situation has not changed since the original ES was published. The amendments to the proposed design will not give rise to any new or different impacts on commercial fisheries. Any potential effects relating to indirect impacts on nursery habitat and fish stocks, and changes in the hydrodynamic regime, are discussed and scoped out in relation to any potential aquatic ecology impacts arising from the proposed amendments relative to Chapter 10 (Aquatic Ecology). This topic is therefore scoped out from the updated ES.	The Inspectorate noted that the original assessment of impact to commercial fisheries was produced a substantial time ago in 2010. The updated ES should include updated baseline information to demonstrate that there has been no material change in the importance of the location for commercial fisheries and if there has, the updated ES should assess any new of different significant effects.	Addressed in Commercial Fisheries Baseline and Impact Assessment Section of the PEIR (Chapter 12). The fish baseline has not changed and fishing effort has not changed.	Chapter 12
Page 49, Table 7	The ES reported impacts on commercial fisheries to be of minor to negligible significance (ES Table 12.2), primarily due to low fishing effort in the area. This situation has not changed since the original ES was published. The amendments to the proposed design will not give rise to any new or different impacts on commercial fisheries. Any potential effects relating to indirect impacts on nursery habitat and fish stocks, and changes in the hydrodynamic regime, are discussed and scoped out in	The Inspectorate notes that habitat changes, and disturbance to fish and fish eggs/larvae from habitat loss and disturbance is to be scoped into the updated ES, and that there may be associated indirect impacts on habitats from capital dredging. It is considered that as there would be a change in the quantum of habitat	Addressed in Commercial Fisheries Baseline and Impact Assessment Section of this PEIR (Chapter 12).	Chapter 12

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
	relation to any potential aquatic ecology impacts arising from the proposed amendments relative to Chapter 10 (Aquatic Ecology). This topic is therefore scoped out from the updated ES.	directly lost to the works, that the effects of habitat loss or modification, and potential alterations to the hydrodynamic regime on commercial fisheries should be assessed in the updated ES.		

Additional Consultation

- 12.2.21 Consultation has been undertaken with relevant bodies only where pertinent to the proposed material changes, including the Environment Agency.

Assessment Methodology

- 12.2.22 For the most part, the revised baseline description, impact assessment coverage and approach follows that undertaken in the original ES. However, when assessing the proposed material changes, then additional information has been collected, collated and assessed using the standard methodology outlined below.

Study Area

- 12.2.23 In accordance with the Scoping Report, the study area has been defined to characterise and address both the directly affected / influenced areas around the proposed development footprint, and dredge disposal sites, together with a wider area of the Humber estuary where commercial and recreational fishing activities could be potentially affected indirectly by the proposed material amendment.

Sensitivity Criteria

- 12.2.24 Sensitivity criteria for the receptors assessed within this Chapter remain the same as in the original ES (Chapter 12, paragraph 12.3.9 et seq)⁶ based around direct effects on the target fish stocks and indirect effects mediated by ecological processes originating from impacts to non-target life stages, food resources, food webs and habitats.

Magnitude of Change (Impact)

- 12.2.25 Impact severity is assessed by considering both the magnitude of the impacts and the duration (original ES Chapter 12, paragraph 12.3.11). This approach is the same as that adopted in the

⁶ [Able Marine Energy Park Environmental Statement. Chapter 12, Commercial Fisheries.](#)

original ES.

Significance of Effect

- 12.2.26 Potential impacts are evaluated according to the likelihood of occurrence as a direct consequence of the development with the approach provided in paragraph 12.3.11 et seq of the original ES Chapter 12.

12.3.0 Changes in Baseline Conditions

DCO Baseline

- 12.3.1 This Section describes the status of current commercial fisheries and recreational angling in the Humber, and in particular, in the environs of the proposed AMEP development. It updates the baseline information provided in the original ES and addresses the potential impacts of the material changes of the proposed development in the light of any alterations in baseline conditions and construction techniques and extent.
- 12.3.2 As this Chapter addresses commercial fishing and recreational angling, it does not address all aspects of the fish communities in the Humber, but rather focuses on components of importance for commercial and recreational use. However further information on the wider fish assemblage ecology of the estuary is described and assessed in Chapter 10 (Aquatic Ecology) of this PEIR.
- 12.3.3 This Section is not intended to reproduce all components of the Commercial Fisheries Chapter from the original ES, but rather to provide a brief summary of key aspects of the topic, and where applicable update these in line with any substantive changes that have occurred since the original ES documents were produced. In the event of any difference between the present day and the time of the original assessment then mitigation measures and residual impacts will be reviewed.

Overview of the Humber Estuary fish fauna

- 12.3.4 The Humber Estuary is a dynamic macrotidal estuarine system, featuring a range of intertidal and subtidal habitats that support a highly productive ecosystem, including saltmarsh, intertidal and subtidal benthic invertebrate communities, and higher taxonomic guilds including fishes, birds and marine mammals. These components are addressed more fully in Chapters 10 (aquatic Ecology) and 11 (Terrestrial Ecology and Nature Conservation) of this PEIR, but significantly, the importance of the estuary is recognised by a number of wildlife protection designations. The estuary is, inter alia, designated as a Special Protection Area (SPA) for its waterbird community, and as a Special Area of Conservation (SAC) for habitats, and a number of species (fish and marine mammals).
- 12.3.5 The estuarine habitat in the Humber is an important habitat for fish, with the fish assemblage is made up of estuarine, freshwater, marine and migratory species, some of these are included as features or sub-features under the Special Area of Conservation (SAC) designation. However, the Humber Estuary also supports components of fish communities that have both direct and indirect importance and value for commercial and recreational exploitation.
- 12.3.6 The Humber Estuary supports a fish assemblage characteristic of a southern North Sea macro-tidal estuary. With over 80 species of fish being recorded the fish fauna in the estuary is particularly diverse compared to other similar larger sized estuaries⁷. The fish assemblage comprises resident, nursery, seasonal and juvenile migratory species, typical of any estuarine fish community.
- 12.3.7 Fish communities in the middle and lower reaches of the Humber Estuary are dominated by small bodied demersal gobiid species of the genus *Pomatoschistus* and juvenile stages of larger species that use the estuary as a nursery ground (especially shallow areas and the intertidal zone). This component is often the most common with typically 80 percent or more of the total abundance. Typical examples are flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*), sole (*Solea solea*),

⁷ Waugh et al. 2019

whiting (*Merlangius merlangus*), sprat (*Sprattus sprattus*), seabass (*Dicentrarchus labrax*), cod (*Gadus morhua*), herring (*Clupea harengus*), lesser weaver fish (*Echiichthys vipera*), and saithe/coley (*Pollachius virens*).

- 12.3.8 In addition to this large group of mostly demersal or benthic juveniles, the Humber Estuary features several estuarine residents, and diadromous fish species which use the estuary as passage to or from freshwater areas. Several marine species appear occasionally in scientific research catches, most of them following a marked seasonality with higher probability of capture in the summer and early autumn.
- 12.3.9 Migratory fish species of importance within the Humber Estuary include the Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*), twaite shad (*Alosa fallax*), eel (*Anguilla anguilla*) and smelt (*Osmerus eperlanus*). Both the eel and the smelt are listed as a BAP priority species and the sea and river lamprey form part of the Humber Estuary SAC and SSSI designations.
- 12.3.10 The most abundant marine migrant species (a marine species that enters estuaries to spawn and undergo early life stages) in the Humber Estuary is the flounder, which is found all year round throughout the estuary, but with higher abundance in late spring and summer, and in the intertidal and shallow subtidal areas of the estuary. These are mostly juvenile/young flounders using the estuarine intertidal habitats as nursery grounds, with higher frequency and abundance in the upper and middle reaches of the estuary, in line with the preference of juveniles for lower salinities.
- 12.3.11 Other marine migrant flatfish species frequent in the estuary are sole and plaice, these making up the main flatfish fishery in the Humber basin, with a similar commercial value to that of finfish. Juvenile sole migrate into the Humber Estuary during the late spring and summer, with their settlement on intertidal and shallow subtidal habitats of the middle and outer estuary during the autumn, with higher frequency and abundance in the lower estuary, and higher numbers on the wider mudflats of the North Bank.
- 12.3.12 Plaice also use the Humber Estuary as nursery grounds, occurring for most of the year with moderate frequency, mainly in the middle and outer estuary, with relatively higher numbers on the intertidal and shallow subtidal habitats of the outer estuary. Another flatfish that shows a similar distribution in the intertidal and shallow subtidal habitats of the outer estuary is dab (*Limanda limanda*), albeit with much lower frequency and abundance than flounder etc.
- 12.3.13 Gadoids (whitefish) such as whiting and cod are also marine migrants which use the Humber Estuary, together with the less common pouting (*Trisopterus luscus*) and pollack (*Pollachius pollachius*). Both whiting and cod are important commercial fish species which are found in the Humber Estuary mostly as juvenile/young individuals, attesting their use of the estuary as a nursery. However, adult cod move into the estuary in the autumn and over winter, with a substantial recreational angling focus around this species at this time as well as for whiting, along the outer estuary banks of the estuary.
- 12.3.14 Whiting is the most abundant whitefish in the Humber Estuary, where it occurs most of the year round, but with higher abundance in the autumn, in the middle and especially the lower estuary. In the latter, the species is most frequent and abundant in deeper habitats, but with also notable abundances recorded in intertidal and shallow subtidal habitats particularly along the North Bank.

Overview of commercial and recreational target species & fishing activity

- 12.3.15 Potentially exploited commercial species, and/or those with recreational angling importance, which are regularly recorded in the Humber include whiting, sprat, common (or Dover) sole and flounder. Less commonly recorded or with a seasonal, spatial or legal restriction include cod, saithe/coley, pollack, dab, plaice and eel.
- 12.3.16 In addition, the coastal components of the Humber Estuary and adjacent coastlines to the north and south support important crustacean fisheries including brown shrimp (*Crangon crangon*); lobster (*Homarus gammarus*); and brown crab (*Cancer pagurus*) as well as other species for developing markets in and now outside Europe e.g. Velvet Swimming Crab (*Necora puber*), and to a lesser extent bivalve molluscs e.g. cockle (*Cerastoderma edule*) and mussel (*Mytilus* spp.).
- 12.3.17 The commercial exploitation of marine resources for recreational angling bait also occurs on the Humber Estuary towards the mouth, as well as its open coast e.g. collection of Lug Worm (*Arenicola marina*), Cat Worm (*Nephtys* spp.) and peeler crabs (*Carcinus* sp.).
- 12.3.18 Commercial fishing methods employed in the Humber Estuary and its adjacent coastlines include long-lining, trawling, netting and potting. Whilst a decline in most fishing activity has occurred in the last couple of decades, there has been an increase in shell-fishing, although post-Brexit, market situations and controls may alter.

DCO Future Baseline

- 12.3.19 No specific alterations to the Commercial Fisheries baseline components were anticipated in the Original ES Chapter from the DCO (Commercial Fisheries).

Current Baseline for the Area around the AMEP Development

- 12.3.20 Since the DCO application, additional evidence regarding fish fauna in the Humber Estuary in general, and for the proposed AMEP site, has become available. The baseline for fish fauna has been updated in detail in the Aquatic Ecology Chapter of this document, but is also summarised below as this has relevance for commercial and recreational fisheries exploitation.

Overview of fish fauna

- 12.3.21 A review of the fish population data in 2013 has updated the information on fish populations and communities dependent on the Humber Estuary and the fisheries in the Humber river basins (EA, 2013). The review collated, harmonised and analysed fish data and information available for the period 2000-2012 from a range of sources for the Humber Estuary.
- 12.3.22 The updated review confirmed the overall existing knowledge of the fish fauna in the Humber Estuary, while also providing additional understanding of the distribution of the different fish species in the system and its catchment.
- 12.3.23 The review considered the spatial distribution of fish species across different areas of the estuary, including the intertidal/shallow subtidal areas along the south bank of the lower estuary as well as the deeper subtidal areas of the lower estuary where the dredge disposal sites (HU080 and HU082) are situated.
- 12.3.24 Table 12--2 lists the species of fish recorded from the Humber Estuary (Environment Agency, 2013).

Fish Fauna at the AMEP Site (Research Survey Results)

12.3.25 Additional fish surveys have been undertaken to characterise the fish fauna at the AMEP site and intertidal and subtidal areas nearby (PMSL, 2014a & 2014b) (Technical Appendices U10-6 & U10-7). These surveys recorded the following fish communities from the use of various gears.

Beam Trawl

12.3.26 The fish abundance was dominated by flatfish such as the sole and flounder. Most of the individuals of both species were year class 0+ and 1+, which highlights the role of the area (typical mudflat) as a flatfish nursery. Flatfish species are a commercially targeted group in the outer estuary and adjacent coasts.

12.3.27 In autumn, gadoids such as cod and whiting also occurred frequently in the beam trawl catches, albeit with few individuals. The former species was mainly found at the AMEP site and adjacent mudflat, while the latter was only recorded at the control sites. These species are commercially targeted when in the marine environment, and are the target of recreational angling on both banks of the outer estuary during the autumn and winter.

12.3.28 Invertebrates, mainly crustaceans, were also abundant in the intertidal beam trawl catches. These were mainly represented by the brown shrimp, a common species in the mudflats of the Humber Estuary and potentially a commercially targeted species in the outer estuary and adjacent coastlines.

12.3.29 The surveys also recorded abundant mysid shrimps such as *Neomysis integer*, together with juvenile brown shrimp, which are prey for juvenile flatfishes in the estuary and thus supporting the nursery function of these estuarine habitats for flatfish.

12.3.30 No migratory fish were recorded from the beam trawl catches from the AMEP area, the only specimen (one eel) having been found on the mudflat at the control site further upstream.

Seine Netting

12.3.31 The capture of commercially important fish in the seine nets was generally sparse but with herring found in highest numbers, and with juvenile flatfish (*Pleuronectidae* sp. indet.) also present. There were no migratory fish occurring in the intertidal seine net catches.

Otter Trawls

12.3.32 Although 18 species were recorded in the subtidal otter trawl catches, most of them were found occasionally and in low numbers, and are not of commercial focus. Sprat (and gobies (*Pomatoschistus* spp.)) dominated the fish assemblage. Other commercial species found in moderate abundance were whiting and cod.

12.3.33 Individuals were present as young of the year (0+ year class), and occasionally as 1+ year class (e.g. herring), thus supporting the nursery function of the Humber Estuary. Brown shrimp were abundant from the samples.

Table 12-2: Fish taxa present in the Humber Estuary (Environment Agency, 2013)

Ecological guild	Family	Latin Name updated	species common name	Ecological guild	Family	Latin Name updated	species common name	
Diadromous (D)	Clupeidae	Alosa alosa	Allis shad	Marine stragglers (MS)	Ammodytidae	Hyperoplus immaculatus	Greater sandeel	
		Alosa fallax	Twaite shad			Hyperoplus lanceolatus	Great sandeel	
		Alosa sp.	Shad sp.			Arnoglossus imperialis	Imperial scaldfish	
	Gasterosteidae	Gasterosteus aculeatus	3-spined stickleback		Bothidae	Callionymidae	Callionymus lyra	Dragonet
	Mugilidae	Liza ramada	thinlip grey mullet		Cottidae	Taurulus bubalis	Long-spined sea scorpion	
	Osmeridae	Osmerus eperlanus	Smelt		Gadidae	Pollachius virens	Coley / Saithe / Coalfish	
	Petromyzontidae	Lampetra fluviatilis	River lamprey			Trisopterus minutus	Poor cod	
		Petromyzon marinus	Sea lamprey			Melanogrammus aeglefinus	Haddock	
		Petromyzontidae	Lamprey sp.			Gobiidae	Crystallogobius linearis	Crystal goby
	Salmonidae	Salmo salar	Atlantic salmon			Pomatoschistus lozanoi	Lozano's goby	
		Salmo trutta	Brown / sea trout			Liparidae	Liparis montagui	Montagu's seasnail
	Anguillidae	Anguilla anguilla	European eel			Liparis sp.	Seasnail sp.	
	Marine migrants (MM)	Atherinidae	Atherina presbyter		Sand smelt	Lotidae	Gaidropsarus mediterraneus	Shore rockling
		Clupeidae	Clupea harengus		Atlantic herring	Mullidae	Mullus surmuletus	Striped red mullet
			Sprattus sprattus		Sprat	Pleuronectidae	Glyptocephalus cynoglossus	Witch flounder
Cyclopteridae		Cyclopterus lumpus	Lumpsucker		Microstomus kitt	Lemon Sole		
Gadidae		Gadus morhua	Atlantic cod		Scomber scombrus	Mackerel		
		Merlangius merlangus	Whiting	Scophthalmidae	Scophthalmus rhombus	Brill		
		Pollachius pollachius	Pollack	Scyliorhinidae	Scyliorhinus sp.	Spotted dogfish		
		Trisopterus luscus	Pouting / Bib	Soleidae	Buglossidium luteum	Solenette		
Lotidae		Ciliata mustela	5-bearded rockling	Syngnathidae	Entelurus aequoreus	Snake pipefish		
Moronidae		Dicentrarchus labrax	Sea bass	Trachinidae	Echiichthys vipera	Lesser weever		
Freshwater species (F)		Mugilidae	Chelon labrosus	Thick lipped grey mullet	Triglidae	Chelidonichthys cuculus	Red gurnard	
			Liza aurata	Golden grey mullet	Cobitidae	Cobitis taenia	Spined loach	
		Pleuronectidae	Limanda limanda	Dab	Cyprinidae	Abramis brama	Common bream	
			Platichthys flesus	Flounder		Alburnus alburnus	Common bleak	
			Pleuronectes platessa	Plaice		Blicca bjoerkna	Silver bream	
	Scophthalmidae	Scophthalmus maximus	Turbot		Carassius auratus	Goldfish		
	Soleidae	Solea solea	Dover sole		Rutilus rutilus	Roach		
	Triglidae	Chelidonichthys lucernus	Tub gurnard		Scardinius erythrophthalmus	Rudd		
		Eutrigla gurnardus	Grey gurnard		Squalius cephalus	Chub		
	Estuarine residents (ES)	Agonidae	Agonus cataphractus	Hooknose / Pogge		Tinca tinca	Tench	
		Ammodytidae	Ammodytes tobianus	Lesser sandeel		Gobio gobio	Gudgeon	
			Ammodytidae	Sandeel sp.		Leuciscus cephalus	Chub	
		Cottidae	Myoxocephalus scorpius	Shorthorn sculpin		Leuciscus leuciscus	Dace	
		Gadidae	Raniceps raninus	Tadpole-fish		Rutilus rutilus x Abramis brama	Roach x Common bream hybrid	
			Aphia minuta	Transparent goby		Rutilus rutilus x Alburnus alburnus	Roach x Common bleak hybrid	
Gobiidae		Pomatoschistus microps	Common goby		Scardinius erythrophthalmus x Abramis brama	Rudd x Common bream hybrid		
		Pomatoschistus minutus	Sand goby	Esocidae	Esox lucius	Pike		
		Pomatoschistus sp.	Gobies	Gasterosteidae	Pungitius pungitius	10-spined stickleback		
Liparidae		Liparis liparis	Sea-snail	Percidae	Perca fluviatilis	Perch		
Pholidae		Pholis gunnellus	Rock gunnel		Gymnocephalus cernuus	Ruffe		
Syngnathidae		Syngnathus acus	Greater pipefish					
		Syngnathus rostellatus	Lesser (Nillsons) pipefish					
		Syngnathidae	Pipefish					
Zoarcidae		Zoarces viviparus	Viviparous blenny					

Fyke Netting

- 12.3.34 The fyke net catches from the intertidal mudflat at the AMEP site were dominated by the commercially targeted flounder. These were mostly young fish (born in the year or the year before), thus supporting previous data suggesting the role of the area (typical mudflat) as a nursery for the species. Other fish species that were frequent in the catches were whiting, sole, with also cod being present.
- 12.3.35 The migratory eel was not recorded on the mudflats around the site, but within some of the terrestrial drainage ditches on and adjacent to the AMEP site.
- 12.3.36 The surveys therefore in combination recorded a fish assemblage which included a number of commercially targeted species, with a large component of juvenile individuals indicating the value of the estuary as a nursery area for individuals which in adult stages would be targeted in more fully marine inshore environments. The high abundance in the catches of small epibenthic crustaceans such as brown shrimp and mysid shrimps confirm the availability of important food resources for the fish using the intertidal and subtidal estuarine habitats, as well as potentially with some commercial exploitation potential.

Commercial & Recreational Fishing Activity

- 12.3.37 The Humber deep sea fishing ports (Hull and Grimsby) retain an active fishing fleet, with 10 vessels over 10m with category A licences with Hull as their home port and 6 vessels registered at Grimsby, together with 5 Category C vessels holding shellfish licences. This level of registration can be compared to 28 vessels registered at the Humber ports in 2014 (the furthest back data available from the MMO)⁸.
- 12.3.38 However, when fishing vessel capacity is compared, the 2021 capacity is 24,213 for 21 vessels, compared to a total capacity of 10,651 for the 28 vessels from 2014 (fishing vessel capacity is measured in terms of vessel capacity units (length x breadth in metres plus 45 per cent of the engine power in kilowatts)).
- 12.3.39 Some of the Category A vessels also maintain multiple external waters licences e.g. Norwegian Waters, Spitzbergen & Bear Island and Greenland licences, and with the Kirkella and Farnella also holding deep water licences (MMO register of 10m and over, March 2021, online accessed March 2021). Although home port registered on the Humber estuary, not all vessels will routinely fish from Humber ports.
- 12.3.40 In addition to the larger open sea vessels a local commercial fishery is still conducted in the Humber Estuary and adjacent open coasts and these are conducted by small vessels largely under 10m, most operating from the ports of Grimsby and Hull, but also from small tributaries e.g. Hedon Haven, Stone Creek and potentially small beach launched boats on the coastal parts, with Brown Crab targeted.
- 12.3.41 The fleet of small vessels largely operates in the outer estuary and along the adjacent coastal waters but also includes commercially operated sea angling charter vessels which mostly use the outer estuary and approaches. The outer estuary and Lincolnshire coast is also targeted on a seasonal basis by vessels from other ports for brown shrimp during the autumn.

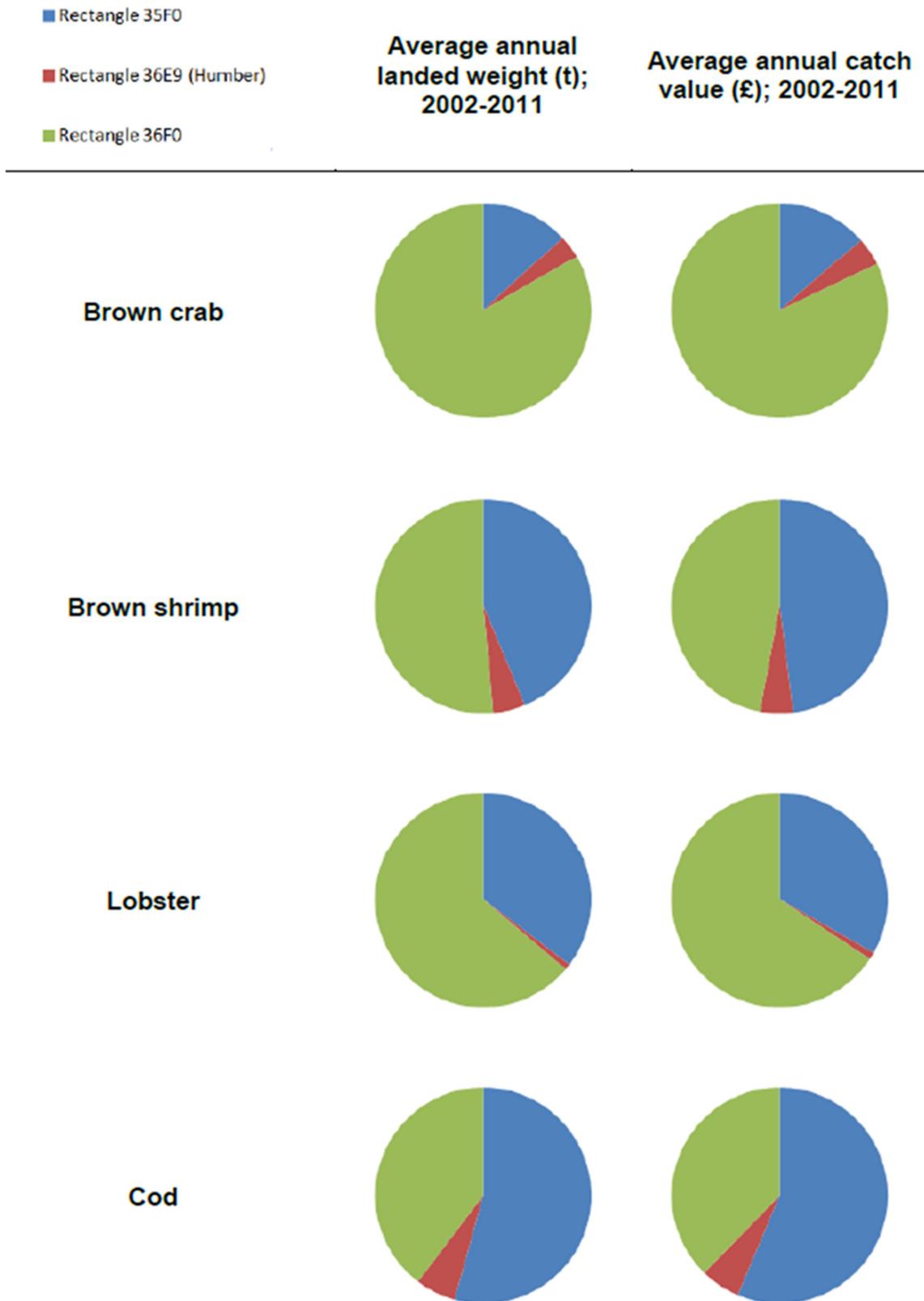
⁸ [MMO register of 10m and over, January 2014 & March 2021](#) (online accessed March 2021).

- 12.3.42 The Environment Agency Review of Fish Population Data in the Humber (Environment Agency, 2013) provides a useful summary of not just aspects of the estuarine fish community, but also an indication of aspects of the commercial fisheries. This report includes a description of fishing activity around the lower estuary following Walmsley and Pawson (2007), although suggests little change in effort since that document was produced.
- 12.3.43 The Environment Agency (2013) report also notes *'a few small beach-launched vessels target lobster, brown (edible) crabs and whelk in the outer estuary on the north bank during summer and early autumn. However, in 2010 this fishery employed only five boats and 11 men from the home ports in the outer and middle estuary (Spurn Point, Cleethorpes, Grimsby and Hull), with a fishing effort of 3,750 hauled pots'*.

The report provides an indication of the relatively low importance of the Humber region ICES Rectangle 36E9 compared to adjacent fisheries along the coast to the north and south for the decade 2002-2011 (

- 12.3.44 1).
- 12.3.45 The NEIFCA apply a series of byelaws which control the minimum landing size for some species and limits the number of fish and shellfish which can be landed, as well as restricting some fisheries.
- 12.3.46 Fishing methods have included a range of gears including beam and otter trawls, as well as fixed gill nets and long lines for fish. The trawling has been restricted to lower middle and outer estuary to the mouth on the south shore, downstream from around East Halton as well as along the adjacent coastlines, with cod and other Gadoids targeted.
- 12.3.47 Fixed gear is also used on the intertidal zone and subtidal fringes of the middle and outer estuary including pots, gill nets and long lines with sole targeted, as well as cod during the winter.
- 12.3.48 Recreational angling activities in the Humber Estuary are conducted by both shore and boat anglers throughout the year, and target species such as common sole, sea bass (*Dicentrarchus labrax*), cod, ling (*Molva molva*), whiting, salmon and sea trout.
- 12.3.49 There is also a beach fishery along the coast. The Environment Agency regulate the beach net fishery for sea trout although with only small numbers of fisherfolk involved in the activity. For instance there were 8 commercial fishermen operating T and J nets along the Holderness coast in 2020. Although not currently permitted, there is a potential for the shore-netting of sea bass to be re-introduced.
- 12.3.50 Cod and other Gadoids are also taken from both banks of the middle to outer estuary by recreational anglers, with the south bank down-stream from East Halton Skitter to Grimsby usually featuring the greatest number of rods during the autumn and winter.
- 12.3.51 It should be noted that whilst individual catches are usually low, the recreational angling component of the fishery, from both vessel and shore casting involves a relatively large number of people (compared to the commercial fisheries employment activity in the estuary), and accounts for a substantial component of the catch of some target species.
- 12.3.52 Bait collection on intertidal sections of the Humber coast is also carried out, with potential impacts to the intertidal ecology, and with byelaw controls in some locations.

Figure 12-1: Relative Importance and Value of the main Humber Fisheries Compared against Neighbouring Reporting Areas (Environment Agency, 2013)



Changes in Baseline

- 12.3.53 Considering these sources of variability in the sampling data, and in the context of the wider knowledge of fish assemblages (see Chapter 10: Aquatic Ecology) it has been concluded that there have been no significant changes in the baseline for commercially exploited fish around the AMEP site.
- 12.3.54 The fish fauna in the area reflects a 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 marine migrant fish which have commercial value at later life stages in marine areas.
- 12.3.55 It should be noted that following the assessment set out in the original ES and the subsequent provisions incorporated into Schedule 8 of the extant DCO, the issue of potential underwater noise and vibration generated during the works was addressed through timing constraints to the works, thus avoiding sensitivity periods for receptors
- 12.3.56 In particular, the requirements to adequately address and mitigate any construction issues to fish was provided in the Environment Agency Written Response 10015552⁹.
- 12.3.57 where, writing on behalf of all three Defra Agencies a series of piling Conditions were identified and are now incorporated into the extant AMEP DCO.
- 12.3.58 The Conditions followed a precautionary approach, and there is considered no requirement to further amend this mitigation as a result of the change on the quay alignment given construction activities generating potential impacts will remain the same and with no substantive alteration to the assemblage characteristics or functional attributes of the fish community receptors around the development having occurred from the original ES baseline for the DCO.
- 12.3.59 It is not considered that any substantive changes have occurred to the commercial and recreational fishing effort undertaken from and around the Humber Estuary since the original ES.
- 12.3.60 Although it is noted that post Brexit, future changes to legislation and markets may influence fishing activity on the Humber, at this present time it is considered that there have not been any substantive changes to the commercial and recreational fishing effort undertaken from and around the Humber Estuary since those reported in the original ES..

⁹ [Environment Agency Written Response 10015552](#)

12.4.0 Assessment of Effects

Additional Construction Phase Effects (from the Material Amendment)

12.4.1 The potential impacts on commercial fisheries during the construction phase of the AMEP quay as a result of the proposed material changes to the AMEP marine development are:

- Change in quay layout leading to:
 - alteration to the fish and shellfish assemblage;
 - alteration to potential commercial resource exploitation;
 - restriction to access of fish and shellfish resources for commercial and recreational fisheries.
- Changes to dredge disposal leading to:
 - alteration to the fish and shellfish assemblage;
 - alteration to potential commercial resource exploitation.

12.4.2 These general potential impacts to commercial fisheries can occur through a number of effects pathways e.g.:

Quay Construction

- Loss of habitat (intertidal and subtidal) and benthic communities from land take required for the quay;
- Creation of new hard substrata habitat;
- Habitat disturbance from water quality changes in the vicinity of outfalls;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes (scoped in only if there is noticeable change to the hydrodynamic and morphodynamic regimes then indirect changes to habitats will be scoped out of the ES); and
- Changes to aquatic environment in adjacent water bodies.

Dredging

- Habitat change from substrate removal;
- Habitat and benthic communities disturbance from the sediment plume;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and
- Disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

Dredge Disposal

- Loss of subtidal habitat and benthic communities from dredge spoil disposal;
- Habitat and benthic community disturbance from the sediment plume;
- Indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and
- Disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

12.4.3 The potential for new, significant or materially different impacts arising as a consequence of the proposed material amendment on the current baseline commercial and recreational fisheries data have been considered as per the Scoping Opinion (Planning Inspectorate 2021) (see

12.4.4).

Impacts to Commercial and Recreational Fisheries

Changes in Impact Prediction – New Effects

12.4.5 Importantly, these effects (detailed in the text below) are substantially similar in nature to those considered in the original ES, and therefore no new effects have been identified.

Changes in Impact Prediction – New Receptors

12.4.6 The baseline for commercial and recreational fisheries has shown that there are no materially different receptors for this ecological component in the aquatic environment at and surrounding the AMEP site.

Changes in Impact Prediction – Characterisation of Effects

12.4.7 As the fish receptors have not changed since the original ES, the sensitivities relevant to this assessment remain the same as identified before. Therefore, any possible change in the significance of the effects of the proposed AMEP development could only be due to a significant change in the magnitude of the impacts on the fish fauna.

12.4.8 Possible changes in the magnitude of impacts and the resulting significance of the effects on fish fauna are considered below, in relation to direct impacts (i.e. due to underwater noise) and indirect impacts (i.e. due to loss and/or disturbance of habitat) on fish.

Changes in Direct Impacts

12.4.9 No significant changes to the direct impacts to the commercial and recreational fisheries have been identified resulting from the material amendment to the proposed development. This conclusion has been derived based on the following:

12.4.10 The boundary extent of the facility will not change from that described in the original ES, and access to the shore frontage and existing banks within the facility will be restricted. No fishing activity would be expected to be undertaken along the subtidal part of the frontage immediately adjacent to the quay during construction. No public access will be possible along the banks within the facility boundary during construction.

12.4.11 Increased sediment loadings from alluvium dredging activity will for the large part be within natural variations in bed loads (HRW 2021a, Technical Appendix U8-1) except potentially on short duration occasions of overflowing. Predicted increases in suspended sediment concentration at the Killingholme Power Station B intake from back-hoe dredging of the glacial till are to a maximum of 70mg/l (near bed) and for trailing suction hopper dredging (TSHD) of the alluvium, an increase in suspended sediment concentrations at the southern intake of up to 45 mg/l (near bed) for a period of around a three weeks (*ibid*).

12.4.12 The proposed dredging of sand/gravel by TSHD will cause increases in suspended sediment concentrations at the southern intake of Killingholme Power Station of up to 450mg/l (near bed) for a period of up to a week. Whilst this may represent a significant increase in the background levels of suspended sediment concentration it is noted that this increase will occur for a limited period of time.

- 12.4.13 With the exception of the dredging location, the predicted increase in suspended sediment concentration caused by the dredging activity is small compared with the natural variation in suspended sediment concentrations which has been measured to be up to 1600mg/l near the surface on spring tides.
- 12.4.14 However, if overflowing is utilised during the dredging of alluvium, then the predicted increases in suspended sediment concentration above background and the deposition of fine sediment arising from this will be considerably larger. Overflowing for ten minutes on every load would result in increases in suspended sediment concentration of up to 630mg/l (near bed) for a period of up to three weeks (*ibid*).
- 12.4.15 As such, HRW (2021a) conclude that overall, the proposed dredging will not cause any significant impact to the sediment transport in the Humber Estuary although temporary and significant rises in background concentrations may potentially occur if overfilling occurs and during the dredging of sand/gravel over the course of a week (or less).
- 12.4.16 Even in these worst case scenarios, elevated suspended sediment levels would be restricted to the immediate vicinity of the dredge activity would remain within natural variation levels e.g. spring tides, with fishes using the Humber Estuary tolerant of the relatively high sediment loadings present.
- 12.4.17 There would therefore be an expectation of either no effect or avoidance, with no barrier to movement created across the estuary from the sediment plume.
- 12.4.18 On this basis, there is no substantive alteration to any potential impacts to the commercial and recreational fisheries to those identified in the original ES.

Changes in Indirect Impacts

- 12.4.19 No substantive changes to the indirect impacts to the commercial and recreational fisheries have been identified resulting from the material amendment to the proposed development. This conclusion has been derived based on the following:
- 12.4.20 As identified in the original ES, the quay construction will lead to a permanent loss of intertidal and shallow subtidal habitat. The material amendment will entail a small reduction in loss of this area (refer to Appendix U11-2). There will also be dredging undertaken with increased volumes disposed to licensed disposal grounds in the estuary, with some small scale alteration to the associated sediment plume. There will also be some alteration to the hydrodynamics in and around both the revised quay and the disposal grounds.
- 12.4.21 These alterations from the original ES have the potential to influence the fish community in the area of the development and disposal sites. However, given the absence of any measurable alteration to the fish community structure in the vicinity of the development and disposal grounds (see Chapter 10), then it is concluded that there would be no measurable alteration to the identified impacts to commercial and recreational fisheries provided in the original ES.
- 12.4.22 Power station cooling water abstraction has the potential to entrain fish, whilst the effluent discharged usually has both a temperature loading and a biocide legacy level, both reducing in concentration with dilution by the receiving waters.
- 12.4.23 The temperature tolerances of fish indicate survival within heated effluents and the upper lethal temperatures of salmonids are 24-32°C and 32-40°C for non-salmonids (Poxton and Allouse, 1982).

However, synergistic effects due to the presence of other stressors will reduce these limits. Of greatest importance however, is the combined stress induced by high temperatures and low dissolved oxygen concentrations (Pomfret et al., 1991).

- 12.4.24 Langford (1990) reported cases where power-plant related fish mortalities or avoidance have been attributable to anti-fouling treatment (principally chlorine) rather than temperature and indicated that chlorine concentrations of 0.11mg/l caused increased mortalities among entrained bass (*Morone* spp.) in the US. Numbers of fish in a discharge are known to decrease during periods of chlorination and residual chlorine concentrations of >0.35mg/l produce an avoidance reaction.
- 12.4.25 Whilst the effects of the adjacent Uniper (formerly E.ON) cooling water abstraction and discharge were addressed in the original AMEP ES, and would also have been addressed in detail in the planning application for the power station's construction and operation, modification to hydrodynamics from the AMEP quay in this area has the *potential* to modify environmental conditions, and potentially reduce dispersion and dilution with increases in temperature and TRO loadings in the CW immediately around the outfall, with a concomitant potential to affect fish utilisation and even entrainment.
- 12.4.26 However, modelling of the hydrodynamics around the quay (HRW, 2021b, Technical Appendix U9-5) have shown no significant alteration to the Uniper thermal plume, indicating no change in the water quality conditions around the Uniper outfall, and thus no potential change to the conditions for fish (either avoidance, impingement or mortality).
- 12.4.27 The potential for increased sediment suspension from the dredging activity has also been identified as a potential indirect impact to the fish community through changes to prey availability e.g. benthic organisms. However, as noted above, increased suspended sediment concentrations from the dredging activity are expected to be within natural fluctuations in loads recorded from the Humber estuary, as well as being restricted in terms of effect to close around the works.
- 12.4.28 The invertebrate community of the middle estuary is adapted to the physical rigors of the environment including erosion, deposition and high suspended sediment load, and as such would be able to withstand these increased deposition rates in the vicinity of the works, e.g. assessed by HRW (2021a) at being up to <1mm of sediment at the outfall c. 100m from the development on a spring tide and <0.5mm on a neap tide.
- 12.4.29 On this basis, in direct effects to the commercial and recreational fisheries are not expected to change significantly compared to that ascribed in the original ES.

Additional Operational Phase Effects

- 12.4.30 No changes to potential operational impacts relevant to the Commercial and Recreational Fisheries components have been identified by the scoping opinion, and therefore there are no differences in the operational effects on marine mammals that feed on the fish, from the original ES.

Additional Cumulative Effects

- 12.4.31 No substantive deleterious cumulative impacts have been identified from multiple developments in the Zone of Impact (ZoI) from those addressed in the original ES e.g. dredge disposal is ongoing from ports activity in the Humber, power station cooling water abstraction and discharge.
- 12.4.32 Based on the assessment of impacts from the material amendment, and plans and projects in the

ZoI, it has been concluded that there are no additional significant cumulative effects arising from the development.

Consideration of DCO

- 12.4.33 As described above, baseline commercial and recreational fisheries conditions are not considered to have significantly changed from the original ES, with commercial activity at a very low level compared to adjacent ICES triangles.
- 12.4.34 Furthermore, the material amendment is not considered to have generated any significant or measurable new impacts to the existing commercial and recreational fisheries potential, although with some small potential alterations e.g. potentially increased vessel traffic.
- 12.4.35 Whilst the quay will restrict public access onto the flood bank, this access has not changed from the consented scheme and, in any case, the extensive fringing intertidal marsh at this location means the reach is not readily used for recreational fishing when compared to upstream and downstream reaches.

12.5.0 Requirement for Additional Mitigation

- 12.5.1 The review of revised baseline data, where available and/or appropriate, in the context of the material amendment have not identified any significant new, or materially different impacts, and as such, no additional mitigation is considered necessary.

DCO Mitigation

- 12.5.2 On the basis of the above, it is considered that the mitigation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:

- piling restrictions included in the extant DCO (Schedule 8, paragraphs 37 *et seq*)
- the provision of compensatory habitat at Cherry Cobb Sands as provided for within the extant DCO. These compensatory habitats provide function for fishes, including nursery areas for commercially exploitable species.

Alternate or Additional Mitigation

- 12.5.3 No additional mitigation is required for impacts to the commercial and recreational fisheries components as there are no significant changes to those identified in the original ES for the DCO.

12.6.0 Residual Effects

- 12.6.1 The review of revised baseline data where available and/or appropriate, in the context of the material amendment have not identified any significant new impacts and as such, no additional mitigation is considered necessary.

Consideration of DCO

- 12.6.2 The residual effects on the Commercial and Recreational Fisheries receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO.

12.7.0 Other Environmental Issues

- 12.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 12.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 12.7.3 The proposed material amendment will not raise any impacts upon infrastructure with regard to the consideration of commercial and recreational fisheries beyond those considered within the original ES.

Waste

- 12.7.4 The proposed material amendment will not raise any impacts upon waste with regard to the consideration of commercial and recreational fisheries beyond those considered within the original ES.

Population and Human Health

- 12.7.5 The proposed material amendment will not raise any impacts upon population and human health with regard to the consideration of commercial and recreational fisheries beyond those considered within the original ES.

Climate and Carbon Balance

- 12.7.6 The proposed material amendment will not raise any impacts upon climate and carbon balance with regard to the consideration of commercial and recreational fisheries beyond those considered within the original ES.

Risks of Major Accidents and/or Disasters

- 12.7.7 The proposed material amendment will not result in any risks of major accidents and/or disasters with regard to the consideration of commercial and recreational fisheries beyond those considered within the original ES.

Summary

- 12.7.8 No other environmental issues of relevance to commercial and recreational fisheries have been identified.

12.8.0 Summary of Effects

- 12.8.1 The potential pathways for effects to Commercial and Recreational Fisheries from the proposed material amendment arise from indirect impacts to the fish and shellfish communities present around the vicinity of the proposed development and/or using the area around the development sites to move through the estuary on migration.
- 12.8.2 On this basis, the main areas of potential effect arise from the impacts of the material amendment to the fish communities of the estuary around the development:
- Construction of the quay entailing: Loss of habitat (intertidal and subtidal); underwater noise and vibration from piling; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes.
 - Dredging of the quay, berth pocket and approaches entailing: Habitat change from substrate removal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.
 - Dredge Disposal entailing: Loss of subtidal habitat and benthic communities from dredge spoil disposal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.
- 12.8.3 The actual likelihood of any significant effects to occur to the commercial fisheries of the area from the material amendment have been discounted, with it being concluded that the effects as identified in the original ES remain valid in the context of Commercial and Recreational Fisheries, with any alteration in effect arising from the material amendment being either so small as to not be measurable or accommodated within the natural variability of the estuarine system.

12.9.0 Conclusions

- 12.9.1 Where data have been available the baseline conditions have been updated although the importance of the area around the vicinity of the AMEP development is not considered to be high for commercial and recreational fishing activity.
- 12.9.2 These data, and potential impact pathways from the material amendment, have been assessed against those described in the original ES, these largely relating to indirect effects through potential impacts to the fish and shellfish communities of the area.
- 12.9.3 No significant changes have been identified outwith those described in the original ES and the Examining Authorities Report (2013).
- 12.9.4 Based on the above assessment of potential changes to the commercial and recreational fisheries of the area against conditions described in the original ES baseline, and from the assessment of the material amendment and pathways of potential impact, no significant effects have been identified other than those assessed in the original ES.
- 12.9.5 Mitigation measures provided in the original ES are considered to remain valid, with no significant residual impacts to the Commercial and recreational Fisheries of the Humber Estuary in the vicinity of the AMEP development expected following their discharge.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 13: FLOOD RISK AND DRAINAGE

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

13.1.0 INTRODUCTION	13-1
Development Consent Order Context.....	13-1
Consideration of Material Amendments.....	13-1
Purpose and Structure of Chapter	13-2
13.2.0 METHODOLOGY.....	13-3
Changes in Legislation, Guidance and Planning Policy.....	13-3
Scoping Opinion	13-4
Additional Consultation.....	13-5
Assessment Methodology	13-6
Effects Not Requiring Further Assessment.....	13-6
13.3.0 CHANGES IN BASELINE CONDITIONS.....	13-8
DCO Baseline	13-8
DCO Future Baseline.....	13-8
Current Baseline	13-8
Future Baseline.....	13-9
13.4.0 ASSESSMENT OF EFFECTS	13-10
Additional Construction Phase Effects	13-10
Additional Operational Phase Effects.....	13-10
Additional Cumulative Effects	13-12
Consideration of DCO	13-12
13.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	13-13
DCO Mitigation.....	13-13
Alternate or Additional Mitigation	13-14
13.6.0 RESIDUAL EFFECTS	13-15
Construction Phase	13-15
Operational Phase	13-15
Consideration of DCO	13-15
13.7.0 OTHER ENVIRONMENTAL ISSUES.....	13-16
Other Environmental Issues of Relevance	13-16
Summary	13-16

13.8.0	SUMMARY OF EFFECTS	13-17
13.9.0	CONCLUSIONS	13-18

DOCUMENT REFERENCES

TABLES

Table 13-1: Scoping Opinion.....	13-4
Table 13-2: Tidal Flood Levels	13-9
Table 13-3: Comparison of overtopping analyses.....	13-11

FIGURES

Figure 13-1: 2114 Overtopping Rates of the New Quay Reported in the Original FRA	13-10
Figure 13-2: 2021 Overtopping rates for the new quay using HUMBER 2100+ HIGER CENTRAL sceario	13-11
Figure 13-3: 2021 Overtopping rates for the new quay using HUMBER 2100+ Upper end sceario	13-11

APPENDICIES

Appendix U13-1: Updated Extreme Still Water Levels	
Appendix U13-2: 2013 legal agreement relating to Flood Defences between Able Humber Ports Limited and the Environment Agency	
Appendix U13-3: Discharge of Requirement 13 by North Lincolnshire Council	
Appendix U14-4: Preliminary Quay Overtopping Calculations	

13.1.0 Introduction

Development Consent Order Context

13.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

13.1.2 The associated development also consented through the DCO includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

13.1.3 Documents relevant to this chapter, that were included in the DCO ES include:

- Environmental Statement Chapter 13¹: Drainage and Flood Risk (AMEP site);
- Environmental Statement Annex 13.1²: Flood Risk Assessment and Drainage Strategy; and
- Environmental Statement Annex EX13.2³: Addendum to AMEP Flood Risk Assessment.

13.1.4 Other works relating to Flood Risk and Drainage were undertaken with respect to the Compensation Site on the north bank of the Humber Estuary. These are however not considered of relevance to the material amendment being applied for.

Consideration of Material Amendments

13.1.5 In the context of the proposed material amendment, this chapter considers the following areas:

- changes in the flood risk posed to the scheme resulting from the change in the proposed layout and any differences in final ground levels;
- changes in flood impact arising from the scheme relating to displacement of tidal flood water; and
- changes in flood impacts arising from the scheme associated with changes in how storm water runoff will be generated and managed within the scheme.

1 Environmental Statement Chapter 13: Drainage and Flood Risk, 2012, <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030001/TR030001-000318-13%20-%20Drainage%20and%20Flood%20Risk.pdf>

2 Environmental Statement Annex 13.1, Flood Risk Assessment and Drainage Strategy, 2012, <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030001/TR030001-000400-13.1%20-%20Flood%20Risk%20Assessment%20and%20Drainage%20Strategy.pdf>

3 EX13.2: Addendum to Flood Risk Assessment, JBA, June 2012

Purpose and Structure of Chapter

13.1.6 This chapter considers the impact of the proposed material amendment on Flood Risk and Drainage.

13.1.7 Consideration is given to:

- changes in legislation, policy and guidance relating to Flood Risk and Drainage since the DCO application;
- physical changes in the baseline context at the site as relevant to Flood Risk and Drainage and the proposed material amendment;
- changes in the understanding of risk for both the current day situation and future scenarios; and
- the material amendment to the proposed scheme.

13.2.0 Methodology

- 13.2.1 As part of the DCO application a Flood Risk Assessment (FRA) was undertaken for the AMEP. The FRA assessed how the proposed development will affect the site and its surroundings as well as the integrity of the Humber Estuary's flood defences.
- 13.2.2 Within the Flood Risk and Drainage ES chapter, the impact of the proposed development on the hydrological environment at the site was evaluated to determine the likelihood of the AMEP causing impacts to the surface water environment as follows:
- impacts on land drainage and flooding;
 - impacts associated with the pollution of surface watercourses during the construction phase; and
 - impacts associated with the pollution of surface watercourses during the operation phase.

Changes in Legislation, Guidance and Planning Policy

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

- 13.2.3 These regulations revoke and replace the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 2003 No. 3242). They continue to transpose Directive 2000/60/EC for England and Wales, establishing a framework for Community action in the field of water policy (the Water Framework Directive).
- 13.2.4 They also transpose aspects of Directive 2006/118/EEC on the protection of groundwater against pollution and deterioration (the Groundwater Directive) and of Directive 2008/105/EC on environmental quality standards in the field of water policy (the Environmental Quality Standards Directive).

National Planning Policy Framework⁴

- 13.2.5 The previous assessments reference Planning Policy Statement 25. This was superseded in 2012 by the National Planning Policy Framework (NPPF) and the associated Planning Practice Guide (PPG) for Flood Risk and Coastal Change⁵.
- 13.2.6 The NPPF and associated PPG now provide the framework for assessing development vulnerability and site suitability with regards to flood risk (Sequential Test and Exception test).

Flood Risk Assessments: Climate change allowances⁶

- 13.2.7 In February 2016 the Environment Agency issued updated guidance on the impacts of climate change on flood risk in the UK to support NPPF. This advice, which was most recently updated in July 2020, sets out how projected changes in peak rainfall intensity, sea level, peak river flow;

4 National Planning Policy Framework, Ministry of Housing, Communities & Local Government, Published March 2012, Updated June 2019, <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

5 Planning practice Guide, Flood risk and coastal change, Ministry of Housing, Communities & Local Government, Published March 2014, <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

6 Flood risk assessments: climate change allowances, Environment Agency, Published February 2016, Updated July 2020, <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

offshore wind speed and extreme wave heights associated with climate change should be considered within the development process.

Non-statutory Technical Standards for Sustainable Drainage Systems⁷

13.2.8 This document sets out non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems. Systems to drain surface water from housing, non-residential or mixed-use developments for the lifetime of the developments.

Pollution Prevention for Businesses⁸

13.2.9 This guidance, published by the Environment Agency in 2016, supersedes the older Pollution Prevention Guidance documents referenced in Flood Risk and Drainage chapter of the DCO ES. The new guidance sets out how businesses and organisations can avoid causing pollution from oil and chemical storage, car washing, construction and other activities.

Scoping Opinion

13.2.10 Table 13-1 summarises the key aspects of the scoping opinion as relevant to drainage and flood risk. This incorporates comments from the Environment Agency and North Lincolnshire Council (the Lead Local Flood Authority).

Table 13-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 31, Paragraph 4.7.1	Arrangements for the disposal of surface water and foul water from the development site do not need to be scoped into the updated assessment.	Agreed	Scoped Out	13.2.20
Page 31, Paragraph 4.7.2	The higher Upper End predictions for sea level rise and the Humber extreme water levels should be used to inform the assessment.	We note that the design would typically be undertaken in relation to High Central climate change allowance with the Upper End allowance used for sensitivity testing.	Changes in extreme still water levels and climate change allowance are considered in this assessment.	13.3.5 – 13.3.15

7 Sustainable Drainage Systems: non statutory technical standards, Department for Environment, Food and Rural affairs, Published March 2015, <https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards>

8 Pollution prevention for businesses, Department for Food and Rural Affairs and Environment Agency, Published July 2016 (updated May 2019), <https://www.gov.uk/guidance/pollution-prevention-for-businesses>

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
			Future tidal flood levels for the Higher Central scenario are lower than previously considered; while for Upper End scenario they are slightly (0.11m) higher.	
Page 31, Paragraph 4.7.2	The updated assessment of flood risk should identify any alteration to overtopping rates on flood defences and be conducted using updated climate change allowances.	The change in quay alignment is unlikely to affect the potential for over topping at the site. It is however noted that updated assessment is required to ensure compliance with the 2l/s/m over topping limit for the existing flood defences adjacent to the quay as specified in the legal agreement between Able and the EA.	A revised assessment of quay overtopping has been undertaken and is included in Appendix U13-4. This is based on information provided by EA from the Humber 2100+ work (Appendix U13-1). Overtopping of the flood defences to the north of the quay is related to wave reflection and this is reviewed in Chapter 8 and is expected to be reduced by the setback berth. Updated modelling of over topping across the adjacent flood defences is in progress and will be included in the ES.	13.4.3 - 13.4.4

Additional Consultation

13.2.11 A virtual consultation meeting with officers from the Environment Agency was undertaken on the 25th March 2021. Key outputs from that meeting as relevant to this chapter were;

- Updated extreme still water flood levels for the Humber estuary were published in February 2021 (Appendix U13-1) and should be considered as part of this application.
- No additional work on extreme wave heights or joint probability analysis for extreme wave and extreme still water levels has occurred since the DCO application and as such the base studies referenced in the DCO application remain the best source of data.
- The Environment Agency expect the applicant to adhere to the terms of the 2013 legal agreement relating to Flood Defences between Able Humber Ports Limited and the Environment Agency (Appendix U13-2). Specifically, they advised that the requirement to limit over topping of existing 'soft' flood defences to 2 l/s/m should be maintained and must reflect

the current understanding of extreme water levels and current guidance relating to potential changes in sea level and wave height associated with climate change.

- Guidance on the use of the climate change allowances⁶ recommends that the Higher Central scenario is used as the design allowance and the Upper End can be used to test the sensitivity of the proposals to flood risk. Testing the sensitivity is important as it will help inform potential future impacts as climate change allowances will continue to be revised at key points in the future.
- Changes in the current understanding of extreme water levels, and guidance relating to potential changes in sea level associated with climate change, could have a small impact on the severity of breach flooding. It was however agreed that this will not significantly alter the prevailing risk. Previously agreed control measures (site evacuation in response to flood warnings) were felt to provide sufficient protection and, as such, there was no expectation that assessments relating to breach flooding should be updated.

13.2.12 Outside of the EIA scoping process no further consultation has been undertaken at this stage.

Assessment Methodology

Study Area

13.2.13 A study area for Flood Risk and Drainage was not formally defined within the ES for the original DCO application ('the original ES').

13.2.14 In relation to drainage, the assessment considered all direct surface water receptors of the site down to where these systems discharged into the Humber Estuary. With regards to Flood Risk the assessment considered the site and the local flood cell of the Killingholme Marshes within which the site is situated.

13.2.15 The same study area will be applied for this update.

Significance of Effect

13.2.16 Significance criteria relating to drainage and flood risk are defined within Table 13.1 of the original ES.

Mitigation Hierarchy

13.2.17 While not defined within the original ES, a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.

Effects Not Requiring Further Assessment

13.2.18 Since the DCO came into force, North Lincolnshire Council has approved the surface water drainage strategy for the terrestrial areas of the site and for the quay (DCO Requirement 13). The approval notices are included as Appendix U13-3.

13.2.19 No changes are proposed to the arrangements for the disposal of surface water and foul water from the development site. The amendments to the proposed design will not therefore give rise to any

new or different impacts on drainage.

- 13.2.20 The risk posed to the scheme by a breach of the tidal flood defences and the impact of the scheme on breach flooding will not be altered by the proposed change in quay alignment. No further consideration of breach flooding is therefore required.

13.3.0 Changes in Baseline Conditions

DCO Baseline

- 13.3.1 Chapter 13 of the original ES¹, the Flood Risk Assessment included as Appendix 13.1 of the DCO ES², and the addendum to the Flood Risk Assessment included as Appendix EX13.2 of the DCO ES³, provide a robust summary of flood risk at the AMEP site.
- 13.3.2 Tidal flood defences are in place along the entire south bank of the Humber Estuary. The site is low-lying behind these defences and is predominantly shown to be located within Flood Zone 3 on the Flood Map for Planning, indicating that without flood defences the annual probability of flooding would be greater than 0.5 per cent (1 in 200).
- 13.3.3 The existing defences at the proposed development site consist of an earth embankment topped by a concrete pavement and wave return wall. As set out in the original Flood Risk Assessment² these are currently maintained by the Environment Agency and provide an annual standard of protection that varies between 1 in 50 and 1 in 150.

DCO Future Baseline

- 13.3.4 The original ES has considered potential changes in tidal flood severity over next 100 years (paragraph 13.5.5). The allowances predicted were:
- an uplift in sea level between 2014 and 2114 of 1.11m, and
 - a 10 % increase in peak wave heights.

Current Baseline

- 13.3.5 The applicant has begun to improve the drainage network at and around the site by widening ditches and is about to start construction of the pumping station consented under the DCO.
- 13.3.6 In some areas of the site, levels have been raised since the DCO application through the import of engineered fill which will have an impact on storm water runoff rates. This has been undertaken in line with the consented surface water drainage strategy.
- 13.3.7 Aside from this there have been no physical changes to baseline conditions that are believed to have significantly altered the prevailing levels of flood risk at and around the site since the DCO application. There have also been no significant changes made to the drainage networks on or adjacent to the site.
- 13.3.8 In December 2013 extreme high-water levels were experienced within the Estuary that were in excess of the previous maximum recorded tidal levels. In the aftermath of this event the Environment Agency updated their tidal level analysis and have recently published further updated estimates for extreme still water levels.
- 13.3.9 Updated estuarine flood levels at North Killingholme (NGR 517581 421056) are presented in Table 13-2 taken from work undertaken by the Environment Agency as part of the Humber 2100+ project (Appendix U13-1). For comparison, the older estuarine flood levels included in the DCO Flood Risk Assessment are also provided (Immingham H090).

Table 13-2: Tidal Flood Levels

Location	Easting	Northing	Data source	Base date	Annual Chance (1 IN X) of tide level (m ODN)						
					1	2	10	50	100	200	1000
Immingham (H090)	519141	417449	Northern Area Tidal Model Analysis, 2006	2006	4.08	-	4.49	4.76	4.88	5.05	5.34
North Killingholme	517581	421056	Humber Estuary 2020 Extreme Water Levels	2021	-	4.32	4.63	4.92	5.05	5.21	5.53

13.3.10 The data presented in Table 13-2 are for different locations along the Humber Estuary and relate to different base dates. Notwithstanding these differences the more recent assessment predicts current day extreme still water flood levels that are between 0.14m and 0.19m higher than were considered in the original ES.

13.3.11 For reference, based on advised current annual sea level rise increment, as set out in Environment Agency guidance⁶ uplifts of between 0.07m and 0.09m would have been expected between the respective base dates for the modelling (2006 to 2021).

Future Baseline

13.3.12 As a result of an improved, or more robust, understanding of potential impacts associated with climate change, allowances advised for design purposes have been updated. Specifically, the allowances used for sea level rise are different than was considered with in DCO application.

13.3.13 Environment Agency guidance⁶ now presents projected sea level rises as two scenarios (Higher Central and Upper End). In line with discussions with the Environment Agency (See paragraph 13.2.11), the Higher Central allowance should be used for design purposes and the Upper End used to test the sensitivity and consider the uncertainty and risk associated with current predictions.

13.3.14 For the Higher Central allowance, which equates to the 70th percentile (i.e. exceeded by 30% of the projections in the range) projected sea level rises from 2000 through to 2125 are 1.15m. This is broadly similar to what was considered by as part of the DCO application (1.11m from 2014 to 2114).

13.3.15 For the Upper End allowance, which equates to 95th percentile (i.e. exceeded by 5% of the projections in the range) projected sea level rises from 2000 through to 2125 are 1.55m. This is in excess of what was considered by as part of the DCO application.

13.3.16 For estuarine situations the projected uplifts to open sea level discussed above can be altered by funnelling within the confined estuarine bathymetry. As such, where possible, the projected uplifts should be applied as a downstream boundary on estuarine modelling and changes in estuarine flood levels assessed based on outputs from modelling. This analysis has been undertaken by the Environment Agency as part of the Humber 2100+ project.

13.3.17 Based on this work, the future (2121) 1 in 200 annual probability flood level at North Killingholme is estimated to be 6.11m above Ordnance Datum (aOD) for the High Central allowance and 6.35m aOD for the Upper End allowance. This compares to a maximum predicted 1 in 200 annual probability still water food level in 2114 of 6.24m aOD considered in the original ES.

13.4.0 Assessment of Effects

Additional Construction Phase Effects

- 13.4.1 Construction phase impacts associated with Flood Risk and Drainage will be unchanged from those considered in the DCO application.

Additional Operational Phase Effects

- 13.4.2 The higher current day peak tidal water levels and the change in climate change allowances could potentially result in additional operational phase impacts associated with flooding.
- 13.4.3 Specifically, there is a risk that topping rates may change. The original FRA reported overtopping at Appendix H and a summary of the reported rates for the 1:200 probability event in 2114 subject to oblique wave attack is extracted in Figure 13-1 below.

Figure 13-1: 2114 Overtopping Rates of the New Quay Reported in the Original FRA

Table 8: Wave overtopping calculations for 1:200-year water level/wave height combinations

SWL (mOD) (1991)	Hs (m) (1991)	SWL (mOD) (2114)	Hs (m) (2114)	Wave period (s)	Q deterministic (~Q68%) (l/s/m) (quay height = +6.1mOD)	Q deterministic (~Q68%) (l/s/m) (quay height = +6.3mOD)
3.73	1.98	4.92	2.18	5.1	73.8	55.4
4.47	1.47	5.66	1.62	4.4	91.8	61.6
4.79	1.00	5.98	1.10	3.9	52.0	32.3

- 13.4.4 A preliminary updated assessment of overtopping rates along the quay frontage in 2121, using the Humber 2100+ predictions is included in Technical Appendix U13-4 and reproduced in Figures 13-2 and 13-3 below for both the Higher Central and Upper end scenarios respectively. Overtopping rates are presented as ‘maximum’ and ‘minimum’, these being related to oblique wave attack and conservatively⁹ for perpendicular wave attack. (Note that levels in Figure 13.1 are in m aOD and in Tables 13-2 and 13-3 are in metres above Chart Datum [mCD], and that 6.1 m aOD is equivalent to 10mCD. In addition, references to ‘FLOODED’ only take into account the front level of the quay and not the rear level which is 280mm higher)

9 Conservative because the same wave height is used in both calculations despite the reduced fetch appropriate to the perpendicular attack

Figure 13-2: 2021 Overtopping rates for the new quay using HUMBER 2100+ HIGER CENTRAL scnearrio

Higher Central Scenario										Equation 7.6 Design approach (Max Overtopping)			Equation 7.16 Oblique wave effect (Min Overtopping)		
										Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
H _{m0} (m)	Crest level 1 (mCD)	Crest level 2 (mCD)	Crest level 3 (mCD)	SWL (mCD)	SLR (m)	R _c 1 (m)	R _c 2 (m)	R _c 3 (m)	β	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)
2.38	10.0	10.2	10.4	6.34	0.9	2.76	2.96	3.16	52	34	28	22	6	5	3
2.37	10.0	10.2	10.4	7.07	0.9	2.03	2.23	2.43	52	75	60	48	21	15	11
2.18	10.0	10.2	10.4	7.80	0.9	1.30	1.50	1.70	52	131	103	81	50	35	25
1.62	10.0	10.2	10.4	8.54	0.9	0.56	0.76	0.96	52	162	117	85	85	52	33
1.10	10.0	10.2	10.4	8.86	0.9	0.24	0.44	0.64	52	127	79	49	78	39	19
0.88	10.0	10.2	10.4	8.90	0.9	0.20	0.40	0.60	52	89	49	27	54	22	9
0.66	10.0	10.2	10.4	8.96	0.9	0.14	0.34	0.54	52	60	27	12	37	11	4
0.55	10.0	10.2	10.4	9.02	0.9	0.08	0.28	0.48	52	54	21	8	36	9	2
0.44	10.0	10.2	10.4	9.05	0.9	0.05	0.25	0.45	52	42	13	4	29	5	1
0.33	10.0	10.2	10.4	9.09	0.9	0.01	0.21	0.41	52	34	7	1	26	3	0
0.22	10.0	10.2	10.4	9.11	0.9	-0.01	0.19	0.39	52	Flooded	2	0	Flooded	1	0

Figure 13-3: 2021 Overtopping rates for the new quay using HUMBER 2100+ Upper end scnearrio

Upper End Scenario										Equation 7.6 Design approach (Max Overtopping)			Equation 7.16 Oblique wave effect (Min Overtopping)		
										Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
H _{m0} (m)	Crest level 1 (mCD)	Crest level 2 (mCD)	Crest level 3 (mCD)	SWL (mCD)	SLR (m)	R _c 1 (m)	R _c 2 (m)	R _c 3 (m)	β	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)	q (l/s/m)
2.38	10.0	10.2	10.4	6.34	1.14	2.52	2.72	2.92	52	45	36	29	10	7	5
2.37	10.0	10.2	10.4	7.07	1.14	1.79	1.99	2.19	52	98	79	63	31	22	16
2.18	10.0	10.2	10.4	7.80	1.14	1.06	1.26	1.46	52	175	138	109	77	54	38
1.62	10.0	10.2	10.4	8.54	1.14	0.32	0.52	0.72	52	238	172	125	150	93	58
1.10	10.0	10.2	10.4	8.86	1.14	0.00	0.20	0.40	52	224	139	87	181	90	44
0.88	10.0	10.2	10.4	8.90	1.14	-0.04	0.16	0.36	52	Flooded	100	55	Flooded	64	27
0.66	10.0	10.2	10.4	8.96	1.14	-0.10	0.10	0.30	52	Flooded	70	32	Flooded	47	15
0.55	10.0	10.2	10.4	9.02	1.14	-0.16	0.04	0.24	52	Flooded	66	25	Flooded	48	12
0.44	10.0	10.2	10.4	9.05	1.14	-0.19	0.01	0.21	52	Flooded	53	16	Flooded	42	7
0.33	10.0	10.2	10.4	9.09	1.14	-0.23	-0.03	0.17	52	Flooded	Flooded	10	Flooded	Flooded	4
0.22	10.0	10.2	10.4	9.11	1.14	-0.25	-0.05	0.15	52	Flooded	Flooded	3	Flooded	Flooded	1

13.4.5 Comparable rates between the original and updated assessment are summarised Table 13-3 below.

Table 13-3: Comparison of overtopping analyses

Quay Level (m aOD)	Overtopping Rates (l/s/m)		
	Original FRA, 2114	Humber 2100+ Higher Central, 2021	Humber 2100+ Upper End, 2021
6.1	91.8	85 ¹	SWL = 6.35 m aOD Rear Quay level = 6.38 m aOD
6.3	61.6	52	SWL = 6.35 m aOD Rear Quay Level = 6.58 m aOD
6.5	Not reported	33	58

1 Whilst the Table predicts 10mm of over topping at the maximum water level, the quay has a 1:100 gradient and rises to a level of 6.38m aOD, at 28m from the quay face

13.4.6 The overtopping analysis in the original FRA² also considered the effects of reflected waves on existing flood defences to the north of the quay. In short it was concluded that rock armour was required over the existing flood defence revetment to limit overtopping to 2l/s/m. The effect of the

proposed change on wave reflection, and in particular the setback berth is discussed in Chapter 8 of this PEIR. In short, it concludes that the setback will have a beneficial effect on wave reflection which is likely to reduce. Notwithstanding this a quantitative assessment will be undertaken.

Additional Cumulative Effects

- 13.4.7 There will be no additional cumulative effects associated with Flood Risk and Drainage.

Consideration of DCO

- 13.4.8 Following this review, it is concluded that the changes in baseline understanding and the changes to the scheme will not result in any new or significant increased effects on Flood Risk and Drainage. This conclusion will be reviewed upon the completion of the updated wave over topping assessment.

13.5.0 Requirement for Additional Mitigation

DCO Mitigation

13.5.1 Key mitigation proposed for the construction phase as part of the DCO involves adherence to good construction methodology as set out in Environment Agency Pollution Prevention Guidance [now Pollution Prevention for Business]. Much of this is secured under requirements of Schedule 11.

13.5.2 This will include:

- minimising pollution risk through the use of good construction practices including use of drip trays on mechanical equipment such as pumps and generators and fail-safe bunded storage of fuel and cement and other materials to prevent spillage to groundwater, watercourses or the sea;
- over-pumping around works in watercourse channels will be carried out with a suitably-sized pump, in order that excessive flows are not generated and disturbance of the bed material is minimised;
- watercourse bank reinstatement works will be carried out by vehicles operating from the bank rather than the watercourse channel;
- for work on, over or adjacent to the watercourses, a maximum of one third of the watercourse will be bunded at any time, and the bunds will have a minimal height above normal water level, and should either wash out or create minimal obstruction during flood conditions.
- construction materials will be prevented from entering watercourses or the sea and blocking either the channels or culverts and bridges; and
- care will be taken with all works involving concrete and cement. Suitable provision will be made for the washing-out of concrete mixing plant or ready-mix concrete lorries, and such washings will not be allowed to flow into watercourses or the sea.

13.5.3 Key mitigation proposed for the operational phase as part of the DCO, will also include adherence to Environment Agency Pollution Prevention Guidance [now Pollution Prevention for Business]. In addition, the following additional mitigation measures are proposed:

- fail-safe bunded storage of fuel and other substances to prevent spillage to groundwater, watercourses and the sea;
- provision of oil interceptors in paved areas;
- installation of penstocks on outfalls to watercourses and the sea to contain any pollution incidents (where there is an identified risk); and
- the implementation of a robust Flood Warning and Evacuation Plan for the site with its key objective being to evacuate the site before flooding occurs. Any people on the site will make their way off site (if safe to do so) or to the safe refuges on the upper floors of the buildings and await rescue by the emergency services. The Flood Warning and Evacuation Plan will not have any particular environmental impacts.

Alternate or Additional Mitigation

- 13.5.4 Following this review, it is concluded that no further mitigation is required, over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Flood Risk and Drainage relating to the proposed scheme. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

13.6.0 Residual Effects

Construction Phase

13.6.1 Within the ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Flood Risk and Drainage during the construction phase were identified to be:

- the accidental release of polluting substances into the sea and inland watercourses (control measures will be implemented to mitigate the impacts of pollution incidents).

Operational Phase

13.6.2 Within the ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Flood Risk and Drainage during the operation phase were identified to be:

- Flood risk due to breach of tidal defences (to be mitigated by implementation of a robust Flood Warning and Evacuation Plan);
- Flood risk due to over topping of the existing tidal defences to the north of the quay which, under the terms of legal agreement (Appendix U13-2), will be restricted to no more than 2l/s/m for the 1 in 200 annual probability event (to be mitigated by implementation of a robust Flood Warning and Evacuation Plan);
- Flood risk due to failure of the proposed NELDB pumping station (residual impacts are likely to be Minor Adverse and will be mitigated by the use of multiple pumps, alarms, etc); and
- Flood risk due to failure of the proposed foul pumping stations (residual impacts are likely to be Minor Adverse and will be mitigated by the use of standby pumps, alarms and flow storage facilities).

Consideration of DCO

13.6.3 Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

13.7.0 Other Environmental Issues

- 13.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 13.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 13.7.3 The risks associated with Infrastructure are not of relevance to this Chapter.

Waste

- 13.7.4 The risks associated with Waste are not of relevance to this Chapter.

Population and Human Health

- 13.7.5 The Chapter has considered the risks associated with Flood Risk and the impacts this may pose with regard to population and human health.

Climate and Carbon Balance

- 13.7.6 The assessment has duly considered the risks associated with climate change through assessment of a suitable future flood risk scenario with raised sea levels. As such, the consideration of climate change is inherently contained within the existing assessment.

Risks of Major Accidents and/or Disasters

- 13.7.7 The assessment duly considers the risks associated with major accidents and/or disasters through assessing the risks associated with flooding, especially with regard to a breach flood scenario.

Summary

With regards to the EIA regulations 2017, in terms of Flood Risk and Drainage there are not considered to be any likely significant effects with regards to Other Environmental Issues.

13.8.0 Summary of Effects

- 13.8.1 As detailed in the original ES residual effect relating to Flood Risk and Drainage will be minimal. This will not impact by the proposed material amendments. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

13.9.0 Conclusions

- 13.9.1 The site is set in a context where flooding is possible; however, this risk is largely controlled through flood defences. The scheme design has been developed to reflect the prevailing risk and will not exacerbate flood risk elsewhere. Residual risk will then be managed through implementation of a robust flood warning and evacuation strategy.
- 13.9.2 With regards to drainage, storm water runoff from the site will largely be discharged to the Humber Estuary. Particularly during construction however, there is a potential for pollution to occur to the adjacent surface water channels and networks. This will be controlled and managed through the implementation of good construction practices.
- 13.9.3 In both cases the proposed material amendment will make no difference to the potential effects and no additional mitigation will be required.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 14: COMMERCIAL AND RECREATIONAL NAVIGATION

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

14.1.0 INTRODUCTION	14-1
Development Consent Order Context.....	14-1
Purpose and Structure of Chapter	14-1
14.2.0 METHODOLOGY.....	14-3
Changes in Legislation, Guidance and Planning Policy.....	14-3
Scoping Opinion	14-4
Additional Consultation.....	14-7
Assessment Methodology	14-8
Effects Not Requiring Further Assessment.....	14-10
14.3.0 CHANGES IN BASELINE CONDITIONS.....	14-11
DCO Baseline	14-11
Current Baseline	14-11
Changes in Baseline.....	14-13
DCO Future Baseline.....	14-15
14.4.0 ASSESSMENT OF EFFECTS	14-16
Additional Construction Phase Effects	14-20
Additional Operational Phase Effects.....	14-20
Consideration of DCO	14-21
14.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	14-25
DCO Mitigation.....	14-25
Alternate or Additional Mitigation.....	14-26
14.6.0 OTHER ENVIRONMENTAL ISSUES.....	14-27
Other Environmental Issues of Relevance	14-27
14.7.0 SUMMARY OF EFFECTS	14-28
14.8.0 CONCLUSIONS	14-29

DOCUMENT REFERENCES

TABLES

Table 14-1 : Legislation and Policy	14-3
Table 14-2 : Scoping Opinion.....	14-4
Table 14-3 : Preliminary Additional Consultation	14-7
Table 14-4 : Frequency Criteria	14-9
Table 14-5 : Magnitude of Change (Impact).....	14-9
Table 14-6 : Significance of Effect	14-9
Table 14-7: Total Vessel Movements (ABP Humber)	14-12
Table 14-8: Assessment of Effects.....	14-16
Table 14-9: Preliminary Risk Assessment Review	14-22
Table 14-10 : Embedded Mitigation Measures	14-25

FIGURES

Figure 14-1: Vessel Tracks from AIS – All Vessels (12 th – 25 th August 2019)	14-12
Figure 14-2: Vessel Tracks from AIS – All Vessels (16 th – 29 th January 2020).....	14-13
Figure 14-3: Humber Estuary Port Tonnage 2005 to 2019. Data source: Department for Transport (DfT)	14-14
Figure 14-4: Humber international short sea, long sea and cruise passenger movements 2005 to 2019. Data source: DfT.....	14-14
Figure 14-5: Humber vessel movements 2005 – 2019. Data source: DfT	14-15

14.1.0 Introduction

Development Consent Order Context

14.1.1 This PEIR chapter has been prepared to consult on navigation aspects of a proposed material change application under Schedule 6 of the Planning Act 2008 and Part 2 of the Infrastructure Planning (Changes to, Revocation of, Development Consent Orders) Regulations 2011. The proposed changes affect The Able Marine Energy Park Development Consent Order (DCO) 2014 (Statutory Instrument 2014 No. 2935).

14.1.2 An Navigational Risk Assessment¹ (NRA) was completed in 2011 and submitted in support of the DCO application. The NRA assessed the development as authorised.

14.1.3 Consideration of Material Amendment

14.1.4 The applicant is seeking to amend the authorised development via a material amendment as detailed within Chapter 4: Description of Changes to Development. Amendments of significance to shipping and navigation are detailed below:

- Increased duration of vessel movements associated with an increased usage of deposit sites within the Humber Estuary;
- Potential changes to vessel arrivals, departures and berthing as a result of amendments to the quay line including;
 - Removal of the specialist berth at the southern end of the quay;
- Creation of a 61 m x 288 m recess in the quay line at the northern end of the quay to accommodate a barge and Ro-Ro berth of -11m CD to allow end load in and load out of cargo.

14.1.5 No materially different construction operations are proposed and no increase in the overall dredge tonnage is predicted.

Purpose and Structure of Chapter

14.1.6 This chapter of the PEIR considers the impact of the proposed development on commercial navigation.

14.1.7 This technical chapter, includes:

- Description of the project and significance of material amendment to shipping and navigation;
- Summary of scoping recommendations applicable to shipping and navigation;
- Preliminary assessment of the current baseline navigation and risk profile within the study area;

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000402-14.2%20-%20Navigation%20Risk%20Assessment.pdf>

- Preliminary stakeholder consultation;
- Preliminary impact identification and assessment;
- Review of existing embedded mitigations; and
- An outline of the approach and scope of the NRA.

14.2.0 Methodology

- 14.2.1 This PEIR assesses the change in impact to commercial and recreational navigation as a result of the material change. It considers the navigation risk posed by the presence of the project to commercial, recreational and fishing vessels.
- 14.2.2 The PEIR considers commercial and recreational aspects based on work undertaken to date and in advance of the comprehensive Navigation Risk Assessment (NRA) and Environmental Statement (ES) and shall be utilised as a foundation for the NRA consultation process.
- 14.2.3 The assessment considers the direct impacts resulting from the presence of the project and associated construction vessels and dredging activities. However, additional comments will be made on the impacts to the wider river area where applicable for consideration of cumulative impacts.

Changes in Legislation, Guidance and Planning Policy

- 14.2.4 This PEIR considers the legislation and policy outlined within Table 14-1.

Table 14-1 : Legislation and Policy

Title	Description
Legislation	
International Regulations for Preventing Collisions at Sea 1972 (as amended) COLREGS	International guidance for the prevention of collisions at sea.
British Transport Act 1981	Provisions of Harbours Act 1964 and Docks and Harbours Act 1966 applying to Associated British Ports
Humber Navigation Byelaws 1990	Vessel navigation and berthing requirements administered by ABP Humber as the Statutory Harbour Authority.
Guidance	
Planning Act 2008: Guidance on Changes to Development Consent Orders (December 2015).	Characteristics by which changes may be considered material.
Guide to Good Practice on Port Marine Operations (2018)	Supplementary to Port Marine Safety Code (PMSC). Useful information and detailed guidance on the management of ports and other marine facilities.
International Maritime Organisation (IMO) Formal Safety Assessment (FSA)	Internationally recognised methodology for undertaking navigation risk assessments.

Policy	
Port Marine Safety Code (PMSC) 2016	National standard for port marine safety for harbour authorities, other marine facilities, berths and terminals with statutory powers and duties within the UK.

Scoping Opinion

- 14.2.5 Table 14-2 provides a summary of the Scoping Opinion feedback received from interested parties in March 2021, whilst Table 14-3 provides a summary of preliminary consultation undertaken to inform the PEIR.
- 14.2.6 Additional detailed consultation will be undertaken during the full NRA process and production of the EIA. The approach to the NRA and the updated ES will be agreed with the relevant consultation bodies, notably the MCA, prior to commencement.

Table 14-2 : Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome
Section 4.8, ID 4.8.1 Page 33	Inspectorate's comments	No matters have been proposed to scope out of the assessment.	All commercial and recreational navigation impacts are scoped in.
		The Scoping Report explains that the assessment will review current automated Identification System (AIS) data and will review the risks associated with a prolonged period of vessel movements.	AIS data has been commercially sourced for August 2019 and January 2020. Advice was sought from Harbour Master Humber to establish representative data periods.
		Navigational impacts arising from increased vessel movements associated with the increased maintenance dredging requirements is to be assessed and considered in combination with other projects.	Navigational impacts arising from increased vessel movements is scoped in. Effects of significance are identified in Table 14-8.
		The Applicant should make effort to agree the approach to the assessment in the updated ES with the relevant consultation bodies.	The approach to the NRA and the updated ES will be agreed with the relevant consultation bodies, notably the MCA, prior to commencement.

Page & Paragraph No.	Scoping Opinion	Comments	Outcome
Section 4.8, ID 4.8.2 Page 33	Inspectorate's comments	The Inspectorate considers that the assessment methodology for Commercial and Recreational Navigation should be updated in line with guidance from the Maritime and Coastguard Agency (MCA). The Applicant should make effort to agree the relevant methodology for the assessment with consultation bodies including the MCA.	The approach to the NRA and the updated ES will be agreed with the relevant consultation bodies, notably the MCA, prior to commencement.
Appendix 2	MMO	The MMO defers to the Maritime Coastguard Agency (MCA) and Trinity House on the suitability of the scope of the assessment with regards to navigation of vessels.	Noted. The approach to the NRA and the updated ES will be agreed with the relevant consultation bodies, notably the MCA, prior to commencement.
Appendix 2	Trinity House	I can advise that Trinity House is content with the Scoping Opinion Report and has no further comments to make at this time.	Noted.
-(Late Response)	Maritime & Coastguard Agency	On the understanding that the proposed assessment methodology for Commercial and Recreational Navigation is updated for the updated Environmental Statement, and that Associated British Ports Ltd (ABP) as the Statutory Harbour Authority for the Humber Estuary, remains fully consulted, the MCA has no concerns to raise that this time.	The approach to the NRA and the updated ES will be agreed with the relevant consultation bodies, notably the MCA, prior to commencement. The NRA methodology will be updated in line with industry best practice.
Section 4.6, ID 4.6.1 Page 30	Inspectorate's comments	The Inspectorate notes that the original assessment of impact to commercial fisheries was produced a substantial time ago in 2010. The updated ES should include updated baseline information to demonstrate that there has been no material change in the importance of the location for	The prevalence of commercial fishing vessels within the study area will be reviewed as part of the NRA update to infer whether there has been any demonstrable or

Page & Paragraph No.	Scoping Opinion	Comments	Outcome
		commercial fisheries and if there has, the updated ES should assess any new or different significant effects.	material change to commercial fishing intensity.
Section 4.19, ID 4.19.3 Page 44	Inspectorate's comments	The Inspectorate agrees with comments received from Hull City Council that cumulative effects with major development proposed in the middle estuary should be assessed in the updated assessment. The Applicant should make effort to agree the list of other developments located within the middle estuary that should be included in the updated assessment with relevant consultation bodies.	NRA consultation will be undertaken with relevant stakeholders and the Statutory Port Authority to establish cumulative effects significant to commercial and recreational navigation.
Section 4.22, ID 4.22.2 Page 48	Inspectorate's comments	The Scoping Report explains that the major accidents/disasters which could be caused or experienced by the proposed development are limited to impacts on navigation in the River Humber and navigation impacts at Humberside airport. It states that the original ES included an assessment on Commercial and Recreational Navigation and a Navigation and Vessel Traffic Risk Assessment and considers that major accidents/hazards have already been appropriately assessed in the original ES, and that this Risk Assessment will be updated in the assessment process to reflect on site proposals.	Major accidents, as they relate to commercial and recreational navigation, will be scoped into the NRA and Commercial and Recreational Navigation ES chapter update.
		The Health and Safety Executive have identified five major accident hazard sites, and one major hazard pipeline within the application boundary. The Inspectorate considers that these matters should also be addressed within the updated risk assessment. The Applicant should make effort to agree the approach to the assessment with relevant consultation bodies.	Major accidents, as they relate to commercial and recreational navigation, will be scoped into the NRA and Commercial and Recreational Navigation ES chapter update.

Page & Paragraph No.	Scoping Opinion	Comments	Outcome
Appendix 2	HSE	According to HSE's records there are five major accident hazard sites and one major accident hazard pipeline within the proposed DCO application boundary of the proposed Able Marine Energy Park Material Change 2 for this Nationally Significant Infrastructure Project.	Major accidents, as they relate to commercial and recreational navigation, will be scoped into the NRA and Commercial and Recreational Navigation ES chapter update.

Additional Consultation

14.2.7 Table 14-3 provides a summary of any preliminary additional consultation undertaken with stakeholders to date. Additional consultation will be undertaken during the full NRA process and production of the ES Chapter.

Table 14-3 : Preliminary Additional Consultation

Date	Consultee	Comments	Outcome
01 March 21	ABP Humber	Hydrodynamic scour leading to silt build up is a concern around the northern barge berth.	Impact on ship grounding risk is scoped into the NRA update.
		Care will need to be taken to ensure that dredge deposits to HU082 do not encroach on the dredged channel.	Impact on ship grounding risk is scoped into the NRA update.
		No significant concerns relating to navigation risk at this stage.	Noted
		Generally, vessel transit frequency has decreased since 2018.	Noted
		Up to date AIS data should be assessed within the NRA. 2019 data is considered to be more representative due to the impact of Coronavirus.	AIS data sourced for August 2019 and January 2020.

Study Area

14.2.8 The 2011 NRA considered a study area from Immingham Oil Terminal to King George Dock. The study area for the purposes of the NRA Update and ES has been extended as shown in Figure 14-1 and Figure 14-2 to incorporate the dredge deposit sites. However, additional comments will be made on the impacts to the wider river area where applicable for consideration of cumulative impacts.

Input Data

14.2.9 The principal data source for the PEIR is AIS. AIS is a transponder system, required on large commercial ships of over 300 Gross Tonnes (GT) and carried voluntarily by smaller fishing and recreational craft, that sends information about vessel identity and location every few seconds to nearby vessels. One month of AIS data has been commercially sourced for the study area for the following durations to reflect seasonal variations:

- 12th – 25th August 2019 inclusive (14 days); and
- 16th – 29th January 2020 inclusive (14 days).

14.2.10 Additional information will be utilised in support of the NRA update, which may include Port Authority statistics, Vessel Monitoring System (VMS) data, historic incident data, pilotage guides and sailing directions from the Admiralty.

Coronavirus Statement

14.2.11 It was noted in consultation with ABP Humber that 2020 is considered largely unrepresentative of the typical traffic profile of the port owing to Coronavirus. Data was therefore selected from August 2019 and January 2020 (pre-coronavirus) to more accurately reflect the true traffic profile.

Assessment Methodology

14.2.12 In advance of the NRA that will accompany the final application, a high-level preliminary assessment of the significance of the potential effects has been undertaken. Broad hazard categories were established for assessment within the PEIR following the identification of navigationally significant impacts that may have the ability to be impacted by the material change, informed by scoping², scoping opinion³ and the 2011 NRA⁴. For each, possible additional mitigation has been suggested based on information available to date.

14.2.13 A detailed assessment of risk for individual hazards will be undertaken as part of the NRA and presented within the subsequent NRA report and Commercial and Recreational Navigation ES chapter. A comprehensive review of additional mitigation, including the appropriateness of that proposed as part of the 2011 assessment will be undertaken. The NRA will utilise a more detailed method of assessment that will consider the likelihood and consequence with quantified scales and the impacts to people, property, the environment and stakeholders utilising the IMO's formal safety assessment methodology.

14.2.14 A simple 5x5 matrix was utilised for the assessment of significance of effects for the DCO ES as detailed in Table 14-6. The frequency and consequence criteria for which are detailed in Table 14-4 and Table 14-5. For consistency, the same matrix has been utilised.

14.2.15 It should be noted that, the approach and terminology of the 2011 NRA, conducted for the DCO ES and DCO application, was undertaken to be cognisant of the existing estuary-wide risk assessment that has been conducted by Associated British Ports (ABP) as the Statutory Harbour Authority. Since

² Fairhurst (2020) AMEP Quay Material Change Application – EIA Scoping Report

³ TR030006-000036-TR030006 – Scoping Opinion

⁴ BMT Isis (2011) TR030001-000402-14.2 – Navigation Risk Assessment

2011, ABP has revised its risk assessment and vessel category bands and terminology. As such the NRA update will be updated accordingly and where possible, phraseology will be adopted that is consistent with that utilised by ABP.

Frequency Criteria

Table 14-4 : Frequency Criteria

Frequency	Definition
Frequent	An event that could be expected to occur yearly.
Likely	An event that could be expected to occur once in 10 years.
Possible	An event that could be expected to occur once in 100 years.
Unlikely	An event that could be expected to occur once in 1,000 years.
Remote	An event that could be expected to occur less than once > 1, 000 years.

Magnitude of Change (Impact)

Table 14-5 : Magnitude of Change (Impact)

Magnitude	Definition
Catastrophic	Multiple fatalities, total loss of vessel, significant pollution or significant operational impact to shipping.
Major	Multiple major injuries or a single fatality, major damage to vessel, major pollution, major operational impact to shipping.
Moderate	Multiple minor injuries or a single major, major damage to vessel, some pollution, some operational impact to shipping.
Minor	Single minor injury, minor damage to vessel, minor pollution, minimal operational impact to shipping.
Negligible	Possible very minor injury, negligible property costs, no pollution, minimal operational impact.

Significance of Effect

Table 14-6 : Significance of Effect

Impact		Frequency				
		Frequent	Likely	Possible	Unlikely	Remote
Magnitude of Effect	Catastrophic	Very High	Very High	High	Moderate	Moderate
	Major	Very High	High	Moderate	Moderate	Moderate
	Moderate	High	Moderate	Moderate	Low	Low
	Minor	Moderate	Low	Low	Low	Negligible

Impact	Frequency				
	Frequent	Likely	Possible	Unlikely	Remote
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

14.2.16 Where appropriate, the significance of effect will be classified as being direct, indirect or cumulative. Effects assessed for the construction phase are considered to be short term while operational phase effects are considered long term. Effects that are assessed to have increased will be considered to have been adversely effected by the proposed material change while those that are assessed to have decreased are considered beneficially impacted by the proposed material change.

14.2.17 The consideration of effects is contained within Section 14.4.0 of this Chapter.

Effects Not Requiring Further Assessment

14.2.18 The Environmental Impact Assessment Scoping Report⁵ and Scoping Opinion⁶ detail the elements relevant to commercial navigation required for assessment within an updated NRA for the proposed material change application and these are summarised in Table 14-2.

14.2.19 The effects considered relevant to the assessment of commercial and recreational navigation are identified in Table 14-8.

14.2.20 The original assessment of commercial and recreational navigation was produced a substantial time ago in 2010 requiring a review and update of the baseline to assess any new or different significant effects. The material change has been identified as having the potential to influence all of the effects assessed as part of the 2011 NRA and identified in Table 14-8. All effects are therefore scoped into the assessment of Commercial and Recreational Navigation.

14.2.21 One additional effect has been included for assessment, namely, ‘Impact on mooring / breakout risk’ so as to align with current standard best practice.

14.2.22 The risk assessment covers all foreseen and credible hazards to navigation but does not include health and safety related effects. Health & safety and injury to personnel are considered as a potential consequence in the assessment of navigation hazards and are, therefore, not separately assessed.

⁵ Fairhurst (2020) AMEP Quay Material Change Application – EIA Scoping Report

⁶ TR030006-000036-TR030006 – Scoping Opinion

14.3.0 Changes in Baseline Conditions

DCO Baseline

- 14.3.1 The DCO assessment baseline is detailed within the 2011 NRA⁷. Aspects of significance to the assessment of the current baseline are considered within the assessment of changes in baseline within Section 14.3.12 to Section 14.3.14.

Current Baseline

- 14.3.2 Almost one quarter of the UK's seaborne trade, by tonnage, passes through the Humber; this includes 25 per cent of the country's natural gas and 25 per cent of its refined petroleum products with the port handling in the region of 30,000 international shipping movements each year⁸.
- 14.3.3 Associated British Ports (ABP) operates four ports on the River Humber - Hull, Goole, Grimsby and Immingham of which Grimsby and Immingham are within the assessment study area. ABP is the Statutory and Competent Harbour Authority (SHA / CHA) overseeing navigation for the Humber Estuary.
- 14.3.4 A wide range of industrial works are situated on or near the estuary including ports, oil refineries, chemical plants and power generation facilities, including the Immingham Oil Terminal (IOT), Associated Petroleum Terminals (APT), South Killingholme Oil Jetty and the C.Ro Port (Killingholme).
- 14.3.5 The Humber Passage Plan, developed to facilitate the safe movement of large vessels in the Humber, applies to all vessels of over 40,000 DWT or with a draught greater than 11 metres and to gas carriers of over 20,000 cubic m irrespective of draught.
- 14.3.6 ABP Humber Estuary Services (HES) monitor navigation safety and provide advice to vessels within the estuary through its Vessel Traffic Services (VTS). HES is the Competent Harbour Authority providing pilotage for all traffic using the Humber Estuary. Additionally, a Safety Management System (SMS) is operated by HES in accordance with the Port Marine Safety Code (PMSC).
- 14.3.7 The original assessment of commercial and recreational navigation was produced a substantial time ago in 2010 requiring a review and update of the baseline to assess any new or different significant effects.
- 14.3.8 Current Automated Identification System (AIS) data has been obtained and is shown in Figure 14-1 and Figure 14-2. The AIS, supported by relevant secondary sources will provide an updated baseline from which to assess impacts arising from the material change including those associated with a prolonged period of vessel movements as stipulated within the Scoping.
- 14.3.9 Approximately 50 vessels per day were identified from AIS transiting past the AMEP project site in January 2020 and 58 per day in August 2019.
- 14.3.10 Vessel movement data has additionally been provided by ABP Humber as demonstrated in Table 14-7 which indicates 21,651 total vessel movements within the Humber Estuary during 2020.

⁷ BMT Isis (2011) TR030001-000402-14.2 – Navigation Risk Assessment

⁸ ABP Humber Estuary Services Website (2021)

Table 14-7: Total Vessel Movements (ABP Humber)

Total Vessel Movements				
2016	2017	2018	2019	2020
24,876	25,540	25,637	24,625	21,651

14.3.11 A detailed analysis of AIS by vessel type, Length Over-All (LOA) and proximity to the Project will be undertaken as part of the NRA process, supported by additional information sources such as Port Authority statistics, Vessel Monitoring System (VMS) data, historic incident data, pilotage guides and sailing directions from the Admiralty.

Figure 14-1: Vessel Tracks from AIS – All Vessels (12th – 25th August 2019)

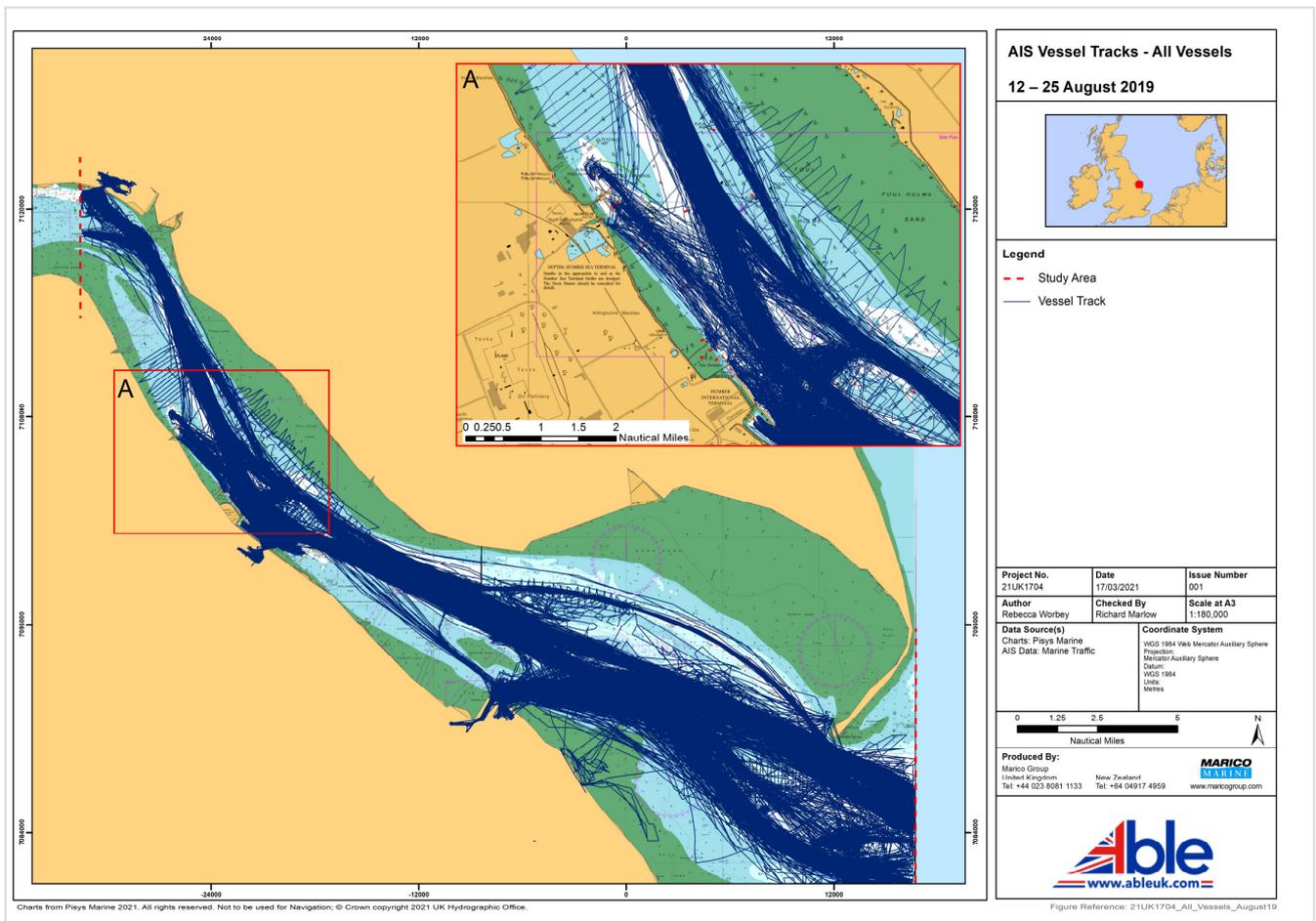
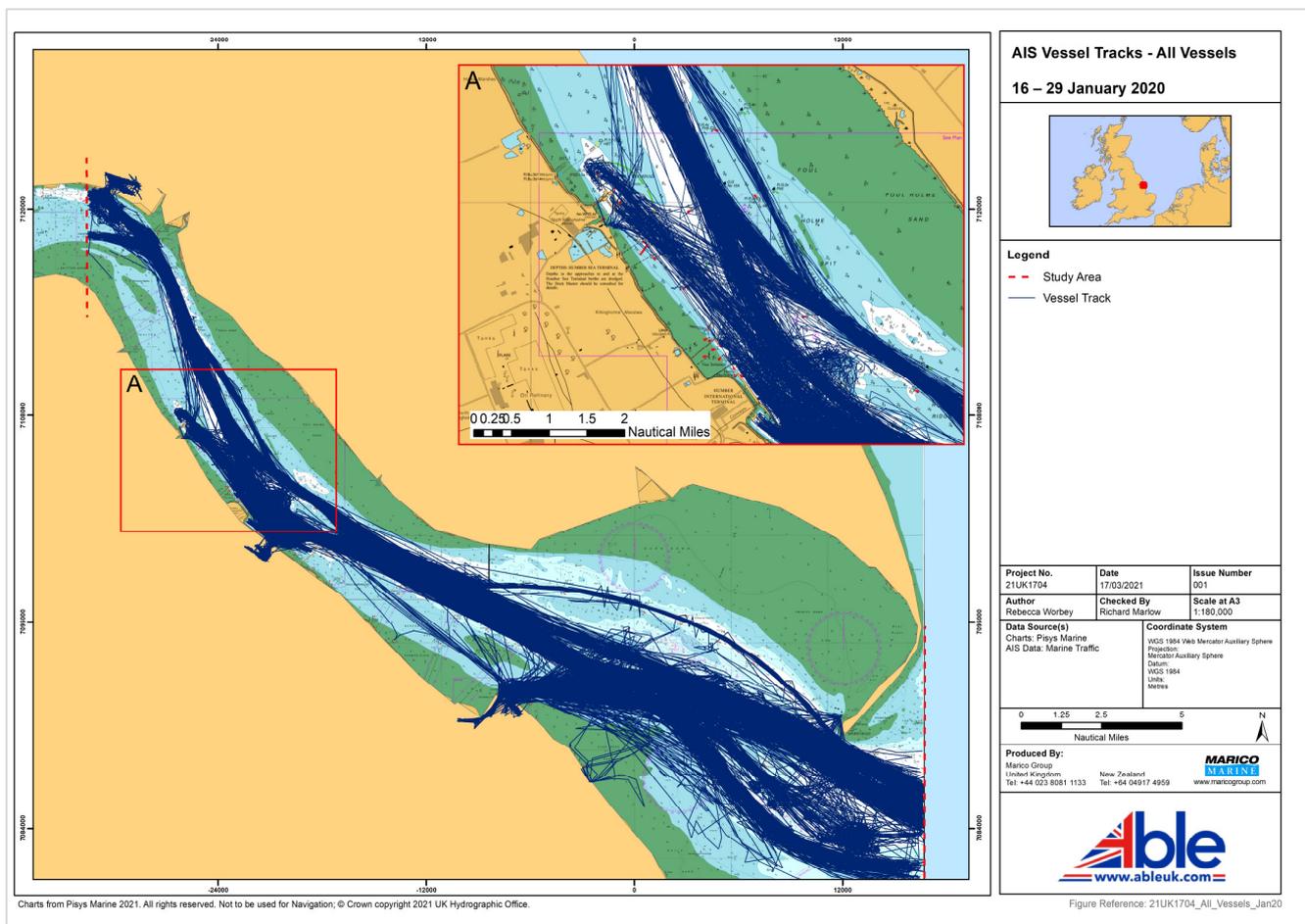


Figure 14-2: Vessel Tracks from AIS – All Vessels (16th – 29th January 2020)



Changes in Baseline

- 14.3.12 Figure 14-3 to Figure 14-5 show the change in Humber Estuary port tonnage, passenger vessel movements and total vessel movements respectively between 2005 and 2019. The data was obtained from Department for Transport (Dft) and updates the analysis undertaken within the 2011 NRA based on the same data source.
- 14.3.13 With the exception of passenger vessel movements to Grimsby and Immingham which more than doubled between 2005 and 2009, there has been a declining trend in total estuary port tonnage, overall passenger vessel movements and total vessel movements. This analysis is consistent with preliminary feedback received from ABP Humber Table 14-3.
- 14.3.14 The preliminary analysis of AIS in Figure 14-1 and Figure 14-2 identified approximately 50 vessels per day transiting past the AMEP project site in January 2020 and 58 per day in August 2019. The 2011 NRA estimated approximately 115 transits per day from AIS indicating a greater than 50% reduction in transits. It should however be noted that only four days of AIS were obtained for assessment within the 2011 NRA which is not considered a large enough dataset from which to derive trends.

Figure 14-3: Humber Estuary Port Tonnage 2005 to 2019. Data source: Department for Transport (DfT)

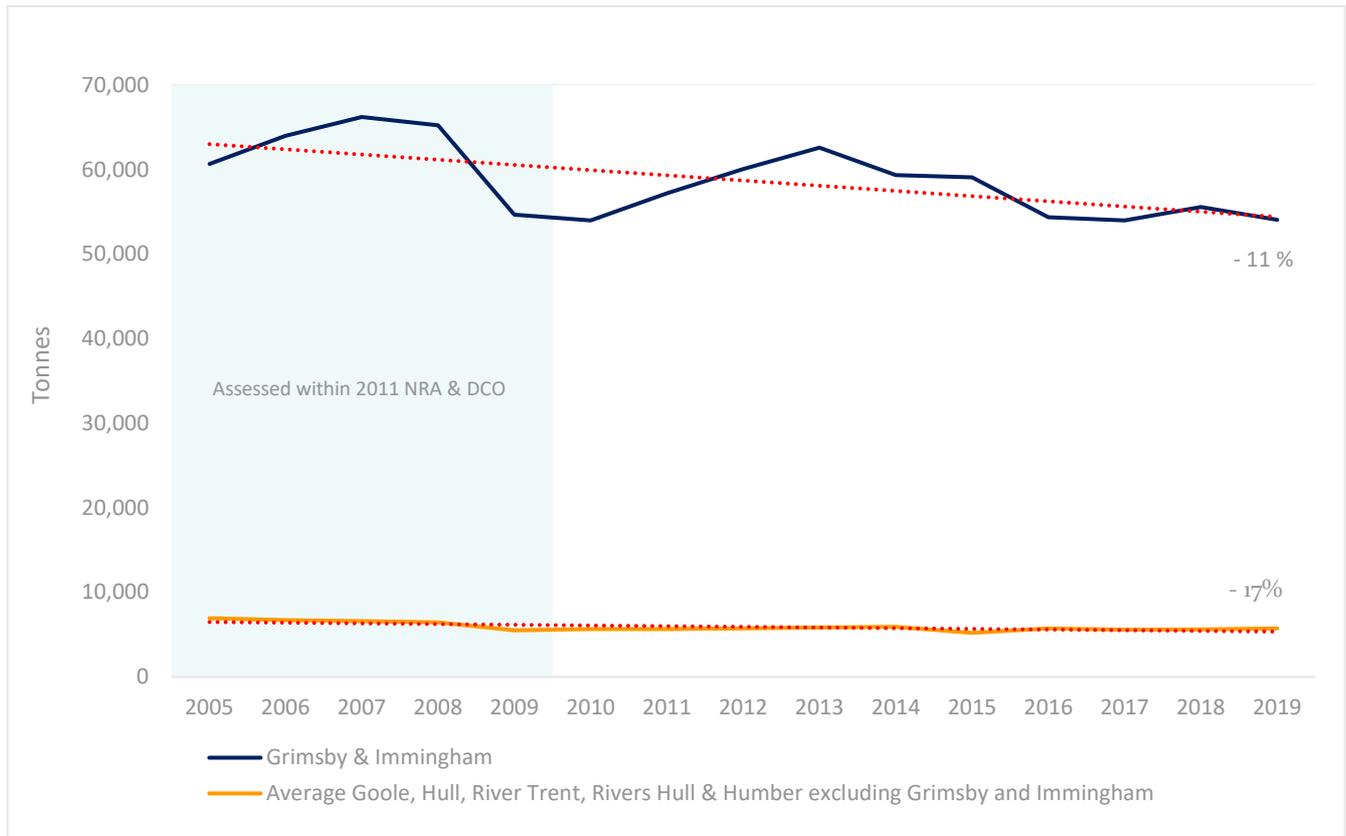


Figure 14-4: Humber international short sea, long sea and cruise passenger movements 2005 to 2019. Data source: DfT.

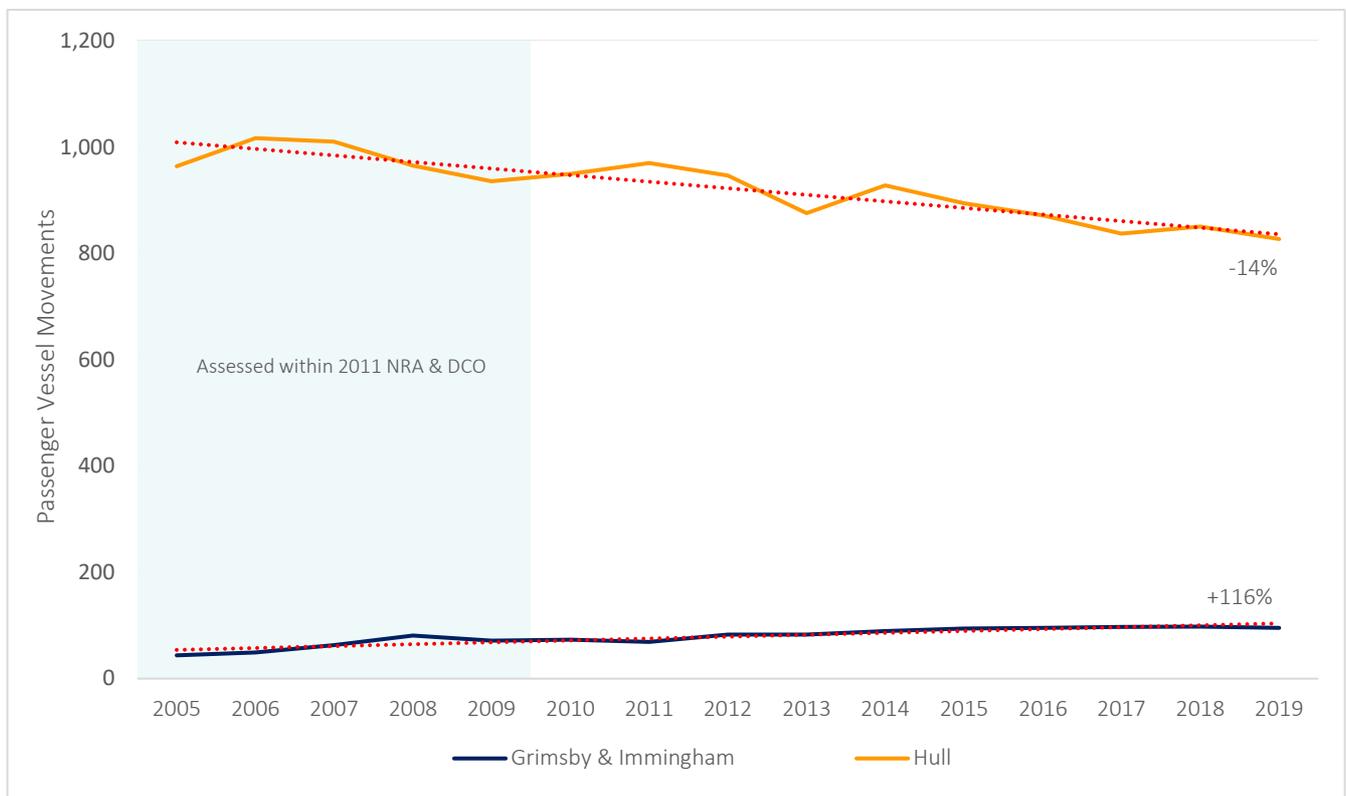
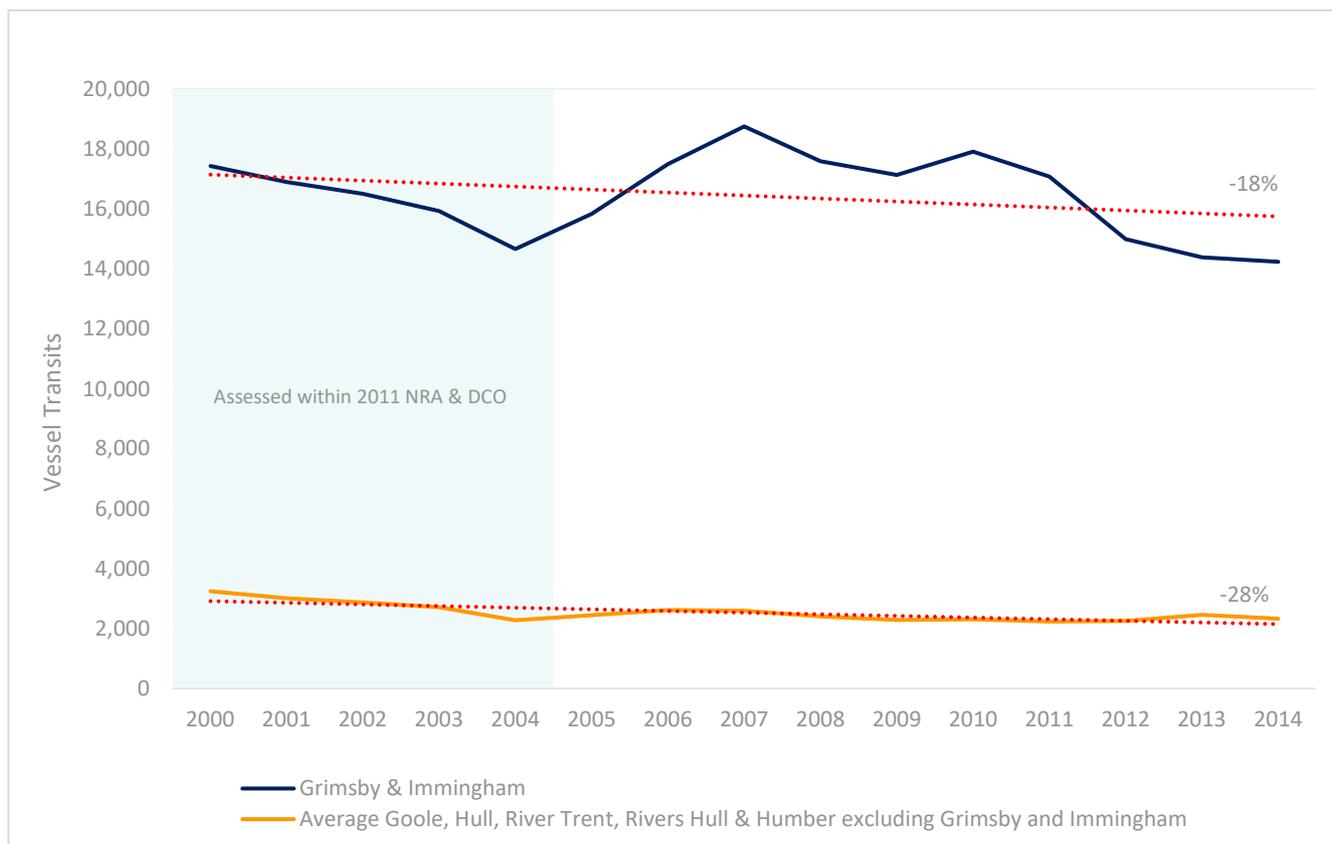


Figure 14-5: Humber vessel movements 2005 – 2019. Data source: DfT



DCO Future Baseline

- 14.3.15 Able UK will have responsibility as a statutory harbour authority over the AMEP site, however, ABP by virtue of the Humber Conservancy Acts (1852-1907) and the Harbour Reorganisation Scheme 1966 will remain the conservancy and Navigation Competent Harbour Authority for the River Humber (including the Lower Trent to Gainsborough) in addition to the Local Lighthouse Authority (Merchant Shipping Act 1894).
- 14.3.16 The data presented in **Section 14.3.0** reasonably suggests a continuing decreasing trend of vessel movements. However, additional considerations, such as the recent announcement that the Humber is to become one of the UK’s Free Ports must be taken into account.
- 14.3.17 A detailed assessment of future and cumulative and in-combination impacts will be undertaken as part of the NRA Update and ES informed by detailed stakeholder consultation.

14.4.0 Assessment of Effects

14.4.1 Following review of the baseline environment, scoping report and scoping responses, the potential effects of the Project on commercial and recreational navigation are identified and justified in Table 14-8.

Table 14-8: Assessment of Effects

Potential Effect	Detail	Justification for Assessment
Construction Phase		
Impact on ship collision risk	Two or more vessels impact each other whilst manoeuvring / on transit.	Increased vessel movements associated with dredging / dredge disposal activities.
		Avoiding action with 3rd party vessel / dredging operations.
Impact on ship contact risk	Impact on Berth Contact Risk	Increased vessel movements associated with dredging / dredge disposal activities.
		Reduction in overall channel width due to dredging operations.
		Avoiding action with 3rd party vessel / dredging operations.
	Impact on Vessel Alongside Contact Risk	Increased vessel movements associated with dredging / dredge disposal activities.
		Reduction in overall channel width due to dredging operations.
		Avoiding action with 3rd party vessel / dredging operations.
	Impact on Navigation Buoy Contact Risk	Increased vessel movements associated with dredging / dredge disposal activities.
		Reduction in overall channel width due to dredging operations.
		Avoiding action with 3rd party vessel / dredging operations.
Impact on ship grounding risk	A vessel unintentionally makes contact with the seabed.	Avoiding action with 3rd party vessel / dredging operations.
		Reduction in channel width due to dredging operations.
		Increased deposition of dredged material at HU082 deposit location impedes dredged channel.
Impact on capsize / swamping risk		Avoiding action with 3rd party vessel / dredging operations.

Potential Effect	Detail	Justification for Assessment
	A vessel fills with water for any reason including capsize, and when overwhelmed, sinks.	Water surge / mooring gear failure (see mooring / breakout).
Impact on mooring breakout risk	A vessel ranges (moves excessively) whilst alongside the berth or when one or more mooring lines fail resulting in the vessel unintentionally breaking away from its moored position.	Water surge caused by large vessel / dredge barge on transit (especially at low water).
		Mooring gear failure / insufficient mooring of project or third-party vessels.
Impact on fire/explosion risk	A vessel suffers from fire or explosion due to on board factors or external influence (including malicious actions)	Vessel requires assistance from external services (fire service, fire tugs, SAR) requiring activation of emergency plans.
		Vessel immobilised and becomes a danger to other shipping or harbour facilities.
Operational Phase		
Impact on ship collision risk	Two or more vessels impact each other whilst manoeuvring / on transit.	Manoeuvring in vicinity of berth.
		Avoiding action with 3rd party vessel / Project vessels, including abnormal loads.
Impact on ship contact risk	Impact on Berth Contact Risk	Manoeuvring in vicinity of berth.
		Avoiding action with 3rd party vessel / Project vessels, including abnormal loads.
	Impact on Vessel Alongside Contact Risk	Manoeuvring in vicinity of berth.
		Avoiding action with 3rd party vessel / Project vessels, including abnormal loads.
		Reduction in overall channel width when vessels alongside.
	Impact on Navigation Buoy Contact Risk	Manoeuvring in vicinity of berth.
Avoiding action with 3rd party vessel / Project vessels, including abnormal loads.		
Impact on ship grounding risk	A vessel unintentionally contacts the seabed.	Avoiding action with 3rd party vessel.
		Alterations to quay line alter sediment dynamics causing increased siltation in vicinity of berth.
Impact on capsize / swamping risk	A vessel fills with water for any reason including capsize, and when overwhelmed, sinks.	Avoiding action with 3rd party vessel
		Water surge / mooring gear failure (see mooring / breakout).

Potential Effect	Detail	Justification for Assessment
Impact on mooring breakout risk	A vessel ranges (moves excessively) whilst alongside the berth or when one or more mooring lines fail resulting in the vessel unintentionally breaking away from its moored position.	Water surge caused by large vessel / dredge barge on transit (especially at low water).
		Mooring gear failure / insufficient mooring of project or third-party vessels.
Impact on fire/explosion risk.	A vessel suffers from fire or explosion due to on board factors or external influence (including malicious actions)	Vessel requires assistance from external services (fire service, fire tugs, SAR) requiring activation of emergency plans
		Vessel immobilised and becomes a danger to other shipping or harbour facilities

14.4.2 A definition for the consideration of each ‘potential effect’ is detailed within the sections below.

Effect on ship collision risk

14.4.3 A collision is defined as when two vessels, that are both underway, collide with one another.

14.4.4 The effect on collision risk may increase due to increased vessel traffic associated with the Project during the construction and operation phases and dredging activities during the construction phase, by the reduction of available sea room and the increase in vessel manoeuvres in vicinity of the berth. This risk can be mitigated by the application of existing regulations and procedures, including COLREGS, Compulsory Pilotage, Humber VTS traffic management (including the Humber Passage plan for Very Large Ships), General Directions, Notices to Mariners and availability of navigation aids such as AIS.

14.4.5 Receptors may include project vessels or non-project ‘other’ vessels. Receptor sensitivity and effect is increased with increased vessel speed and where a collision occurs between a large commercial and small non-commercial vessel.

The consequence of a collision between two vessels can vary widely from very minor damage to a major incident resulting in loss of life, pollution and the loss of the vessel(s). The more likely outcome would be for minor damage to both vessels with only minor injury.

Effect on ship contact risk

14.4.6 A contact is defined as an incident where a vessel that is underway contacts a fixed object (including a berthed vessel – sometimes known as Allision).

14.4.7 The effects of contact may be increased by the placing of new temporary or permanent structures (construction related, temporary or permanent fixed navigation aids, the new quay itself). These consequences can be mitigated against by means (including) Temporary Notices to mariners, chart corrections, lighting of obstructions, VTS broadcasts and use of pilotage.

- 14.4.8 The consequence of a contact between a vessel and a fixed object can vary widely depending the nature of the fixed object hit. The incident could result in very minor damage to a major incident resulting in loss of life, pollution and the loss of the vessel(s). The more likely outcome would be for minor damage and minor injury. Receptors may include project vessels or non-project 'other' vessels, port, stakeholder or project infrastructure. Receptor sensitivity and effect is increased with increased where port infrastructure / stakeholder vessels are contacted by a large commercial vessel.

Effect on ship grounding risk

- 14.4.9 A grounding is defined as when a vessel unintentionally makes contact with the seabed.
- 14.4.10 The effect on grounding risk may increase due to local changes in bathymetry as a result of siltation or dredge deposits impeding the dredged channel. Equally, the effects may be reduced by increased survey frequency, dredging, reducing the Under Keel Clearance (UKC) allowance, Notice to mariners and VTS broadcasts.
- 14.4.11 The consequence of a grounding can vary widely, depending the nature of the grounding and vessel. The more likely outcome would be for minor damage and minor injury. Receptors include project vessels and other traffic navigating in the margins of the project site, or diverted from normal tracks due to interaction with project vessels.

Effect on capsize / swamping risk

- 14.4.12 Capsize / swamping is defined as when a vessel fills with water for any reason including capsize, or loss of hull integrity, and when overwhelmed, sinks.
- 14.4.13 The effect of capsize / swamping may be increased by adverse weather, human error (incorrect cargo loading), or mechanical failure (loss of hull watertight integrity). These effects will be reduced through correct following of procedures and personnel experience / training, and good maintenance routines.
- 14.4.14 Consequence of capsize / swamping is potentially major or catastrophic leading to loss of vessel, significant injury or fatality, pollution and major business disruption especially if the vessel sinks in a deep-water channel, closing the estuary to all shipping.

Effect on fire/explosion

- 14.4.15 Fire or Explosion is defined as when vessel suffers from fire or explosion on board or in the cargo, due to on board factors or external influence (including malicious actions).
- 14.4.16 The effect of a fire may be significant damage to the vessel and cargo, and possible immobilisation leading to inability to navigate the vessel (potentially leading to Grounding, contact, collision). These effects can be mitigated by on board procedures and security protocols, as well as on board and regional emergency planning, and response procedures and assets.
- 14.4.17 Consequences may range from minor damage to catastrophic damage to the vessel, cargo and port infrastructure, and major injury / fatalities, as well as major environmental impact.

Additional Construction Phase Effects

- 14.4.18 Impact on mooring / breakout risk has been identified as a new effect for assessment within the construction phase NRA in line with current industry standard navigation risk assessment methodology.

Effect on mooring breakout risk

- 14.4.19 Mooring Breakout is defined as when vessel ranges (moves excessively) whilst alongside the berth or when one or more mooring lines fail resulting in the vessel unintentionally breaking away from its moored position.
- 14.4.20 The effect of Mooring breakout includes damage to mooring lines and shore infrastructure, possible damage to the vessel, and may escalate into potential grounding, collision or contact hazards if the casualty cannot be safely re-moored. The potential effects can be mitigated against by mooring plans, shore side infrastructure testing and monitoring, and the availability of rapid response towage vessels to re-moor the casualty vessel.
- 14.4.21 Consequences of mooring break may include moderate damage and injuries but may escalate if the breakout leads to one of the other assessed hazards (Grounding, contact, collision).

Additional Operational Phase Effects

- 14.4.22 Impact on mooring / breakout risk has been identified as a new effect for assessment within the construction phase NRA in line with current industry standard navigation risk assessment methodology.

Effect on mooring breakout risk

- 14.4.23 Mooring Breakout is defined as when vessel ranges (moves excessively) whilst alongside the berth or when one or more mooring lines fail resulting in the vessel unintentionally breaking away from its moored position.
- 14.4.24 The effect of Mooring breakout includes damage to mooring lines and shore infrastructure, possible damage to the vessel, and may escalate into potential grounding, collision or contact hazards if the casualty cannot be safely re-moored. The potential effects can be mitigated against by mooring plans, shore side infrastructure testing and monitoring, and the availability of rapid response towage vessels to re-moor the casualty vessel.
- 14.4.25 Consequences of mooring break may include moderate damage and injuries, but may escalate if the breakout leads to one of the other assessed hazards (Grounding, contact, collision)

14.4.26 Additional Cumulative Effects

- 14.4.27 Cumulative effects are considered in more detail within Chapter 26: Cumulative and In-Combination Effects. No marine cumulative effects have been identified.
- 14.4.28 Preliminary consultation with the Harbour Master did not establish any cumulative effects of significance to shipping and navigation.

Consideration of DCO

- 14.4.29 A summary of the anticipated changes from the assessment of effects contained within the DCO based on preliminary assessment and information available to date are shown in Table 14-10.

Table 14-9: Preliminary Risk Assessment Review

Description of impact	DCO Baseline Impact	DCO mitigation measures	Residual DCO Residual Impact	New Predicted Baseline	Potential additional mitigation measures	New Predicted
Construction						
Impact on ship collision risk	Moderate	<ul style="list-style-type: none"> Suitably qualified personnel; Emergency procedures; Availability of pollution response equipment; Construction project manager Communication devices; Guidance for small craft. 	Moderate	Moderate		Moderate
Impact on ship contact risk	Moderate	<ul style="list-style-type: none"> Suitably qualified personnel; Dedicated dockside marine manager; Navigation aids and communication equipment; Communication devices; Simulator based studies. 	Low	Moderate		Low
Impact on ship grounding risk	Low	<ul style="list-style-type: none"> Dredging; Navigation aids and communication equipment; Suitably qualified personnel; Notice to mariners; Availability of towage. 	Low	Moderate	<ul style="list-style-type: none"> Additional surveys of study area 	Low

Impact on capsizing / swamping risk	Moderate	<ul style="list-style-type: none"> • Availability of towage; • Emergency procedures; • Suitably qualified ships personnel; • PPE. 	Moderate	Moderate	-	Moderate
Impact on mooring / breakout risk	N/A	N/A	N/A	Moderate	<ul style="list-style-type: none"> • Standard Operation Procedures (SOP) • Up-to date weather forecasting. 	Low
Impact on fire/explosion risk	Moderate	<ul style="list-style-type: none"> • Availability of fire tug; • Availability of pollution response equipment; • Availability of shoreside emergency services; • Emergency procedures. 	Moderate	Moderate	-	Moderate
Operation						
Impact on ship collision risk	Moderate	<ul style="list-style-type: none"> • Suitably qualified personnel; • Emergency procedures; • Availability of pollution response equipment. • Guidance for small craft. 	Moderate	Moderate	-	Moderate
Impact on ship contact risk	Moderate	<ul style="list-style-type: none"> • Suitably qualified personnel; • Dedicated dockside marine manager; 	Moderate	Low	-	Low

		<ul style="list-style-type: none"> • Navigation aids and communication equipment; • Simulator based studies. 				
Impact on ship grounding risk	Moderate	<ul style="list-style-type: none"> • Dredging; • Navigation aids and communication equipment; • Suitably qualified personnel; • Notice to mariners; • Availability of towage. 	Moderate	Moderate	<ul style="list-style-type: none"> • Additional surveys of study area 	Moderate
Impact on capsizing / swamping risk	Moderate	<ul style="list-style-type: none"> • Availability of towage; • Emergency procedures; • Suitably qualified ships personnel; • PPE. 	Low	Moderate		Low
Impact on mooring / breakout risk	N/A	N/A	N/A	Moderate	<ul style="list-style-type: none"> • Standard Operation Procedures (SOP) • Up-to date weather forecasting. 	Moderate
Impact on fire/explosion risk	Moderate	<ul style="list-style-type: none"> • Availability of fire tug; • Availability of pollution response equipment; • Emergency procedures; • Dedicated dockside manager. 	Low	Moderate	-	Low

14.5.0 Requirement for Additional Mitigation

14.5.1 This section of the PEIR Chapter provides details of the monitoring and mitigation to be brought forward under the original ES to the DCO and also identifies whether any alternate or additional mitigation may be required as a result of the proposed material amendment.

DCO Mitigation

14.5.2 Existing embedded mitigation measures, those that have an impact upon navigation risk and are already in place or required by the port authority, are outlined within Table 14-11 below.

Table 14-10 : Embedded Mitigation Measures

Embedded Mitigation	Phase	Description
River Works Consent process	Construction	Ensuring SHA and CHA (HES) are fully aware of all stages of project, are included in project updates, and can effectively manage safety of navigation during construction
Promulgation of information to local stakeholders (including Notice to Mariners)	Construction Operation	Hold regular meetings with dredge contractors during dredging operations. Issue Notice To mariners prior to intended works commencing.
Appropriate marking and lighting	Operation	Review navigation aids in vicinity of project berths as directed by ABP / THLS.
Compulsory Pilotage / PEC process	Construction Operation	Ensuring all large vessels in the project area are competently navigated and advised
Adherence to risk control measures listed within the current Port Navigation Risk Assessment.	Construction Operation	Including international, national and local regulations. As listed in the Port Safety Management System.
Vessel Traffic Service (VTS)	Construction Operation	VTS provides 24/7 coverage for the port and provides an Information Service (INS), TOS and Navigational Advice Service (NAS) to all traffic using the port. Important particularly during the construction phase to co-ordinate large dredgers.
Movements associated with barges carrying windfarm cargos treated as project moves.	Operation	In accordance with ABP procedures.
Post dredge surveys and promulgation.	Construction Operation	Charts to be frequently updated to include new berths and berthing pockets and in-channel dredge depths.

Alternate or Additional Mitigation

- 14.5.3 The requirement for any additional mitigation beyond that outlined within the original ES in addition to a review of the appropriateness of the DCO mitigations with respect to commercial and recreational navigation will be undertaken as part of the NRA process informed by stakeholder consultation. A final detailed list of recommended existing and additional mitigation (if any) will be provided within the NRA and Shipping and Navigation ES Chapter.
- 14.5.4 Risk control measures pertinent to commercial and recreational navigation proposed by the 2011 NRA and as part of the DCO are summarised within Table 14-2 in addition to any potential additional mitigations based on preliminary assessment and information available to date.

14.6.0 Other Environmental Issues

- 14.6.1 Any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017, of significance to commercial and recreational navigation are detailed below.
- 14.6.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the PEIR.

Other Environmental Issues of Relevance

Risks of Major Accidents and/or Disasters

- 14.6.3 The Scoping Report explains that the major accidents/disasters which could be caused or experienced by the proposed development are limited to impacts on navigation in the River Humber and navigation impacts at Humberside airport.
- 14.6.4 This Risk Assessment will be updated to include an assessment of major accidents, as they relate to commercial and recreational navigation.
- 14.6.5 The risk of major accidents and disasters as they relate to Commercial and Recreational Navigation will therefore be scoped into the NRA update and ES.
- 14.6.6 This assessment will give due consideration to the five major accident hazard sites, and one major hazard pipeline within the application boundary identified by the HSE during scoping where they are applicable to commercial and recreational navigation.
- 14.6.7 Relevant regulators will be consulted with regards to scope and approach prior to assessment.

14.7.0 Summary of Effects

- 14.7.1 This PEIR has considered the possible effects of the Project pertinent to commercial and recreational navigation in light of the material change.
- 14.7.2 All effects assessed as part of the existing DCO application are scoped into the NRA update. One additional effect 'Impact on mooring / break out risk' has been identified for assessment.
- 14.7.3 Preliminary assessment of effects anticipates little significant change to the 2011 assessment of commercial and recreational navigation as a result of the material change.
- 14.7.4 Possible additional risk controls may be identified, and the most appropriate mitigation measures will be recommended in light of their assessed effectiveness, ensuring navigational risks are 'As Low As Reasonably Practicable' (ALARP).

14.8.0 Conclusions

- 14.8.1 Early review of the anticipated effect of the material amendment to the consented AMEP project is anticipated to be low given information available to date. Detailed assessment of individual hazards and stakeholder consultation is required and will be undertaken as part of an updated NRA to fully consider the effect of the material change.

REFERENCES

- BMT Isis (2011) TR030001-000402-14.2 – Navigation Risk Assessment
- TR030001-000319-14 – Navigation
- Fairhurst (2020) AMEP Quay Material Change Application – EIA Scoping Report
- TR030006-000036-TR030006 – Scoping Opinion

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 15: TRAFFIC & TRANSPORT

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
Version No: FINAL
April 2021



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CONTENTS

15.1.0 INTRODUCTION	15-1
Development Consent Order Context.....	15-1
Consideration of Material Amendment	15-1
Purpose and Structure of Chapter	15-1
15.2.0 METHODOLOGY.....	15-3
Changes in Legislation, Guidance and Planning Policy.....	15-3
Scoping Opinion	15-7
Additional Consultation.....	15-8
Assessment Methodology	15-8
Effects Not Requiring Further Assessment.....	15-12
15.3.0 CHANGES IN BASELINE CONDITIONS.....	15-13
DCO Baseline	15-13
DCO Future Baseline.....	15-13
Current Baseline	15-14
Changes in Baseline	15-14
15.4.0 ASSESSMENT OF EFFECTS	15-16
Additional Construction Phase Effects	15-17
Additional Operational Phase Effects.....	15-17
Additional Cumulative Effects	15-17
Consideration of DCO	15-17
15.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	15-18
DCO Mitigation in ES	15-18
DCO Specified Mitigation	15-19
Alternate or Additional Mitigation	15-20
15.6.0 RESIDUAL EFFECTS	15-21
Construction Phase	15-21
Operational Phase	15-21
Consideration of DCO	15-21
15.7.0 OTHER ENVIRONMENTAL ISSUES.....	15-22

15.8.0	SUMMARY OF EFFECTS	15-23
15.9.0	CONCLUSIONS	15-24

DOCUMENT REFERENCES

TABLES

Table 15-1 Changes to Relevant Legislation, Guidance and Planning Policy	15-3
Table 15-2: Scoping Opinion.....	15-7
Table 15-3 Sensitivity Criteria.....	15-10
Table 15-4 Magnitude of Effect.....	15-11
Table 15-5 Significance of Effect	15-12

APPENDICES

Appendix U15-1: Consultation Correspondence

15.1.0 Introduction

Development Consent Order Context

- 15.1.1 The Development Consent Order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 15.1.2 The associated development also consented through the DCO includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180;
 - Surface water disposal arrangements; and
 - A minor footpath diversion (FP50).
- 15.1.3 The DCO was supported in an EIA Traffic and Transport Chapter¹ of the Environmental Statement (ES) that accompanied the original DCO application ('the original ES'); that Chapter provided a summary of the direct impacts resulting from road traffic generated by AMEP. A Transport Assessment (TA) was prepared (JMP Consultants Limited) which provided a more detailed assessment of the traffic impacts of the proposed development². A Travel Plan was also produced to promote sustainable transport.³

Consideration of Material Amendment

- 15.1.4 This Traffic and Transport Chapter of the Preliminary Environmental Information Report (PEIR) reviews the original ES and considers whether any of the elements require reconsideration due to the proposed Material Amendment.
- 15.1.5 With the exception of the minor diversion to Footpath 50, the proposed Material Amendment will not directly alter the highways arrangements or traffic movements associated with the proposed development.

Purpose and Structure of Chapter

- 15.1.6 This chapter of the PEIR considers the impact of the proposed Material Amendment on traffic and

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000320-15%20-%20Traffic%20and%20Transport.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000404-15.1%20-%20Transport%20Assessment.pdf>

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000405-15.2%20-%20Framework%20Travel%20Plan.pdf>

transport arising from construction and operation.

15.1.7 This Traffic and Transport Chapter of the PEIR seeks to undertake a review of transport related assessments previously undertaken and consider the likely implications of the proposed Material Amendment. It can then be determined as to whether the proposals are compliant with the extant ES / DCO.

15.1.8 This Technical Chapter includes:

- Methodology – including consideration of changes in legislation, guidance and planning policy;
- Changes in baseline conditions;
- Assessment of effects;
- Requirement for additional mitigation;
- Residual effects;
- Other environmental issues;
- Summary of effects; and
- Conclusions.

15.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

- 15.2.1 This section summarises the changes in legislation, guidance and planning policy associated with traffic and transportation since the preparation of the original ES and provides references to relevant and updated guidance as appropriate.
- 15.2.2 Table 15-1 below sets out the changes to legislation, guidance and planning policy associated with traffic and transportation.

Table 15-1 Changes to Relevant Legislation, Guidance and Planning Policy

Original Legislation, Guidance and Planning Policy	Status	Current Legislation, Guidance and Planning Policy
Department for Communities and Local Government (2011), 'Planning Policy Statement 13: Transport'	Withdrawn	National Planning Policy Framework (NPPF) February 2019
National Policy Statements – NPS for Ports (2012)	Remains valid	
North Lincolnshire Council Local Plan (2003)	Replaced	North Lincolnshire Local Development Framework (2011)
Institute of Environmental Management and Assessment (1993), Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic	Remains valid	
Department for Transport (2007) Guidance on Transport Assessment	Withdrawn	National Planning Policy Framework (NPPF) February 2019 and Planning Practice Guidance (PPG): Travel Plans, Transport Assessments and Statements (March 2014)
Department for Transport (2007) Circular 2007/02	Superseded	Department for Transport (DfT) Circular 02/2013: Strategic road network and the delivery of sustainable development
Department for Transport (April 2009) Good Practice Guidelines: Delivering Travel Plans through the Planning Process	Replaced	National Planning Policy Framework (NPPF) February 2019 and Planning Practice Guidance (PPG): Travel Plans, Transport Assessments and Statements (March 2014)

- 15.2.3 As detailed in Table 15-1, a number of the legislative, guidance and policy documents referred to in the original ES have now been withdrawn, replaced or superseded. To ensure the PEIR reflects the current guidance, a summary of the current documents which have been considered is provided in this section.

National Planning Policy Framework (NPPF) February 2019

- 15.2.4 The National Planning Policy Framework (NPPF) initially introduced in March 2012 replaced over a thousand pages of previous planning policies including all Planning Policy Statements and Planning Policy Guidelines (PPS/PPG) with the aim of refocussing planning policy on encouraging growth. The most recent revision of the NPPF in February 2019 sets out the Government's planning policies for England and how these are expected to be applied.
- 15.2.5 At the heart of NPPF there is a presumption in favour of sustainable development which should be delivered in accordance with three main objective areas: economic, social and environmental (Paragraph 8). The revised NPPF aims to enable local people and their local authorities to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.
- 15.2.6 While Paragraph 7 states that the purpose of the planning system is to contribute to the achievement of sustainable development, and Paragraph 9 notes that planning policies and decisions should play an active role in guiding development towards sustainable solutions, it is also recognised that decisions "*should take local circumstances into account, to reflect the character, needs and opportunities of each area*".
- 15.2.7 It is also stated, at Paragraph 10 that at the heart of the NPPF there is a "*presumption in favour of sustainable development*".
- 15.2.8 Section 9 of the NPPF relates to "Promoting Sustainable Transport" and Paragraph 102 stresses the importance of considering transport issues from the earliest stages of plan-making and development proposals, so that:
- a) *the potential impacts of development on transport networks can be addressed;*
 - b) *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised - for example in relation to the scale, location or density of development that can be accommodated;*
 - c) *opportunities to promote walking, cycling and public transport use are identified and pursued;*
 - d) *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account - including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
 - e) *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.*
- 15.2.9 Furthermore, Paragraph 103 notes that significant development should be "focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes".
- 15.2.10 Paragraphs 108 to 111 of the NPPF relates to the factors which must be taken into account when considering development proposals. Accordingly, Paragraph 108 outlines the need to ensure that:
- a) *appropriate opportunities to promote sustainable transport modes can be - or have been - taken up, given the type of development and its location;*

- b) safe and suitable access to the site can be achieved for all users; and*
- c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.*

15.2.11 Paragraph 109 asserts that development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe. This is developed in Paragraph 110 which notes that applications for development should:

- a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second - so far as possible - to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*
- b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;*
- c) create places that are safe, secure and attractive - which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;*
- d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and*
- e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.*

15.2.12 Paragraph 111 relates to Travel Plans and Transport Statements and Assessments, noting that all developments that will generate significant amounts of movement should be required to provide a Travel Plan, and the application should be supported by a Transport Statement or Transport Assessment so that the likely impacts of the proposal can be assessed.

North Lincolnshire Local Development Framework (2011)

15.2.13 The North Lincolnshire Local Plan which was adopted in 2003 and was referenced in the original ES, has since been replaced by the North Lincolnshire Local Development Framework (LDF).

15.2.14 The LDF consist of a series of documents including the North Lincolnshire Core Strategy (adopted June 2011), the Employment and Land Allocations (adopted 2016) and Saved Policies of the North Lincolnshire Local Plan (May 2003, saved September 2007).

15.2.15 The Core Strategy is the principal document of the LDF and provides strategic policies and guidance to deliver the vision for the area up to 2026 including the scale and distribution of development, the provision of infrastructure to support it and the protection of the natural and built environment.

15.2.16 With specific regard to the proposals, Policy CS12: South Humber Bank Strategic Employments Site Employment Site section (c) sets out the need for improved transport accessibility to the ports *“Improve multimodal land access to the South Humber Ports and develop their complementary roles. The transport strategy includes the delivery of the South Humber Bank Transport Study outcomes within the SHBSES, the Highways Agency A160/A180 Highway Improvement Scheme (top priority in the Regional Transport Priorities) anticipated to begin construction around 2015 and the Network*

Rail Freight Utilisation Strategy that programmes line speed and signalling improvements between Immingham and Doncaster (being carried out within the current strategy 2007 and 2014) and the Killingholme Loop (that will enable a one way freight rail route into the South Humber Ports) post 2015. In improving transport accessibility, it is vital that the ports can be accessed by a range of transport modes, including public transport, cycling and walking. According, robust travel plans should be developed to show how the area will be linked to surrounding settlements.”

- 15.2.17 Chapter 15 of the Core Strategy focuses on transport in the area and in paragraph 15.10, the significance of the ports is identified *“The Humber Ports are the largest in the UK by tonnage of cargo handled, with the South Humber Bank ports of Killingholme, and Immingham handling the bulk of this. They are also important nodes in the North European Trade Axis (NETA). The RSS and the Northern Way Growth Strategy both highlight the major opportunity for these ports and wharves to have significant growth and expansion, particularly by competing with the ports in the south and south east of England for traffic that has a final destination in the north of England and Scotland.”*
- 15.2.18 Paragraph 15.11 goes on to state that *“Further growth and expansion will not only help the area’s economy and assist in bridging the north-south output gap, it will offer wider sustainability and environmental benefits by having a major positive impact on road congestion and reducing CO2 emissions.”*
- 15.2.19 Policy CS26: Strategic Transport Infrastructure proposals sets out the key strategic road schemes that the Council wishes to support which includes *‘The dualling of the A160 South Humber Bank access road between the A180(T) and South Killingholme including associated improvements to junctions along the route and at the port entrance.’*
- 15.2.20 North Lincolnshire Council is in the process of preparing a new Local Plan for North Lincolnshire. This will eventually supersede both the 2003 Local Plan and the Local Development Framework Plans.

Department for Communities and Local Government (DCLG) Planning Practice Guidance (PPG): Travel Plans, Transport Assessments and Statements (March 2014)

- 15.2.21 The Department for Communities and Local Government (DCLG) launched the new Planning Practice Guidance (PPG) web-based resource in March 2014. The PPG includes advice on when travel plan, transport assessments and transport statements are required, and what they should contain. The document acknowledges that *“Travel Plans, Transport Assessments and Statements can positively contribute to:*
- *encouraging sustainable travel;*
 - *lessening traffic generation and its detrimental impacts;*
 - *reducing carbon emissions and climate impacts;*
 - *creating accessible, connected, inclusive communities;*
 - *improving health outcomes and quality of life;*
 - *improving road safety; and*
 - *reducing the need for new development to increase existing road capacity or provide new*

roads.”

This online guidance sets out a logical arrangement of the information and analysis required to properly assess the likely traffic and transport impact of proposed developments. It seeks to remove the prescriptive thresholds contained in previous guidance and empowers local authorities to decide on whether a full Transport Assessment is required, based on the local highway network context surrounding the proposed development site.

Department for Transport (DfT) Circular 02/2013: Strategic road network and the delivery of sustainable development (2013)

15.2.22 The original ES contained reference to the Department for Transport (DfT) Circular 02/2007 which was published in March 2007. This document has now been superseded by the Department for Transport (DfT) Circular 02/2013: Strategic road network and the delivery of sustainable development.

15.2.23 DfT Circular 02/2013 explains how the Highways Agency (now Highways England) will engage with the planning system and how it will fulfil its remit to be a delivery partner for sustainable economic growth whilst maintaining, managing and operating a safe and efficient strategic road network. The document highlights the need for developers to put forward initiatives that manage down the traffic impact of proposals to support the promotion of sustainable transport and the development of accessible sites. It states that development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe. Where proposals would not result in capacity issues, the Highways England’s prime consideration will be the continued safe operation of the strategic road network.

Scoping Opinion

15.2.24 A Scoping Opinion was issued by the Planning Inspectorate in March 2021 with regard to the proposed material amendment and relevant extracts are reproduced in Table 15-2 below.

Table 15-2: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
P.34, ID 4.9.1	The Scoping Report explains that the proposed changes are unlikely to alter the previously assessed construction and operational traffic flows. The Inspectorate agrees with this explanation and is content that these matters need not be assessed in the updated ES since new or different significant effects are unlikely to occur.	This Chapter reviews the original ES Transport Chapter.	Scoped out	n/a
P.34, ID 4.9.2	The Inspectorate agrees that impacts to the footpath as a result of the proposed change to the approved route should be assessed. The assessment should include impacts that result during construction and operation. The assessment should also consider whether additional options for alternative access during prolonged periods of disruption are required should they occur.	The footpath will be diverted before the start of the quay construction work.	This chapter considers the impacts of the minor diversion during the operation and construction phases.	Paragraphs 15.4.2 – 15.4.9

Additional Consultation

- 15.2.25 Consultation with North Lincolnshire Council has confirmed that all major highways works are complete and they are satisfied the Material Amendment will not impact on the highway networks.
- 15.2.26 Strategic Development Officer of the Development Management Team at North Lincolnshire Council has confirmed that they have:
- “...received the confirmation from Highways England that they are satisfied that there is no longer a need for the improvement works to the 160/Eastfield Road junction and receiving similar confirmation from our own internal Highways department I can confirm that the LPA agrees that ABLE's obligations under Schedule 9 Part 3 have been met and that this protective provision has been complied with”.*
- 15.2.27 The above is an extract from an email exchange during August/September 2020, which is included at Appendix U15-1.
- 15.2.28 In 2020, Network Rail advised Able UK Ltd that, whilst the licensing authority for a new rail crossing lay with the Office of Rail and Road (ORR), in their view the ORR would be unlikely to approve a new rail crossing other than by means of construction of a new footbridge, and that changing the agreed new route of the footpath to avoid crossing any tracks would be preferable.
- 15.2.29 ORR responded in September 2020 that it is not within their remit to approve any new crossing, but that ORR have no objections to the proposed right of way, including the foot crossing, subject to satisfactory completion of a risk assessment.
- 15.2.30 Correspondence has also taken place between the Applicant and North Lincolnshire Council (Principal Access and Commons Officer) with regard to amending the consented diversion of the public right of way. Email correspondence dated 6 April 2021 confirms that North Lincolnshire Council did not receive any adverse comments in response to an informal pre-order consultation conducted in 2020 with respect to where the new footpath would cross the ‘operational’ railway, including no adverse comments from Natural England who are responsible for the establishment of the England Coast Path along this section of footpath.

Assessment Methodology

- 15.2.31 As per the Scoping Opinion, the proposed Material Amendment will not directly alter the highways arrangements or traffic movements associated with the proposed development. The Planning Inspectorate agrees that these matters need not be assessed in the updated ES since new or different significant effects are unlikely to occur.
- 15.2.32 The assessment methodology is defined within the original ES at Section 15.3. The methodology was in accordance with the principles of PPG 13, the Guidelines for EART, IEMA (2003) and the DfT Guidance on Transport Assessment (2007).
- 15.2.33 The original ES states that The IEMA Guidelines set out a range of potential environmental effects that can arise due to increased traffic flow. It states that the following potential impacts were assessed:
- *“changes to traffic conditions on the local highway network and their potential for delays and congestion; and*

- *accidents and safety*".

15.2.34 The method of assessing the traffic impacts of construction and operation of AMEP was stated as:

- *"describing the existing transport network and existing road traffic flows which are potentially sensitive to traffic and transport impacts;*
- *identifying the future baseline conditions based on traffic survey information, growthed to the assessment years;*
- *predicting the traffic impacts that are likely to arise during the construction and operation of the development; and*
- *identifying measures to mitigate any predicted impacts*".

15.2.35 The original ES Chapter states at paragraph 15.3.2 that:

"the roads that will carry the vast majority of development traffic in the construction and operational phases will be the A160, A180 and M180, which, for the most part, avoid sensitive residential areas. Therefore, with the exception of the A160 (which has been identified as a sensitive link by the HA), the 30 percent threshold has been applied to these links".

15.2.36 The previous ES Chapter states at paragraph 15.3.3 that:

"For the A160 and any sensitive local roads that are affected, the 10 percent rule has been applied".

15.2.37 Paragraph 15.3.5 of the previous ES Chapter states that:

15.2.38 Additional criteria for undertaking junction capacity assessments, derived by the HA taken from the Department for Transport (2007) Guidance on Transport Assessment is as follows:

"significant impact is created by 30 additional two-way trips on the strategic highway network in the peak hour (30 trips is taken as one directional on slip roads). Therefore, this was the threshold that has been applied across the whole network in terms of assessing the impact of AMEP on junction capacity".

15.2.39 However, the impacts on pedestrians associated with the proposed minor amendments to Footpath 50 will be considered within this chapter.

Study Area

15.2.40 The study area is as defined within the original ES for the DCO as the 'area close to AMEP'. This is considered in more detail within the Transport Assessment and further at paragraph 15.3.42.

15.2.41 As referred to above, the original ES Chapter states that the roads which will carry the vast majority of development traffic in the construction and operational phases will be the A160, A180 and M180.

15.2.42 Groups of individuals who may have a high sensitivity to the impact of the proposed development were determined as:

- Drivers experiencing delays on A160 due to intensification of use;

- Drivers encountering possible congestion problems at the following junctions:
 - Rosper Road/Humber Road;
 - A160/Top Road/Habrough Road;
 - A160/Ulceby Road;
- Vulnerable road users at uncontrolled pedestrian crossing at junction of A160/Town Street; and
- Possible intensification of severance issue in South Killingholme, school located north of A160.

15.2.43 The study area covers the extents considered within the DCO Transport Assessment. This includes the following junctions:

- A1173 / Manby Rd;
- Chase Hill Rd / Rosper Rd / Clough Lane;
- Rosper Rd / Humber Rd;
- A160 / Top Rd / Harbrough Rd;
- A160 / A1173 / Humber Rd;
- Eastfield Rd / Chase Hill Rd;
- A1173 / Kings Rd;
- A1173 / North Moss Lane / Kiln Lane;
- A180 / A1173;
- A180 / A1136 / Europarc;
- A160 / A1077; and
- A160 / Eastfield Rd.

Sensitivity Criteria

15.2.44 Receptor sensitivity is as defined within the original ES for the DCO. These were defined as follows:

Table 15-3 Sensitivity Criteria

Sensitivity	Description
High	People whose livelihood depends upon unrestricted movement within their environment; this includes commercial drivers and the companies who employ them. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges, accident hotspots.

Sensitivity	Description
Medium	People who pass through or habitually use the area but whose livelihood is not wholly dependant on free access. Receptors such as congested junctions, hospitals, most residential areas and conservation areas.
Low	Occasional users of the road network. Receptors such as public open space.
Negligible	Users not sensitive to transport effects.

Magnitude of Change (Impact)

15.2.45 Magnitude of change is as defined within the original ES for the DCO. It is termed as magnitude of effect and defined within the original ES for the DCO as Major, Moderate, Slight and Negligible. This is shown within the below table.

Table 15-4 Magnitude of Effect

Subject Area	Major	Moderate	Slight	Negligible
Effect on walking and cycling	Greater than +/- 25% change to existing levels of walking and cycling.	Up to +/- 25% change to existing levels of walking and cycling.	Up to +/- 10% change to existing levels of walking and cycling.	No measurable change from existing mode share or habits.
Effect on public transport	Greater than +/- 25% change to existing levels of public transport patronage.	Up to +/- 25% change to existing levels of public transport patronage.	Up to +/- 10% change to existing levels of public transport patronage.	No measurable change from existing mode share or habits.
Private vehicular traffic from operation of scheme	Greater than +/- 30% change in traffic flow or HGV content. (10% on sensitive links)	Up to +/- 30% change in traffic flow or HGV content.	Up to +/- 5% change in traffic flow or HGV content.	No measurable increase or decrease in traffic flow or nature of traffic.
Construction Traffic	Construction daily traffic flow greater than scheme related daily traffic flows.	Construction daily traffic flow greater than 100 vehicles per day on major road network, or greater than 50 vehicles per day on minor roads.	Construction daily traffic flow less than 100 vehicles per day on major road network, or greater than 25 vehicles (but less than 50) on minor roads.	Construction daily traffic flow less than 25 vehicles per day on all roads.

Significance of Effect

15.2.46 Significance of Effects are as defined within the original ES for the DCO. These were stated as follows:

Table 15-5 Significance of Effect

Subject Area	Major	Moderate	Slight/Negligible
Effect on walking and cycling	The majority of people in the study area changing their walking and cycling habits.	Some people in the study area changing their walking and cycling habits.	Negligible mode shift.
Private vehicular traffic from operation of scheme	Change which leads to perception of an increase or decrease in delays and congestion.	Change which will increase or decrease traffic flows but remain within the design capacity of the road.	Negligible change.
Construction Related Traffic	Traffic passes through residential areas.	Some traffic through residential areas.	Traffic only affects strategic routes.

Effects Not Requiring Further Assessment

- 15.2.47 There are no further considerations associated with 'effects not requiring further assessment beyond those defined within the original ES for the DCO.

15.3.0 Changes in Baseline Conditions

DCO Baseline

Highways and Traffic

- 15.3.1 The original ES Transport Chapter references analysis undertaken within the DCO Transport Assessment. The DCO baseline was based on highway and transportation conditions in the year 2012. Base traffic flows on the local and strategic highway network were derived using traffic surveys undertaken on behalf of the Highways Agency for the then prospective A160/A180 upgrade work. An additional traffic survey was commissioned at the A180 / Europarc Great Coates Interchange.
- 15.3.2 It was agreed that since a large number of committed developments (some of which had not yet gained planning approval) were included in the assessment, no traffic growth was applied or future year assessment undertaken.

Footpath Diversion

- 15.3.3 Footpath 50 follows the section of coast along the Humber Bank to the south of North Killingholme Haven. The DCO baseline identified that the proposed development would have an impact on the coastal footpath, which was identified as “*a significant local amenity*”. The sensitivity of the receptor was not addressed, but the use of the term “local” suggests that it would have been rated as being of low sensitivity.
- 15.3.4 At the time the DCO baseline was reviewed, the route of the England Coast Path in this area had not been defined, nor was there any other designated long distance trail covering this section of coast.

DCO Future Baseline

Highways and Traffic

- 15.3.5 The original ES states that during scoping discussions with the HA and NLC, the issue of the proposed HA A160/A180 upgrade scheme was raised, in terms of how this should be taken into account within the EIA. Although, at the time, there was a possibility that the A160/A180 scheme would not be given funding, or alternative streams of funding might be found, for the purposes of the EIA, scenarios with the scheme in place were not included.

Footpath Diversion

- 15.3.6 The DCO consents the permanent stopping up of a length of Footpath 50 along the Humber Bank to the south of North Killingholme Haven to allow construction and operation of the proposed Quay. The consented alternative route would be slightly inland.
- 15.3.7 From the south, the route would turn inland from the coast to follow Rosper Road and Haven Road, then proceed northwards across open land to connect with Footpath 77 for a short distance. Thereafter the route would turn back towards the coast to join Footpath 74.
- 15.3.8 This section of the route between Footpaths 77 and 74 would cross the operational Killingholme Branch railway.

- 15.3.9 Information provided by North Lincolnshire Council's access officer dated 24 August 2020 in the informal consultation for the footpath diversion indicates the alternative route would form part of the Mablethorpe to Humber Bridge leg of the England Coastal Path, and that the consented realignment of the England Coast Path would therefore cover a distance of 5.18 km.

Current Baseline

Highways and Traffic

- 15.3.10 Highway works including the following have since been completed and are in operation:
- Improvements to the A160-A180 trunk road by Highways England in accordance with the A160-A180 (Port of Immingham Improvements) DCO have since been completed; and
 - Construction of a roundabout at the junction of Chase Hill Road and Eastfield Road pursuant to PA/2016/1254.
 - New junction to create Access Road 2 entrance into AMEP, constructed under LPA Consent (reference PA/2008/525)
 - Improved Rosper Road/Station Road access to create Access Road 3 entrance into AMEP, constructed under LPA consent (reference PA/2019/497)
- 15.3.11 Additionally, elements of the wider development have been built out and occupied. These are detailed within Chapter 1.

Footpath Diversion

- 15.3.12 Footpath 50 is expected to form part of the Mablethorpe to Humber Bridge section of the England Coast Path. This section is identified by Natural England (3 February 2021) as being at the 'Develop and Propose' stage of progress, which is the least developed of all the categories of progress. A date for opening of this section of the England Coast Path is not yet available.

Changes in Baseline

Highways and Traffic

- 15.3.13 Highway improvement works have been completed that were not accounted for within the Transport Chapter future baseline. The previous assessment is based on lower standard highway infrastructure with a lower theoretical operational capacity; the DCO assessment would therefore be considered extremely robust.

Footpath Diversion

- 15.3.14 As the England Coast Path is still under development, it is not possible to estimate the level of likely use, or the extent to which the Path will draw additional visitors to the area. Based on experience of long distance route development elsewhere, the presence of a National Trail is considered likely to be seen as a tourist attraction in its own right. The sensitivity of the receptor is assessed as high due to its national importance.
- 15.3.15 The England Coast Path is expected to contribute to the tourism economy in North Lincolnshire

when in place. Tourism is an important element of the local economy which is promoted in the Regional Economic Plan for Greater Lincolnshire, with the intention of doubling its contribution to the local economy in the Plan period. The sensitivity of the local tourism economy is assessed as medium due to its regional importance.

15.4.0 Assessment of Effects

Highways and Traffic

- 15.4.1 SLR has reviewed the assessment of effects from the original ES Transport Chapter. Although no detailed analysis has been completed by SLR itself to validate the traffic forecasts, the original assessment appears to provide a comprehensive assessment of effects for both construction and operational phases.

Footpath Diversion

- 15.4.2 The consented DCO includes the diversion of Footpath 50, with a crossing point of the operational Killingholme Branch railway.
- 15.4.3 The proposed change to the authorised diversion route is proposed in order to avoid the diversion crossing the railway, albeit that it has been unused for many years. Network Rail has advised that a crossing of the operational line would require an engineering solution, possibly even a bridge.
- 15.4.4 The authorised crossing point is shown on the Rights of Way Plan Sheet No. 5⁴. The proposed revision is shown on the application plan: Rights of Way Plan Sheet No. 5 Rev 1, and the proposed changes are further shown on drawing AME-036-00004 D Changes to Footpath No.50 Diversion. These drawings are provided within Appendix U21-2 and U21-3 respectively.
- 15.4.5 The proposed change extends the diversion route to the north west for a distance of approximately 220m so that the crossing point of the railway line can be gained across a closed section, using an existing agricultural access. This access is at grade (level) with the railway line and avoids the need for construction of a bridge crossing.
- 15.4.6 The proposed change would impact the route of the Footpath 50 diversion and England Coast Path diversion by increasing the length of the route by a total distance of approximately 440m, along the extension loop to the agricultural crossing.
- 15.4.7 The proposed change to the diversion route would add only a negligible additional distance to the route of the England Coast Path for those users who are travelling a long section of the route. The slight additional distance and delay for some users would be offset by the avoidance of a bridge crossing, which would result in a benefit to accessibility for all users, but especially ambulant disabled users, for whom using a bridge would be at best inconvenient or at worst potentially prohibitive.
- 15.4.8 On balance, the overall magnitude of impact is assessed as negligible, and even allowing for the high sensitivity for the England Coast Path the resulting level of effect would be minor and not significant.
- 15.4.9 The proposed use of an existing agricultural crossing would not require any upgrade and therefore construction phase effects would be limited to minor works required to facilitate the new route, such as signage and grass cutting. These works would take place prior to the new footpath being brought into use and would therefore not have any impact on users of Public Rights of Way network

⁴<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000558-Rights%20of%20Way%20Plan%20Sheet%20No.%205%20of%2012.pdf>

or the England Coast Path.

Additional Construction Phase Effects

- 15.4.10 No changes to the operational phase effects detailed in the original DCO are anticipated due to the proposed material amendment.

Additional Operational Phase Effects

- 15.4.11 As the operational phase effects are not significant, there is no change to the conclusions of the original ES.

Additional Cumulative Effects

- 15.4.12 No additional cumulative effects have been identified as a result of the material amendment.

Consideration of DCO

- 15.4.13 No additional cumulative effects have been identified as a result of the material amendment.

15.5.0 Requirement for Additional Mitigation

15.5.1 As traffic levels or patterns would not vary significantly from those assessed in the original DCO, SLR does not consider any additional mitigation is required beyond that outlined within the original DCO.

DCO Mitigation in ES

15.5.2 The following mitigation measures were included within the original ES Transport Chapter at Section 15.8:

Construction Phase

Traffic

15.5.3 Since there is no predicted significant traffic impact, the original ES Transport Chapter concluded that no mitigation is required during the construction phase.

Rail

15.5.4 In terms of mitigating the potential for HGV movements across the railway line during construction, the original ES Transport Chapter stated that level crossings should be constructed as required.

PROW

15.5.5 The DCO requires (Requirement 9 of Schedule 11) that “no stage of the authorised development shall commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority”.

Operational Phase

15.5.6 The original ES Transport Chapter states that it was agreed with NLC and the HA, that mitigation would be required to ensure that the ‘base + existing committed development’ flows were no worse with AMEP in operation than during the baseline scenario.

15.5.7 The following mitigation measures for the operational phase were included within the original ES Transport Chapter:

Traffic

15.5.8 Mitigation measures in the form of junction improvements were proposed at the following junctions:

- Rosper Road / Humber Road;
- Humber Road / A160 / A1173 (Manby Road Roundabout); and
- A1173 / North Moss Lane / Kiln Lane.

15.5.9 The junction improvements include minor road widening, kerb realignments and increased number

of junction approach lanes.

- 15.5.10 In addition to the above, the DCO at Schedule 9 Protective Provisions Part 3 reinforces the requirements for highway works stating that:

'For the protection of the Highways Agency, no part of the authorised development is to be occupied until improvements to the following junctions (or alternatives approved in writing by the local planning authority in consultation with the Highways Agency) have been implemented in accordance with details approved by the local planning authority in consultation with the Highways Agency:

(a) A160/A1173/Humber Road (Manby Road Roundabout);

(b) A160/Top Road/Habrough Road;

(c) A160/A1077 Ulceby Road;

(d) A160/Eastfield Road (signalised junction), and

(e) A180/A160 Merge/Diverge (Brocklesby Interchange)'.

Rail

- 15.5.11 Appropriate safety measures would be in place at the rail crossings to minimise the potential for any collisions between vehicles on the site and trains to as low as reasonably practicable.

DCO Specified Mitigation

- 15.5.12 The Development Consent Order at Schedule 9 Part 13 provides protective provisions relating to Royal Mail Group Ltd. It states at item 109 that:

(1) For the protection of Royal Mail Group Ltd ('Royal Mail') the following provisions, unless otherwise agreed in writing between the undertaker and Royal Mail, have effect.

(2) No part of the authorised development is to be occupied until improvements to the A1173 / Pelham Road junction (or alternative mitigation measures to be approved in writing by the relevant planning authority, following consultation with Royal Mail), have been implemented in accordance with details approved by the relevant planning authority in consultation with Royal Mail.

(3) Such improvements must mitigate the effects of the proposed development on the operation of this junction and must be designed in accordance with normal standards.

(4) The undertaker must have due regard to any consultation response received from Royal Mail.

- 15.5.13 The Development Consent Order at Schedule 11 also lists the following transport related requirements:

Highway Access – Item 10

1) No stage of the authorised development is to commence until for that stage, written details of the siting, design and layout of any new permanent or temporary means of access to a public highway to be used by vehicular traffic, or any alteration to an existing means of access to a public highway used by vehicular traffic, has, after consultation with the relevant highway authority, Royal

Mail Group Ltd and Centrica plc, been submitted to and approved by the relevant planning authority.

(2) The undertaker must have regard to any consultation responses received.

(3) The public highway accesses must be constructed, or, as the case may be, altered, in accordance with the approved details.

(4) No stage of the authorised development is to commence until for that stage, a written scheme (the "Access Management Scheme") has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority.

(5) The Access Management Scheme must be carried out in accordance with the approved details.

Public rights of way – Item 11

(1) No stage of the authorised development is to commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority.

(2) The alternative Footpath 50 and Paull Footpath 6 must be implemented in accordance with the relevant approved plan and specification.

Construction traffic – Item 25

(1) No stage of the authorised development is to commence until a written transport statement, including any road condition survey, temporary speed limits, lay-bys and details of the preferred route for that stage to be used by construction traffic on public highways, after consultation with the highway authority, Royal Mail Group Ltd and Centrica plc, has been submitted to and approved by the relevant planning authority.

(2) The undertaker must have regard to any consultation responses received.

(3) Notices must be erected and maintained throughout the period of construction at every construction site exit to a public highway, indicating to drivers the route agreed by the relevant planning authority for traffic entering and leaving the site.

Alternate or Additional Mitigation

- 15.5.14 As no significant adverse effects have been identified pursuant to the proposed change, there is no requirement for additional mitigation.
- 15.5.15 The change to the agreed diversion route would be incorporated into the written implementation plan and specification as required under Requirement 9.

15.6.0 Residual Effects

- 15.6.1 The original ES did not identify any effects which remained significant following the application of the mitigation measures.

Construction Phase

- 15.6.2 The original ES determined that since no significant impacts are predicted during the construction phase.
- 15.6.3 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in the original ES Transport Chapter, which were defined as negligible.

Operational Phase

- 15.6.4 The original ES determined that since no significant impacts are predicted during the operational phase.
- 15.6.5 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in the original ES, which were defined as negligible.

Consideration of DCO

- 15.6.6 No changes are identified to the residual effects previously identified as part of the DCO.

15.7.0 Other Environmental Issues

- 15.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017.
- 15.7.2 There are no other additional transport associated environmental effects relating to Infrastructure, Waste, Population & Human Health, Climate & Carbon Balance or Risk of Major Accidents and/or Disasters.
- 15.7.3 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

15.8.0 Summary of Effects

- 15.8.1 The proposed Material Amendment has been reviewed for the potential impacts on traffic and transportation during the construction and operation phases, with consideration of how the proposed Material Amendment changes the effects identified in the original ES to the DCO.
- 15.8.2 The proposed amendment to the agreed diversion route around the Quay is required to avoid the potential construction of a new bridge crossing of the Killingholme Branch line. The proposed new route would, by means of a 440m diversion, relocate the path onto a closed section of the railway line where there is an existing agricultural crossing. The proposed addition to the length of the route is considered to be offset by the benefit to users of removing the proposed footbridge, especially for users such as ambulant disabled users for whom using a bridge would be at best inconvenient or potentially prohibitive. The proposed changes are therefore not assessed to have a significant effect on users.
- 15.8.3 Qualitative consideration indicates that the proposed Material Amendment will not materially affect the level of traffic generated during the construction or operation phases of the development. Any changes to the construction traffic are likely to be minimal in scale, and therefore the original ES to the DCO is deemed to suitably assess the effects of traffic and transportation.
- 15.8.4 The original ES provides mitigation measures (for both the construction and operation phases) which would remain in place for the proposed Material Amendment. Consultation with North Lincolnshire Council has confirmed that all major highways works necessary to mitigate for the development of AMEP are complete and they are satisfied the Material Amendment will not impact on the highway networks.
- 15.8.5 The residual impacts of traffic and transportation of the development are Neutral/Negligible with no discernible effect.

15.9.0 Conclusions

- 15.9.1 On the basis of the above review, SLR considers that the proposed Material Amendment would result in no material change to traffic levels/patterns generated during the construction and operation phases.
- 15.9.2 During the original DCO scoping discussions with the HA and NLC, the issue of the proposed HA A160/A180 upgrade scheme was raised, in terms of how this should be taken into account within the EIA. Although there was a possibility that the A160/A180 scheme would not be given funding, or alternative streams of funding might be found, for the purposes of the EIA, scenarios with the scheme in place were not included. These highway improvement works have since been completed, therefore the previous assessment is considered to be extremely robust.
- 15.9.3 Consultation with North Lincolnshire Council has confirmed that all major highways works are complete and they are satisfied the Material Amendment will not impact on the highway networks.
- 15.9.4 The proposed amendment to the agreed footpath diversion route around the Quay is required to avoid construction of a new bridge crossing of the Killingholme Branch line. The proposed new route would, by means of a 440m diversion, relocate the path onto a closed section of the railway line where there is an existing agricultural crossing. The proposed addition to the length of the route is considered to be offset by the benefit to users of removing the proposed footbridge, especially for users such as ambulant disabled users for whom using a bridge would be at best inconvenient or potentially prohibitive. The proposed changes are therefore not assessed to have a significant effect on users of the England Coast Path.
- 15.9.5 As such, SLR concludes that the original ES remains adequate in its review of the effects of development derived traffic.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 16: NOISE AND VIBRATION

**Able Marine Energy Park, Killingholme, North
Lincolnshire**



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CONTENTS

16.1.0 INTRODUCTION	16-1
Development Consent Order Context.....	16-1
Consideration of Material Amendment	16-2
Purpose and Structure of Chapter	16-2
16.2.0 METHODOLOGY.....	16-3
Changes in Legislation, Guidance and Planning Policy.....	16-3
Scoping Opinion	16-5
Additional Consultation.....	16-6
Assessment Methodology	16-6
Effects Not Requiring Further Assessment.....	16-7
16.3.0 CHANGES IN BASELINE CONDITIONS.....	16-8
DCO Baseline	16-8
DCO Future Baseline.....	16-8
Current Baseline	16-8
Changes in Baseline	16-8
16.4.0 ASSESSMENT OF EFFECTS	16-9
Additional Construction Phase Effects	16-9
Additional Operational Phase Effects.....	16-9
Additional Cumulative Effects	16-9
Consideration of DCO	16-10
16.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	16-11
DCO Mitigation.....	16-11
Alternate or Additional Mitigation	16-11
16.6.0 RESIDUAL EFFECTS	16-12
Construction Phase	16-12
Operational Phase	16-12
Consideration of DCO	16-12
16.7.0 OTHER ENVIRONMENTAL ISSUES.....	16-13
Other Environmental Issues of Relevance	16-13
Summary	16-13

16.8.0	SUMMARY OF EFFECTS	16-14
16.9.0	CONCLUSIONS	16-15

DOCUMENT REFERENCES

TABLES

Table 16-1: Scoping Opinion.....	16-5
Table 16-2: Receptor Sensitivity.....	16-6

APPENDICES

Appendix U16-1: Plan on Proximity of Piling to North Killingholme Pits SSSI (Drawing no. AME-0102-00123)	
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16.1.0 Introduction

Development Consent Order Context

16.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

16.1.2 The associated development for the above proposals includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

16.1.3 Documents, relevant to this Preliminary Environmental Information Report (PEIR) chapter, that were prepared in support of the DCO application include:

- Environmental Statement (ES) Chapter 16: Noise and Vibration¹;
- ES Annexes 16.1 to 16.8.
- ES Chapter 10: Aquatic Ecology²
- ES Chapter 11: Terrestrial Ecology and Birds³
- ES Annex 11.11⁴ - Noise Contour Maps
- ES Annex 10.3⁵ – MEP Effects of Underwater Piling Noise on Migratory Fish; and
- Shadow Habitat Regulations Assessment (sHRA) Annex F: Piling Impacts on birds from AMEP⁶.

16.1.4 The original ES and sHRA provided an assessment of noise and vibration impacts from the proposed

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000321-16%20-%20Noise%20and%20Vibration.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000314-10%20-%20Aquatic%20Ecology.pdf>

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000315-11%20-%20Ecology%20and%20Nature%20Conservation.pdf>

⁴<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000396-11.11%20-%20Noise%20Contour%20Maps.pdf>

⁵<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000383-10.3%20-%20MEP%20Impact%20of%20Underwater%20Piling%20Noise%20on%20Migratory%20Fish.pdf>

⁶[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)

development upon nearby terrestrial noise sensitive receptors. In particular, the following aspects were addressed:

- Potential noise and vibration impact as a result of construction of the proposed development;
- Potential noise impact as a result of operation of the proposed development; and
- Potential noise impact as a result of any traffic flow increases as a result of the construction and operation of the proposed development.

Consideration of Material Amendment

16.1.5 Chapter 16 of the original ES will be reviewed in the context of the proposed material amendment to determine whether the proposed changes have the potential to alter the assessment of any change as set out within the original ES.

16.1.6 Chapter 16 considered the potential for noise and vibration impacts upon human receptors. Reference will also be made to Chapter 10: Aquatic Ecology, Chapter 11: Terrestrial Ecology and Birds, and Annex F of the sHRA, which provided an assessment of noise and vibration impacts from the development upon ecological sensitive receptors, using noise and vibration predictions.

Purpose and Structure of Chapter

16.1.7 This chapter of the PEIR considers the impact of the proposed material amendment on noise and vibration.

16.1.8 Within this chapter, consideration is given to the following:

- changes in legislation, policy and guidance relating to noise and vibration;
- changes in baseline conditions;
- changes in assessment of effects; and
- changes in proposed mitigation.

16.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

16.2.1 Where there have been subsequent changes to legislation, policy or guidance contained within Chapter 16 of the original ES, those documents and changes are detailed below. Where legislation, policy or guidance has changed, a summary of the changes and an assessment as to whether they have the potential to alter the assessment of any change, are detailed.

Planning Policy Guidance Note PPG24: Planning and Noise

16.2.2 PPG24 was withdrawn in March, 2012 on the publication of the NPPF (National Planning Policy Framework). Whilst the NPPF has replaced PPG 24 many of the principles remain the same. Furthermore, PPG24 provides measurable guidelines using a decibel scale, whilst the NPPF does not provide an easily relatable measure of objectivity.

16.2.3 The former guidance identified four Noise Exposure Categories (NEC's) which ranged from A through to D. NEC's were used primarily by Local Planning Authorities when considering Planning Applications for residential development near to transport-related noise sources.

16.2.4 Although referenced within the original ES, the assessment of effects was not undertaken with respect to PPG24. It is therefore considered that withdrawing of PPG24 does not change the original assessment

BS 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas

16.2.5 BS 4142:1997 'Method for rating industrial noise affecting mixed residential and industrial areas' has been superseded by BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.

16.2.6 The general basis for the revised BS4142:2014+A1:2019 is derived from the application of previous editions. Key changes between BS4142:1997 and BS4142:2014 are as follows:

- Consideration of uncertainty;
- Consideration of context;
- Night-time reference period of 15-minutes (increased from 5-minutes);
- Altered procedures for applying acoustic character corrections to specific sound levels; and
- Consideration of impact.

16.2.7 Based on information and the assessment of operational effects contained within the original ES, it is considered that revisions to the methodology contained within BS 4142:2014 + A1:2019 would not lead to significant changes in the assessment methodology or findings.

Design Manual for Roads and Bridges

- 16.2.8 The Design Manual for Roads and Bridges Volume, Section 3, Part 7 ‘Noise and vibration’ has been withdrawn and replaced by LA111 ‘Noise and Vibration’ (May 2020). Methods for the calculation of road traffic noise levels (CRTN 1988) remain the same and criteria for determining impact magnitude due to changes in road traffic have not changed.
- 16.2.9 It is therefore considered that the findings of the road traffic assessment remain unchanged.

North Lincolnshire Local Plan

- 16.2.10 The original ES referred to the North Lincolnshire Council (NLC) Local Plan, Policy DS1- ‘General Requirements’. Policy DS1 required that, *“A high standard of design is expected in all developments in both built-up areas and the countryside and proposals for poorly designed development will be refused.”* The policy included criteria against which all proposals would be considered. With regard to noise, policy DS1 required, *“...No unacceptable loss of amenity to neighbouring land uses should result in terms of noise...”*
- 16.2.11 The NLC Local Plan has since been replaced by the North Lincolnshire Local Development Framework, which includes the Supplementary Planning Document (SPD) ‘*Planning for Health and Wellbeing*’, (November 2016). The following policy relates to noise:
- Policy 3 ‘Well Designed Places’ requires that: *“When considering the detail of development, proposals should:...Seek to reduce noise and air pollution through ensuring planning applications include a Noise Impact Assessment ... in areas of concern”*.

- 16.2.12 It is considered that the implementation of Policy 3 ‘Well Designed Places’ does not alter the original assessment.

East Riding of Yorkshire Local Plan

- 16.2.13 The original ES referred to the East Riding of Yorkshire (ERYC) Local Plan.
- 16.2.14 The ERYC Local Plan has since been replaced by the East Riding Local Plan (2016). The following policies relate to noise in the context of the proposed development:
- Policy EC5: ‘Supporting the energy sector’ advises that: *“Proposals for the development of the energy sector, excluding wind energy but including the other types of development listed in Table 7, will be supported where any significant adverse impacts are addressed satisfactorily and the residual harm is outweighed by the wider benefits of the proposal. Developments and their associated infrastructure should be acceptable in terms of:.. 3. The effects of development on: i. local amenity, including noise....”*
- 16.2.15 It is considered that the implementation of Policy EC5 does not change alter the original assessment.

Scoping Opinion

16.2.16 Table 16-1 summarises the key aspects of the scoping opinion as relevant to noise and vibration.

Table 16-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 6, paragraph 2.3.4	Changes to the quay would facilitate Ro-Ro operations by allowing self-propelled transporter (SPMT) units. It is not clear how or what has been assessed in relation to the use of SPMTs.	The ES should provide specific reference to the location of this information in the original ES.	SPMT units have been included within the original ES Chapter 16. Source data used for SPMTs is located within Annex 16.4.	N/A
Page 27, paragraph 4.5.2	It remains unclear whether the alterations in piling activities would result in additional noise impacts due to changes in extent, intensity or duration.	The updated ES should include evidence to support any conclusions made.	Consideration of alterations in piling activities has confirmed that this will not result in greater noise or vibration effects than those predicted within the original ES. Proposed mitigation remains appropriate.	Paragraphs 6.4.1 to 6.4.6
Page 35, paragraph 4.10.1	The Inspectorate is concerned that the assumption that the proposed change in quay construction methods would not significantly alter the characteristics of the impact or the effects for sensitive receptors particularly marine ecological receptors may be incorrect.	The updated ES should include information to support the assumptions made or should include an updated assessment of the likely significant effects	Consideration of alterations to quay construction methods has confirmed that this will not result in greater noise or vibration effects than those predicted within the original ES. Proposed mitigation remains appropriate.	Paragraphs 6.4.1 to 6.4.6
Page 35, paragraph 4.10.2	The Inspectorate agrees that the proposed changes are unlikely to change the traffic noise impacts previously assessed as resultant from road traffic.	The Inspectorate is content that these matters be scoped out of the updated assessment.	Scoped out	N/A

Additional Consultation

16.2.17 Outside of the EIA scoping process no further consultation has been undertaken at this stage.

Assessment Methodology

Study Area

16.2.18 The study area is as defined within the original ES for the original DCO application.

Sensitivity Criteria

16.2.19 Sensitivity criteria for receptors are not described within Chapter 16 of the original ES. The significance of the noise effect will depend on the receptor type and its sensitivity to the noise impact. An example matrix indicating the sensitivity of the receiving environment is shown in Table 16-2.

Table 16-2: Receptor Sensitivity

Sensitivity	Definition
Very High	Residential properties (night-time), Schools and healthcare building (daytime)
High	Residential properties (daytime), Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas
Low	Industrial areas

16.2.20 All receptors considered within Chapter 16 of the original ES are residential and therefore sensitivity would be defined as 'very high' during the night and 'high' during the day. Ecological receptors are considered in Chapters 10 and 11.

Magnitude of Change (Impact)

16.2.21 Criteria to describe magnitude of changes are as defined within Table 16.4 of the original ES for the DCO.

Significance of Effect

16.2.22 Significance criteria for assessing noise impacts are as defined within Table 16.5 of the original ES for the DCO.

Mitigation Hierarchy

16.2.23 Mitigation measures to reduce sound from construction and operational phases have been recommended within the original ES. Whilst not defined within the original ES, the preference would always be to reduce noise at source where practicable, before the implementation of other measures (e.g. screening). The recommended mitigation measures have been proposed with

reference to best practice guidance.

Effects Not Requiring Further Assessment

- 16.2.24 The proposed amendments will not affect road traffic (as referenced within paragraph 4.10.2 of the Scoping Opinion), therefore there will be no new or different impacts associated with road traffic noise. No new or different impacts associated with noise during operation will arise as a result of the proposed amendments.

16.3.0 Changes in Baseline Conditions

DCO Baseline

16.3.1 DCO baseline conditions are set out within Section 16.5 of the original ES.

DCO Future Baseline

16.3.2 DCO future baseline conditions (road traffic) have been considered within the original ES.

Current Baseline

16.3.3 Chapter 16 of the original assessment identified human noise sensitive receptors in the vicinity of the proposed development. The majority of receptors are located in South and North Killingholme, and to the north of the Humber; a considerable distance from the proposed development. Receptors S1 (North Killingholme Low Lighthouse and the Lookout), S2 (Station House) and S3 (Hazeldene, Marsh Lane) are within 100m of the site boundary.

16.3.4 With regard to terrestrial ecological sensitive receptors, North Killingholme Haven Pits, located adjacent to the northern site boundary, is the nearest and most sensitive terrestrial ecological receptor, being a designated Site of Special Scientific Interest and a component part of the Humber Estuary Special Protection Area and Ramsar site.

Changes in Baseline

16.3.5 Since the original ES was undertaken, Receptors S1 and S2 are no longer in residential use; they were subsequently purchased by AHPL and will not return to residential use. Receptor S3 at Marsh Lane remains occupied and in residential use.

16.3.6 Receptor S3 (Hazeldene Marsh Lane) remains the nearest sensitive receptor to the proposed development. There have been no changes in the distance from Receptor S3 to the proposed development, and there are not any new noise sensitive receptors that have been introduced nearer to, or in proximity to, the proposed development.

16.3.7 The nearest new committed noise sensitive receptors would be residential development (Peter Ward Homes) on the north western edge of Immingham. This location is approximately 1.8km from the site boundary. As this committed development is not in proximity to the proposed development, and receptors which are nearer have been included within the original ES, it is considered that further consideration of future receptors is not required.

16.3.8 There are no identified changes to areas surrounding sensitive receptors that are considered to have led to a significant changes in baseline conditions.

16.4.0 Assessment of Effects

Additional Construction Phase Effects

- 16.4.1 The proposed amendments result in a different alignment of the quay wall. Drawing AME-0102-00123 provided in Appendix U16-1 shows that the new alignment will not result in a change in proximity of piling to sensitive receptors, including North Killingholme Haven Pits SSSI.
- 16.4.2 Regarding pile types and piling methods, predictions of vibration and noise effects in the original ES were based on the assumptions that tubular steel piling and sheet piling for the quay wall would be used. Assumptions within the calculations included two hydraulic hammer piling rigs operating simultaneously, performing 20,000-40,000 hammer strikes per day, with a hammer blow energy of up to 500kJ.
- 16.4.3 Anchor piles are now proposed as an option to flap anchors at the back of the quay wall. Anchor piles are shorter than quay piles and will only require driving into superficial deposits, rather than chalk (as with quay piles). The anchor piles would therefore require a smaller hammer and less energy per blow (300kJ will be more than adequate), compared to quay pile driving. As per the original ES, no more than two piling rigs would be expected to operate simultaneously, performing 20,000-40,000 strikes per day.
- 16.4.4 Based on the above information, it is considered that changes to the alignment of the quay wall and types of piles to be used will not result in greater noise or vibration effects than those predicted within the original ES.
- 16.4.5 Appropriate mitigation has been identified in Chapter 16, Section 16.7 of the original ES and secured through the DCO itself (Schedule 8 paragraphs 37-43 and Schedule 11 paragraph 37) and the amended quay will be constructed in accordance with this mitigation. It is considered that proposed mitigation remains appropriate.
- 16.4.6 In summary, there are no changes in the method of construction and no material changes (in terms of noise and vibration) to the location of the material amendment that would lead to greater noise or vibration effects than those identified within the original ES. Further consideration of construction phase effects is not required.

Additional Operational Phase Effects

- 16.4.7 Whilst craneage associated with the revised quay layout will be located in closer proximity to the North Killingholme Haven Pits SSSI, this minor locational change in operational machinery is considered de minimis and will not result in a change to the assessment of the overall noise impact upon this sensitive receptor as contained within the original ES.
- 16.4.8 On this basis, there are no changes to the proposed operation that would result in changes to predicted operational sound levels and therefore the original assessment of effects. Further consideration of operational phase effects is not required.

Additional Cumulative Effects

- 16.4.9 A review of committed developments (additional to those considered within the original ES) indicates that noise emissions will be unlikely to lead to a perceptible increase in sound levels at

receptor locations, due to distance and existing ambient and background sound levels. Further consideration of cumulative effects is not required.

Consideration of DCO

- 16.4.10 Following this review, there are no identified changes in baseline conditions or the assessment of effects that will result in new or significant effects.

16.5.0 Requirement for Additional Mitigation

DCO Mitigation

- 16.5.1 Suitable mitigation measures to ensure that potential noise and vibration effects are managed and controlled to acceptable levels where practicable will be implemented are described within the original ES.

Alternate or Additional Mitigation

- 16.5.2 Mitigation measures to be implemented are appropriate and no alternate or additional mitigation beyond that contained within the original ES is required.

16.6.0 Residual Effects

Construction Phase

- 16.6.1 Following consideration of mitigation, residual effects relating to noise and vibration during the construction phase are identified within the original ES.

Operational Phase

- 16.6.2 Following consideration of mitigation, residual effects relating to noise during the operational phase are identified within the original ES.

Consideration of DCO

- 16.6.3 Following this review, it is considered that there are not any changes to the assessment of effects identified within the original ES.

16.7.0 Other Environmental Issues

16.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.

16.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

16.7.3 None identified.

Waste

16.7.4 None identified.

Population and Human Health

16.7.5 The scope of any noise and vibration assessment inherently considers the population and human health, given the known impacts of noise and vibration on human health.

16.7.6 Potential impacts on human health have been assessed for both the construction and operational phases, and the significance of effects were concluded as 'not significant'.

Climate and Carbon Balance

16.7.7 None identified.

Risks of Major Accidents and/or Disasters

16.7.8 The risks of major accidents and/or disasters is not considered of relevance to the noise and vibration Chapter.

Summary

16.7.9 No other environmental issues of relevance have been identified.

16.8.0 Summary of Effects

- 16.8.1 Chapter 16 of the original ES has been reviewed in the context of the proposed material amendment, to determine whether the proposals, and subsequent changes in policy, guidance and baseline conditions have the potential to lead to changes in the findings as described within the original ES.
- 16.8.2 Following this review, no changes have been identified that would alter the assessment of effects as described within the original ES.

16.9.0 Conclusions

- 16.9.1 This review has identified that the proposed material amendment, and changes in policy, guidance and baseline conditions that have occurred since the original DCO application, will not alter the findings presented within the original ES.
- 16.9.2 It is therefore concluded that Chapter 16: Noise and Vibration of the original ES remains valid.

REFERENCES

- Department for Communities and Local Government, (1994). Planning Policy Guidance Note PPG24: Planning and Noise
- British Standard BS 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas. BSI Standards Ltd
- The Design Manual for Roads and Bridges Volume, Section 3, Part 7 'Noise and vibration' (2011). Highways Agency
- North Lincolnshire Council, (2003). North Lincolnshire Local Plan
- North Lincolnshire Council, (2016). North Lincolnshire Local Development Framework (SPD) Planning for Health and Wellbeing
- East Riding of Yorkshire Council, (2016). East Riding of Yorkshire Local Plan

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 17: AIR QUALITY

**Able Marine Energy Park, Killingholme, North
Lincolnshire**



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CONTENTS

17.1.0 INTRODUCTION	17-1
Development Consent Order Context.....	17-1
Consideration of Material Amendment	17-2
Purpose and Structure of Chapter	17-2
17.2.0 METHODOLOGY	17-3
Changes in Legislation, Guidance and Planning Policy.....	17-3
Scoping Opinion	17-6
Additional Consultation.....	17-6
Assessment Methodology	17-7
Effects Not Requiring Further Assessment.....	17-11
17.3.0 CHANGES IN BASELINE CONDITIONS	17-12
DCO Baseline	17-12
DCO Future Baseline.....	17-12
Current Baseline	17-13
Changes in Baseline	17-16
17.4.0 ASSESSMENT OF EFFECTS	17-17
Additional Construction Phase Effects	17-17
Additional Operational Phase Effects.....	17-22
Additional Cumulative Effects	17-22
Consideration of DCO	17-22
17.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	17-24
DCO Mitigation.....	17-24
Alternate or Additional Mitigation	17-25
17.6.0 RESIDUAL EFFECTS	17-26
Construction Phase	17-26
Operational Phase	17-26
Consideration of DCO	17-26
17.7.0 OTHER ENVIRONMENTAL ISSUES	17-27
Other Environmental Issues of Relevance	17-27
Summary	17-27

17.8.0	SUMMARY OF EFFECTS	17-29
17.9.0	CONCLUSIONS	17-30

DOCUMENT REFERENCES

TABLES

Table 17-1: Scoping Opinion.....	17-6
Table 17-2: Sensitivity Criteria – Deposited Dust.....	17-8
Table 17-3: Sensitivity Criteria – Odour	17-8
Table 17-4: Impact Descriptors for Individual Receptors.....	17-9
Table 17-5: Automatic Monitors: Details	17-13
Table 17-6: Automatic Monitors: 2014-2019 Annual Mean NO ₂ Results	17-14
Table 17-7: Automatic Monitors: 2014-2019 Number of NO ₂ Hourly Mean Exceedances.....	17-14
Table 17-8: Automatic Monitors: 2014-2019 Annual Mean PM ₁₀ Results.....	17-14
Table 17-9: Automatic Monitors: 2014-2019 Number of PM ₁₀ Daily Mean Exceedances.....	17-14
Table 17-10: Automatic Monitors: 2014-2019 Annual Mean PM _{2.5} Results	17-14
Table 17-11: Automatic Monitors: 2018 SO ₂ Monitoring Results.....	17-14
Table 17-12: NO ₂ Passive Diffusion Tube Monitoring Sites: Details.....	17-15
Table 17-13: NO ₂ Passive Diffusion Tube Monitoring Sites: Results	17-15
Table 17-14: Summary of Impacts Arising from Non-Road Sources at Sensitive Human Receptors.....	17-18
Table 17-15: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NO _x Annual Mean.....	17-19
Table 17-16: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – SO ₂ Annual Mean.....	17-20
Table 17-17: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NO _x 24-hour	17-20
Table 17-18: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Acid Deposition.....	17-21
Table 17-19: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Nitrogen Deposition.....	17-22
Table 17-20: Summary of Effects for Air Quality.....	17-29

17.1.0 Introduction

Development Consent Order Context

- 17.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 17.1.2 The associated development for the above proposals includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 17.1.3 To support the DCO Application, an Air Quality Chapter to the Environmental Statement (ES) – Chapter 17¹ and associated Annex 17.1² was prepared. An additional Air Quality Chapter (Chapter 39) was also prepared and specifically related to the Compensation Site but no changes are proposed to that part of the consented development.
- 17.1.4 The original Air Quality Chapter 17 has been referred to as the “original ES” herein. **In short, all impacts on air quality assessed in the original ES were found ‘not significant’.**
- 17.1.5 The air quality assessments detailed within the original ES include both qualitative and detailed quantitative methods of assessment, with consideration given to the potential impacts from several key air pollutants, including:
- nitrogen oxides (NO_x);
 - nitrogen dioxide (NO₂);
 - particulate matter with an aerodynamic diameter of ≤10µm (PM₁₀);
 - particulate matter with an aerodynamic diameter of ≤2.5µm (PM_{2.5});
 - sulphur dioxide (SO₂);
 - Volatile Organic Compounds (VOCs) assessed as benzene; and
 - carbon dioxide (CO₂).

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000322-17%20-%20Air%20Quality.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000414-17.1%20-%20Detailed%20Methodology%20and%20Results.pdf>

- 17.1.6 The air quality assessment also considered potential impacts from deposited dust, odour and nitrogen (N) (in terms of N and acid deposition on ecological receptors).
- 17.1.7 The assessment included detailed assessment of emissions from road sources, non-road sources, rail and shipping, and assessed impacts on sensitive human and ecological receptors.

Consideration of Material Amendment

- 17.1.8 In terms of air quality, the material amendment includes it is proposed to amend the deposit site for 1,100,000 tonnes of clay that is to be dredged to form the berthing pocket from its consented location on the *'terrestrial area landward of the existing Killingholme Marshes flood defence wall'*, to licenced disposal sites within the Humber Estuary. The change in the deposit location will increase the total number of vessel trips associated with disposal operations but will not introduce any additional vessels, so that the dredging programme will be prolonged with the same number of disposal barges operating at any one time. The extension to the duration of the dredging programme will be associated with an increase in total emissions associated with vessel movements. The original ES considered the dredging programme and associated vessel movements would occur over a 4-month period. The material amendment would result in vessel movements to the deposit sites over an 8-month period (representing a 100% increase). This increase in vessel movements and associated emissions has been considered in the context of this Air Quality PEIR. Reference should be made to Chapter 4 of this document, 'Description of Changes to Development and Consideration of Alternatives', for further details.
- 17.1.9 Beyond the increase in vessel movements and associated emissions, other changes are not considered likely to result in any new or materially different impacts on air quality separate to those previously assessed in the original ES.

Purpose and Structure of Chapter

- 17.1.10 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed material amendment on the air quality and compliance with relevant policy and standards.

17.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

17.2.1 In the interim since the extant DCO, the changes in legislation, guidance and planning policy detailed in the following subsections have occurred. As noted by the dates, several of the guidance documents were not available at the time of the original air quality assessment.

Legislation

17.2.2 The original ES referred to several legislative documents, including the following:

- The Air Quality Standards Regulations 2010 (AQSR 2010) – transposed from EU Ambient Air Quality Directive (2008/50/EC) and the Fourth Daughter Directive (2004/107/EC);
- The Air Quality (England) Regulations 2000;
- Environmental Protection Act 1990;
- The Habitats Directive (92/43/EEC) (covers the Natura 2000 Network);
- The Conservation of Habitats and Species Regulations 2010 ('Habitats Regulations');
- Wildlife and Countryside Act 1981;
- Countryside and Rights of Way (CRoW) Act 2000; and
- The Environment Act 1995.

17.2.3 Of the above, and since the original ES, the AQSR 2010 were amended by The Air Quality Standards (Amendment) Regulation 2016, and the Habitats Regulations were updated by The Conservation of Habitats and Species Regulations 2017. However, neither amendments would materially change the assessment methodology.

17.2.4 The air quality legislation within the original ES therefore remains valid, with no significant changes in the interim period.

Local Air Quality Management Technical Guidance LAQM.TG(16)

17.2.5 The original ES utilised Local Air Quality Management Technical Guidance LAQM.TG(09) published by the Department for Environment, Food and Rural Affairs (Defra) in February 2009. This document has been updated several times in the interim, with the most recent update LAQM.TG(16) published by Defra in February 2018. However, it is considered that the main principles of the guidance document have remained and are therefore still valid.

Land-Use Planning & Development Control: Planning for Air Quality

17.2.6 The original ES utilised guidance produced by Environmental Protection UK (EPUK) '*Development Control: Planning For Air Quality*' (2010 Update) for the assessment of impacts. In the interim since the DCO came into force, updated versions of this guidance document have been produced. Most

recently in 2017, EPUK and the Institute of Air Quality Management (IAQM) published the guidance document '*Land-Use Planning & Development Control: Planning For Air Quality*' (v1.2). The document provides key guidance for air quality assessments and the assessment of the significance of effects. This document would effectively replace previous versions.

Demolition and Construction Dust Guidance

- 17.2.7 The original ES refers to the '*Minerals Policy Statement 2*' published by the Office of the Deputy Prime Minister in 2005, and studies by the Building Research Establishment (BRE). Recommendations for assessment have been utilised in the original ES and it therefore considered a qualitative 'risk-based' approach for the assessment of dust impacts.
- 17.2.8 More recently, in 2014 and later revised in 2016 incorporating minor amendments, the IAQM published the document '*Guidance on the assessment of dust from demolition and construction*' which details the current, recognised method of assessment of demolition and construction dust.

Odour for Planning

- 17.2.9 The original ES refers to a 'qualitative risk-based' approach for the assessment of odour and did not reference specific guidance.
- 17.2.10 In 2018, the IAQM published an update to the document '*Guidance on the assessment of odour for planning*' (v1.1), originally published in 2014. The guidance details qualitative and quantitative methods of assessment and is specific to odour.

Design Manual for Roads and Bridges (DMRB)

- 17.2.11 The original ES refers to the Design Manual for Roads and Bridges (DMRB) and although not specified this reference would relate to Volume 11, Section 3, Part 1 HA207/07. The DMRB has been updated in the interim period. The new version '*LA 105 Air Quality*' was published in 2019. The identification of receptors up to 200m from an 'affected road' remains, as was referenced within the original ES.

Air Quality Impacts on Designated Conservation Sites

- 17.2.12 The original ES refers to the H1 Environmental Risk Assessment produced by the Environment Agency (EA). Also, the Air Pollution Information System (APIS) resource produced in partnership by the Centre for Ecology and Hydrology and other UK conservation agencies.
- 17.2.13 In the interim period, the EA has produced several guidance notes and documents, including – 'Air emissions risk assessment for your environmental permit' (2016 and 2020 update) and Operational instructions 66_12 and 67_12 (2012).
- 17.2.14 Also, in 2020, the IAQM published 'A guide to the assessment of air quality impacts on designated nature conservation sites' (v1.1) to set out the requirements for assessment of air quality impacts on designated nature conservation sites.

National Planning Policy Framework

- 17.2.15 The original ES referenced Planning Policy Statement (PPS) 23: Planning and Pollution Control.
- 17.2.16 This has since been replaced by the National Planning Policy Framework (NPPF), which was most

recently updated in 2019. The NPPF describes the policy context in relation to pollutants including air pollutants, as follows:

“Para 170: Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] air [...] pollution [...]. Development should, wherever possible, help to improve local environmental conditions such as air [...] quality [...].”

“Para 180: Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”

17.2.17 The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values [...] It is important that the potential impact of new development on air quality is taken into account [...] where the national assessment indicates that relevant limits have been exceeded or are near the limit.”

“Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).”

17.2.18 The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *“assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality [...] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact”*.

North Lincolnshire Planning Policy

17.2.19 The North Lincolnshire Local Plan was replaced by the North Lincolnshire Local Development Framework (LDF) in 2011.

17.2.20 The Core Strategy is a key part of the LDF and sets out the long-term vision for growth and development in North Lincolnshire. The Strategy includes Spatial Objective 7:

“To ensure the efficient use of resources, maximising recycling of minerals and waste products, minimising pollution, maintaining and improving air, soil and water quality, and employing sustainable building practices in new development.”

Scoping Opinion

17.2.21 Table 17-1 outlines issues relating to air quality which were included within the ES Scoping Opinion.

Table 17-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
ID 4.11.1	[...] the Inspectorate notes that the Scoping Report also identifies an anticipated increase in vessel movements during operation. [...] Any significant effects on air quality associated with the increased vessel movements should be assessed.	The Scoping Opinion reference to <i>'increase in vessel movements during operation'</i> is incorrect: there is no proposed increase to operational phase vessel movements. Reference should be made to Chapter 14: Commercial and Recreational Navigation for details of vessel movements associated with the material amendment. However, there is a proposed increase to construction phase vessel movements associated with a change to the consented deposit location for 1.1M tonnes of clay to be dredged from the berthing pocket, to permit its disposal at HU082 if no alternative beneficial use is identified.	Increased construction phase vessel movements and associated emissions have been considered within this Air Quality Chapter.	Paragraph 17.4.5
ID 4.11.1	The Applicant should make effort to agree the scope of the updated assessment for air quality with relevant consultation bodies.	-	Additional consultation was undertaken with the NLC Environmental Protection Team to discuss the scope of the updated assessment.	Paragraph 17.2.22

Additional Consultation

17.2.22 In light of the Scoping Opinion detailed in Table 17-1, and in reference to the increase in vessel movements associated with the construction phase of the proposed material amendment, additional consultation with the NLC Environmental Protection Team was undertaken. The scope of this additional consultation was limited to the assessment construction phase vessel movements and associated emissions, only. No other aspects of the Air Quality PEIR were discussed with NLC. At the time of writing, no response was received from the NLC Environmental Protection Team. A

copy of the correspondence to the NLC Environmental Protection Team is appended to this Air Quality PEIR.

Assessment Methodology

17.2.23 Section 17.3 of the original ES details the assessment methodology. The original ES included a qualitative construction dust assessment (paragraphs 17.3.10 to 17.3.17) which employed a risk-based approach. It also contained detailed dispersion modelling to assess emissions from road traffic (paragraphs 17.3.18 to 17.3.21), non-road sources including shipping (paragraphs 17.3.22 to 17.3.24), rail (paragraphs 17.3.25 to 17.3.27), and paint spraying (which considered odour/VOCs) (paragraphs 17.3.28 to 17.3.31).

Study Area

17.2.24 The study area and receptors assessed are as defined within Section 17.5 'Baseline' of the original ES and Section 3 'Receptor Locations' of Annex 17.1 'Air Quality: Detailed Methodology and Results'.

17.2.25 As set out in the original ES, sensitive human and ecological receptor locations were considered in the assessment when located within set screening distances from the Site, specific Site pollutant sources and/or roads predicted to witness increases in traffic as a result of the scheme. Section 17.5 'baseline' of the original ES references the following screening distances to identify relevant receptors:

- Human receptors to road traffic emissions: within 200m of roads identified to be subject to significant increases in traffic;
- Human receptors to on-site rail and paint-spraying emissions: within 1 – 2km of the site boundary;
- Human receptors to shipping activities and associated emissions: within 1 – 2km of the dockside and the routes to and from dockside;
- Receptors to construction dust: within 200m of construction activities; and
- Ecological receptors – all European protected habitat sites within 10km and all Nationally protected site within 2km of the AMEP site.

Sensitivity Criteria

17.2.26 In terms of construction dust, the original ES did not specifically apply sensitivity criteria. However, for human receptors the Chapter stated that impacts were primarily assessed at nearby residential receptors (likely because of their high sensitivity). For ecological receptors, the assessment considered statutory European and national sites (likely because of their high sensitivity) and recognised that the sensitivity of a site is dependent on the sensitivity of the species and habitats within the designated site.

17.2.27 For the assessment of odour, the original ES did not apply sensitivity criteria, although noted that the assessment would consider human receptor locations only. In the interim period from the original ES, new guidance documents have been released in relation to construction dust and odour by the IAQM. The documents are based on current research and knowledge and set out sensitivity criterion defining receptors as 'low', 'medium' or 'high' sensitivity.

17.2.28 A summary of the sensitivity of receptors to deposited dust and odour, based on the IAQM guidance documents, is displayed in Table 17-2 and 17-3, respectively.

Table 17-2: Sensitivity Criteria – Deposited Dust

Sensitivity	Indicative Examples
High	<ul style="list-style-type: none"> Residential dwellings Museums and other culturally important collections Medium- and long-term car parks Car showrooms International or national designated sites with designated features that may be affected by dust soiling. Designated sites where there is a community of a particular dust sensitive species such as vascular species including in the Red Data List for Great Britain. E.g. SAC designated for acid heathlands or local site designated for lichens near to demolition of a concrete (alkali) building.
Medium	<ul style="list-style-type: none"> Parks Places of Work Designated sites where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Designated sites with a national designation where the features may be affected by dust deposition. E.g. SSSI with dust sensitive features.
Low	<ul style="list-style-type: none"> Playing fields Farmland (unless commercially sensitive horticultural) Footpaths Short term car parks Roads Locations with a local designation where the features may be affected by dust deposition. E.g. local nature reserve with dust sensitive features.

Table 17-3: Sensitivity Criteria – Odour

Sensitivity	Indicative Examples
High	<ul style="list-style-type: none"> Residential dwellings Hospitals Schools/education Tourist/cultural
Medium	<ul style="list-style-type: none"> Places of Work Commercial/retail premises Playing/recreation fields
Low	<ul style="list-style-type: none"> Industrial use Farms Footpaths Roads

- 17.2.29 The sensitivity of human receptors and international and national designated ecological sites (i.e. SPA, SAC, Ramsar, SSSI) to emissions to air from road vehicle, plant, and industrial processes/stacks is generally considered high.
- 17.2.30 For human receptors, the sensitivity is relative to the existing, baseline concentrations at a given receptor location. For example, as set out within the magnitude of change matrix (Table 17-4, below), receptors subject to lower baseline concentrations are less sensitive to the magnitude of change. As baseline concentrations increase, a receptor becomes increasingly sensitive to a smaller magnitude of change. Therefore, where background concentrations are elevated, in AQMAs for example, the receptors located here would be considered more sensitive. This was recognised within the original ES.
- 17.2.31 For designated ecological sites, the sensitivity of the site is defined based on the habitats, species and features within the site. For example, certain vegetation may be more susceptible to combustion emissions than others. This was recognised within the original ES.
- 17.2.32 The new guidance documents available in the interim since the original ES are unlikely to amend the overall sensitivities assigned within the original ES.

Magnitude of Change (Impact)

- 17.2.33 For pollutants which have objectives defined within legislation and guidance, the magnitude of change (impact) is compared against the air quality objective and existing baseline concentrations at the receptor.
- 17.2.34 The original ES utilised the matrix set out within the EPUK 2010 guidance document for determining the magnitude of change – as set out Section 17.3, Table 17.4 of the original ES.
- 17.2.35 In the interim period from the original ES, the EPUK guidance document and subsequent magnitude of change matrix has been updated. Table 17-4 displays the current matrix, reproduced from the EPUK-IAQM guidance document ‘*Land-Use Planning & Development Control: Planning For Air Quality*’. This is applied in the assessment of long-term (annual mean) impacts from road vehicle emissions and process emissions on human receptors.

Table 17-4: Impact Descriptors for Individual Receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1*	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Table note: *percentage changes of 0%, i.e. less than 0.5%, will be described as Negligible.

- 17.2.36 As noted in Table 17-4, the matrix considers both the magnitude of change, and the total concentration at the receptor in the assessment year to determine the impact.

17.2.37 Whilst the original ES utilised an earlier version of the matrix, when considering the predicted results of the assessment, the overall conclusions would not alter in terms of the magnitude of change classification.

Significance of Effect

17.2.38 The original ES sets out the determination of significance for human and ecological receptors within Section 17.3, paragraphs 17.3.43 to 17.3.46. This included consideration of the following:

- Process Contribution (PC) – the impact associated with emissions from the AMEP only; and
- Predicted Environmental Concentration (PEC) – the impact associated with emissions from the AMEP added to the existing baseline concentrations.

17.2.39 For human receptors, the original ES utilised the EPUK 2010 magnitude of change matrix, combined with other factors e.g. the presence of AQMAS/elevated baseline concentrations, to determine the significance of effect from emissions.

17.2.40 For ecological receptors, the original ES utilised principles set out with the EA's H1 Environmental Risk Assessment to determine the significance of effect from emissions, whereby impacts can be classified as insignificant if:

- PC is <1% of the long-term Critical Level (CLe) or Critical Load (CLo); or
- If PC is >1% but the PEC is <70% of the CLe or CLo.

17.2.41 The above principles are still considered valid.

17.2.42 For the assessment of short-term (e.g. 1-hour mean) impacts on human receptors, the recent 2017 EPUK-IAQM guidance indicates the following – when the PC is <10% of the objective it can be classified as 'negligible', 10-20% 'small', 20-50% 'medium', and >50% 'large' and the significance of this impact can be described as 'negligible', 'slight', 'moderate', or 'substantial' respectively without considering background concentrations.

17.2.43 In regard to ecological receptors, the EA's 'Operational instruction 66_12' provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in combination)' for European sites, 'no likely damage' for SSSIs and 'no significant pollution' for other sites, as follows:

- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for European sites and SSSIs;
- PC does not exceed 10% short-term CLe for NO_x for European sites and SSSIs;
- PC does not exceed 100% long-term CLe and/or CLo other conservation sites; and
- PC does not exceed 100% short-term CLe for NO_x (if applicable) for other conservation sites.

17.2.44 The above bullet points are in line with the original ES, although provide additional criteria in relation to short-term impacts and other conservation sites. That said, the conclusions of the original ES, which found all impacts on ecological receptors to be 'not significant' (Table 17.11 and paragraphs

17.6.26 and 17.6.27), would not be altered by use of the additional criteria.

- 17.2.45 In line with IAQM guidance, the determination of the significance of effects from construction dust impacts is not undertaken. With the effective implementation of appropriate mitigation measures, the potential construction dust effects would be rendered 'not significant'. In addition, construction dust impacts are likely to be short-term and temporary in nature – only occurring at certain times or in certain meteorological conditions.
- 17.2.46 For the assessment of odour, the original ES converted VOC emissions (associated with paint spraying) to European Odour Units (OU_E) and compared this against the 10OU_E/m³ criterion – which represents the point at which most receptors will first perceive the odour. This was compared against the standards set out within the AQSR 2010 to determine significance.
- 17.2.47 The current methods for determining the significance of effect from odour impacts are set out within the IAQM odour guidance (2018). It recommends the employment of several methods, both qualitative and quantitative, to gather evidence on the predicted magnitude of the effect. From this, it states that professional judgement is required to consider the sensitivity and value of a receptor, and the wider societal or stakeholder consensus, in addition to the predicted magnitude of effect (for which it provides a series of matrices to determine). It states: '*Where the overall effect is greater than "slight adverse", the effect is likely to be considered significant*'.
- 17.2.48 The new guidance documents available in the interim since the original ES would not amend the overall significance for odour given the maximum predicted magnitude of change / odour concentrations within the original ES.

Mitigation Hierarchy

- 17.2.49 The original ES did not employ or detail the use of a mitigation hierarchy.
- 17.2.50 The mitigation measures are detailed within Section 17.7 of the original ES and were determined based on the predicted effects of the assessments and industry good practice.

Effects Not Requiring Further Assessment

- 17.2.51 Beyond construction phase vessel / shipping movements and associated emissions, the material amendment is not considered to result in any new or materially different impacts separate to those previously assessed and/or of a greater magnitude. Therefore, wider impacts arising during the construction phase (as road traffic emissions and construction dust) and impacts during the operational phase (as road traffic emissions, vessel / shipping emissions and emissions from paint spraying of products) and considered as part of the original ES are not considered to require assessment in this Chapter.

17.3.0 Changes in Baseline Conditions

DCO Baseline

- 17.3.1 The receptors detailed within the original ES are still considered relevant and their respective sensitivities are not expected to have altered. For example, residential dwellings and European designated ecological sites would still be considered of 'high' sensitivity. The reasoning for the inclusion of a receptor within the air quality assessment is likely still valid. Reference should be made to Section 3 'Receptor Locations' of Annex 17.1 'Air Quality: Detailed Methodology and Results for details of modelled human receptor locations, and paragraphs 17.5.17 to 17.5.19 of the original ES for details of modelled ecological receptors.
- 17.3.2 The original ES identified four Air Quality Management Areas (AQMAs) that may be potentially impacted by the AMEP. These were identified in paragraphs 17.5.6 to 17.5.7 of the original ES. AQMAs are declared for exceedances of the air quality objectives at locations of relevant human exposure. Two of the four AQMAs identified have since been revoked – the Immingham AQMA declared for PM₁₀ was revoked in 2016, and the Low Stanton AQMA also declared for PM₁₀ was revoked in 2018.
- 17.3.3 The original ES also identified an area in close proximity to the Humber Road (A160) in Killingholme, as recording NO₂ concentrations near to or above the air quality objectives – potentially triggering the need for the declaration of an AQMA. However, a review of the NLC 2019 Air Quality Annual Status Report (ASR) indicates annual mean NO₂ concentrations in this area of concern have improved/reduced in the interim since the original ES and therefore an AQMA was not declared.
- 17.3.4 Recent air quality monitoring results, including near the A160, to inform the baseline air quality within the Site locale were presented within the original Air Quality Chapter and Annex.
- 17.3.5 The original ES identified a number of existing emissions sources in the vicinity of the Site.

DCO Future Baseline

- 17.3.6 In the interim period between the DCO Application, there is the potential for new sensitive human receptor locations to have been introduced into the study area by new developments. The sensitivities of such receptors would be defined and assessed as per the original ES.
- 17.3.7 From a review of Defra's interactive Magic³ mapping service, there are no new European or National designated ecological sites (e.g. SPA/SAC/Ramsar/SSSI) are present within the study area since the original ES. Sensitivities of the existing ecological receptors would be defined as per the original ES.

Baseline air quality, as concentrations of NO₂, SO₂ and PM₁₀ considered within the original ES was sourced from air quality monitoring undertaken by NLC at the 'CM6 Killingholme School' monitoring location, sited within North Killingholme. As a precautionary approach, the original ES appears to consider maximum monitored concentrations from the 'CM6 Killingholme School' monitoring location, as the applied background concentration. No trends were assumed regarding future-year background concentrations, in terms of DEFRA forecast year-on-year reductions. However, in the interim since the original ES, concentrations of NO₂, SO₂ and PM₁₀ monitored at the 'CM6 Killingholme School' monitoring location have reduced in comparison to those applied as part of the original ES. Reference should be made to Table 17-5 to

³ <https://magic.defra.gov.uk/MagicMap.aspx>

17.3.8 Table 17-11 for recent monitoring data from the site locale including the ‘CM6 Killingholme School’ monitoring location. These reductions mirror national predictions and the trends in air pollutant concentrations across the UK and, therefore, it may be reasonable to expect the DCO future baseline will exhibit an improved outlook in terms of air quality.

Current Baseline

17.3.9 The receptors defined within the original ES are still considered to be unchanged and have the same sensitivities as previously defined. It is noted that in the interim since the original ES a number of receptors surrounding the site (including North Killingholme Low Lighthouse and the Lookout, and Station House) were subsequently purchased by AHPL and will not return to residential use.

17.3.10 To determine the current baseline air quality conditions, Local Air Quality Management (LAQM) reports and monitoring data within the administrative areas of North Lincolnshire Council (NLC), and North East Lincolnshire Council (NELC) were considered.

17.3.11 From review of the Site locale, two of the AQMAs detailed within the original ES are still present – the Hull AQMA declared for NO₂, and the Scunthorpe AQMA declared for PM₁₀. However, neither of these AQMAs are located within 10km of the Site. Given that the number of declared AQMAs within the study area have decreased in the interim since the original ES, this suggests an improvement in the air quality baseline conditions. For an AQMA to be revoked, Defra would require long-term evidence of the downward trend in pollutant concentrations and therefore such revocations present a positive outlook in terms of air quality. A review of the NLC 2019 Air Quality ASR and the NELC 2020 Air Quality ASR demonstrates this improving air quality through annual year-on-year reductions of monitored air pollutants.

Automatic Air Quality Monitoring

Table 17-5 to

17.3.12 Table 17-11 provide details and recent monitoring results from the interim period since the original ES, from the closest locations to Site within NLC and NELC. 2019 monitoring data for NLC has not been presented as this has not been made publicly available.

17.3.13 The automatic monitor located in Immingham is affiliated with the Automatic Urban and Rural Network (AURN) operated on behalf of Defra.

17.3.14 Monitoring results (year not specified) from the automatic monitor at Killingholme School (CM6) were presented in the original ES (Table 17.5).

Table 17-5: Automatic Monitors: Details

Site ID / Name	Site Type	NGR (m)		Within AQMA	Pollutants Measured
		X	Y		
CM6 – Killingholme School	Other	514880	416133	No	NO ₂ , PM ₁₀ , SO ₂
CM11 – Killingholme East Halton Road	Other	514148	417514	No	PM ₁₀ , PM _{2.5}
AURN – Woodlands Avenue, Immingham	Urban Background	518277	415116	No	NO ₂

Table 17-6: Automatic Monitors: 2014-2019 Annual Mean NO₂ Results

Site ID	Annual Mean NO ₂ Concentration (µg/m ³)					
	2014	2015	2016	2017	2018	2019
CM6	22.1	20.4	17.0	17.0	18.0	-
AURN – Immingham	-	-	-	16.9	13.9	13.5

Table 17-7: Automatic Monitors: 2014-2019 Number of NO₂ Hourly Mean Exceedances

Site ID	Hourly NO ₂ Means in Excess of 200µg/m ³					
	2014	2015	2016	2017	2018	2019
CM6	0	0	0	0	0	-
AURN – Immingham	-	-	-	0 (56.8)	0 (27.5)	0

Note:
 If the period of valid data is less than 85%, the 99.79th percentile of 1-hour means is provided in brackets.

Table 17-8: Automatic Monitors: 2014-2019 Annual Mean PM₁₀ Results

Site ID	Annual Mean PM ₁₀ Concentration (µg/m ³)					
	2014	2015	2016	2017	2018	2019
CM6	19.1	18.0	18.0	18.0	19.0	-
CM11	-	-	-	-	20.0	-

Table 17-9: Automatic Monitors: 2014-2019 Number of PM₁₀ Daily Mean Exceedances

Site ID	Daily PM ₁₀ Means in Excess of 50µg/m ³					
	2014	2015	2016	2017	2018	2019
CM6	6	2	1	4	3	-
CM11	-	-	-	-	7	-

Table 17-10: Automatic Monitors: 2014-2019 Annual Mean PM_{2.5} Results

Site ID	Annual Mean PM _{2.5} Concentration (µg/m ³)					
	2014	2015	2016	2017	2018	2019
CM11	-	-	-	-	7.0	-

Table 17-11: Automatic Monitors: 2018 SO₂ Monitoring Results

Site ID	Number of Exceedances 2018		
	15-minute Objective (266µg/m ³)	1-hour Objective (350µg/m ³)	24-hour Objective (125µg/m ³)
CM6	0	0	0

17.3.15 As noted from the above results tables, all monitoring results, years, and pollutants presented are found to be below the relevant air quality objectives, with the exception of the 1-hour mean in 2017/2018 at the AURN – Immingham as presented in Table 17-7, where calculation of the 99.79th percentile of 1-hour means indicates concentrations are likely exceeding the objective.

17.3.16 Annual mean NO₂ concentrations (a key pollutant of concern for human health) exhibit a decrease in concentrations over the period presented.

Passive Diffusion Tube Monitoring

The details and results from passive NO₂ diffusion tube monitoring undertaken by NLC and NELC are presented in Table 17-12 and

17.3.17 Table 17-13. 2019 monitoring data for NLC has not been presented as this has not been made publicly available.

17.3.18 Where possible, monitoring results from the monitors that featured in the original ES have been presented i.e. Humber Road Chip Shop, Humber Road LP 695 and monitors in Killingholme – years 2008-2011 were presented in the original ES Annex, Table A17.6.

Table 17-12: NO₂ Passive Diffusion Tube Monitoring Sites: Details

Authority	Site ID	Site Name	Site Type	NGR (m)		Within AQMA
				X	Y	
NLC	DT13	Ulceby Road, Killingholme	Roadside	514573	415901	No
	DT14	School Road, Killingholme	Roadside	514782	415971	No
	DT15	Humber Road Chip Shop	Urban Background	515452	416107	No
	DT16	Humber Road, LP 695	Roadside	515279	416085	No
	DT22	East Halton Road, Killingholme	Roadside	514141	417483	No
NELC	NEL 23	Kings Road, Immingham AQM Station	Roadside	519193	415279	No
	NEL 24	Bluestone, Immingham	Kerbside	517543	414312	No
	NEL 25	St Margret/Pelham Ave, Immingham	Kerbside	518108	414533	No

Table 17-13: NO₂ Passive Diffusion Tube Monitoring Sites: Results

Authority	Site ID	Annual Mean NO ₂ Concentration (µg/m ³)					
		2014	2015	2016	2017	2018	2019
NLC	DT13	42.9	26.2	31.0	20.0	17.0	-
	DT14	46.7	33.7	31.0	27.0	28.0	-
	DT15	27.3	19.4	21.0	19.0	20.0	-
	DT16	35.1	27.0	26.0	25.0	26.0	-

Authority	Site ID	Annual Mean NO ₂ Concentration (µg/m ³)					
		2014	2015	2016	2017	2018	2019
	DT22	-	-	-	-	21.0	-
NELC	NEL 23	31.3	30.0	33.3	28.5	26.6	24.5
	NEL 24	-	-	-	-	-	16.5
	NEL 25	-	-	-	-	-	19.1

As noted from the monitoring results presented in

17.3.19 Table 17-13, annual mean NO₂ concentrations were above the Air Quality Objective (AQO) at monitors DT13 and DT14 in 2014. NO₂ concentrations at these monitors reduce to below the AQO in 2015 and have since shown continued improvement.

17.3.20 All other monitors and years presented are below the annual mean NO₂ AQO.

Changes in Baseline

17.3.21 As noted in the above sections, pollutant concentrations at nearby monitors within the study area have shown an improvement in recent years and in the interim since the original ES. This is consistent with current predictions and trends for pollutant concentrations across the UK.

17.3.22 The original ES raised concerns about the potentially elevated concentrations near to the Humber Road (A160) in Killingholme. The reduction/improvement in concentrations exhibited alleviates such concerns and acts to support the conclusions of the original ES given that no AQMA was declared and concentrations would not be classified as 'elevated' when considering the magnitude of change matrix presented in Table 17-4 of this Chapter.

17.3.23 It has been assumed that there have been no changes to the receptor sensitivities within the study area. That said, a reduction/improvement in baseline concentrations would result in a receptor being less sensitive to changes in concentrations (as set out within the EPUK-IAQM matrix). However, given that the original ES concluded all impacts as '*not significant*', this 're-classification' of sensitivity would not alter this.

17.4.0 Assessment of Effects

- 17.4.1 As discussed in paragraph 17.1.8, the material amendment includes the extension to the programme of dredge disposal within the marine disposal sites. The original ES considered the dredging programme and associated vessel movements would occur over a 4-month period. The material amendment would result in vessel movements to the HU082 deposit site over an 8-month period (representing a 100% increase). Therefore, as a precautionary approach, a 100% uplift to the modelled impacts arising from all non-road sources (construction and operational phases) has been considered and applied to reflect the increase in emissions associated with vessel movements.
- 17.4.2 The updated assessment of effect is outlined in the subsections below.

Additional Construction Phase Effects

Human Receptors

- 17.4.3 The assessment of impacts associated with the material amendment from non-sources at sensitive human receptors is presented in the tables below. It is noted that the presented Process Contributions (PC) / impacts are maximum concentrations at any considered receptor location. Impacts at all other locations will be lower than presented.

Table 17-14: Summary of Impacts Arising from Non-Road Sources at Sensitive Human Receptors

Pollutant	Averaging Period	Applied AQO ($\mu\text{g}/\text{m}^3$)	Original ES Process Contribution (PC) ($\mu\text{g}/\text{m}^3$)	Material Amendment PC ($\mu\text{g}/\text{m}^3$)	PC as a Percentage of the AQO (%)	Predicted Environmental Concentration (PEC) ($\mu\text{g}/\text{m}^3$)	PEC as a Percentage of the AQO (%)	Magnitude	Significance
NO ₂	Annual mean	40	0.0172	0.0344	0.09	- (A)	- (A)	Imperceptible	Not significant
	1-hour mean 99.79%ile	200	0.0686	0.1372	0.07	- (A)	- (A)	Imperceptible	Not significant
SO ₂	15-minute mean 99.9%ile	266	0.112	0.224	0.08	- (A)	- (A)	Imperceptible	Not significant
	1-hour mean 99.73%ile	350	0.0635	0.127	0.04	- (A)	- (A)	Imperceptible	Not significant
	24-hour mean 99.18%ile	125	0.0352	0.0704	0.06	- (A)	- (A)	Imperceptible	Not significant
PM ₁₀	Annual mean	40	0.00105	0.0021	0.01	- (A)	- (A)	Imperceptible	Not significant
	24-hour mean 90.41%ile	50	0.00373	0.00746	0.01	- (A)	- (A)	Imperceptible	Not significant
PM _{2.5}	Annual mean	25	0.00105	0.0021	0.01	- (A)	- (A)	Imperceptible	Not significant
Benzene (C ₆ H ₆)	Annual mean	5	0.529	1.058	21.16	2.66	53.2	Large	Not significant

Notes:

- (A) EPUK & IAQM guidance states where changes in concentration of <0.5% of the applied limit will be described as 'negligible' (imperceptible following the applied ES terminology) irrespective of the background concentration. Therefore, background concentrations not considered.
- (B) C₆H₆ background concentrations are no longer forecast by DEFRA as part of the background pollutant concentration data on a 1km x 1km spatial resolution. The most up to date C₆H₆ DEFRA mapped background concentrations are based upon a 2001 base-year. Therefore, the annual mean background concentration applied as part of the original ES is considered to be relevant and has been applied as part of the assessment of the material amendment.

17.4.4 As referenced in Table 17-14, the PC associated with the material amendment is predicted to result in a ‘not significant’ effect on all considered pollutants / averaging periods at human receptor locations.

Ecological Receptors

17.4.5 The assessment of impacts associated with the material amendment from non-road sources at sensitive ecological receptors is presented in the tables below. It is noted that the presented PC / impacts are maximum concentrations at any considered receptor location. Impacts at all other locations will be lower than presented.

Table 17-15: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NOx Annual Mean

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level	Original ES PC ($\mu\text{g}/\text{m}^3$)	Material Amendment PC ($\mu\text{g}/\text{m}^3$)	PC as a Percentage of the Applied Critical Level (%)	Significance
Maximum at compensation site	30	0.000396	0.000792	<0.01	Not significant
Maximum at Swallow Wold SSSI	30	0.00101	0.00202	0.01	Not significant
Maximum at North Killingholme Pits SSSI	30	0.0329	0.0658	0.22	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	30	0.100	0.2	0.67	Not significant

17.4.6 As referenced above in Table 17-15, the PC associated with the material amendment is predicted to be <1% of the applied annual mean NOx Critical Level (CLe). Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- ‘no significant pollution’ at the compensation site;
- ‘no likely damage’ at SSSI ecological receptor designations; and
- ‘no likely significant effects (alone and in-combination)’ at SAC / SPA / Ramsar ecological receptor designations.

17.4.7 Impacts on the annual mean NOx CLe are, therefore, predicted to remain ‘not significant’.

Table 17-16: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – SO₂ Annual Mean

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level	Original ES PC (µg/m ³)	Material Amendment PC (µg/m ³)	PC as a Percentage of the Applied Critical Level (%)	Significance
Maximum at compensation site	20	0.0000665	0.000133	<0.01	Not significant
Maximum at Swallow Wold SSSI	20	0.000374	0.000748	<0.01	Not significant
Maximum at North Killingholme Pits SSSI	20	0.0110	0.022	0.11	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	20	0.0376	0.0752	0.38	Not significant

17.4.8 As referenced above in Table 17-16, the PC associated with the material amendment is predicted to be <1% of the applied annual mean SO₂ Cle. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- ‘no significant pollution’ at the compensation site;
- ‘no likely damage’ at SSSI ecological receptor designations; and
- ‘no likely significant effects (alone and in-combination)’ at SAC / SPA / Ramsar ecological receptor designations.

17.4.9 Impacts on the annual mean SO₂ Cle are, therefore, predicted to remain ‘not significant’.

Table 17-17: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NO_x 24-hour

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level / Critical Load	Original ES PC (µg/m ³)	Material Amendment PC (µg/m ³)	PC as a Percentage of the Applied Critical Level (%)	Significance
Maximum at compensation site	75	0.0439	0.0878	0.12	Not significant
Maximum at Swallow Wold SSSI	75	0.0234	0.0468	0.06	Not significant
Maximum at North Killingholme Pits SSSI	75	0.144	0.288	0.38	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	75	0.425	0.85	1.13	Not significant

17.4.10 As referenced above in Table 17-17, the PC associated with the material amendment is predicted to be <10% of the applied annual mean NOx 24-hour mean CL. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- ‘no significant pollution’ at the compensation site;
- ‘no likely damage’ at SSSI ecological receptor designations; and
- ‘no likely significant effects (alone and in-combination)’ at SAC / SPA / Ramsar ecological receptor designations.

17.4.11 Impacts on the 24-hour mean NOx CL are, therefore, predicted to remain ‘not significant’.

Table 17-18: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Acid Deposition

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Load (kg eq/ha/yr)	Original ES PC (kg eq/ha/yr)	Material Amendment PC (kg eq/ha/yr)	PC as a Percentage of the Applied Critical Load (%)	Significance
Maximum at compensation site	4.0	0.0000119	0.0000238	<0.001	Not significant
Maximum at Swallow Wold SSSI	4.71	0.0000546	0.0001092	<0.01	Not significant
Maximum at North Killingholme Pits SSSI	4.0	0.00164	0.00328	0.08	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	4.81	0.0110	0.022	0.46	Not significant

17.4.12 As referenced above in Table 17-18, the PC associated with the material amendment is predicted to be <1% of the applied acid Critical Load (CL). Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- ‘no significant pollution’ at the compensation site;
- ‘no likely damage’ at SSSI ecological receptor designations; and
- ‘no likely significant effects (alone and in-combination)’ at SAC / SPA / Ramsar ecological receptor designations.

17.4.13 Impacts on the acid CL are, therefore, predicted to remain ‘not significant’.

Table 17-19: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Nitrogen Deposition

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Load (kg N/ha/yr)	Original ES PC (kg N/ha/yr)	Material Amendment PC (kg N/ha/yr)	PC as a Percentage of the Applied Critical Load (%)	Significance
Maximum at compensation site	8	0.000571	0.001142	0.01	Not significant
Maximum at Swallow Wold SSSI	5	0.000145	0.00029	0.01	Not significant
Maximum at North Killingholme Pits SSSI	10	0.00473	0.00946	0.09	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	8	0.0144	0.0288	0.36	Not significant

As referenced above in

17.4.14 Table 17-19, the PC associated with the material amendment is predicted to be <1% of the applied nutrient nitrogen CLo. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- ‘no significant pollution’ at the compensation site;
- ‘no likely damage’ at SSSI ecological receptor designations; and
- ‘no likely significant effects (alone and in-combination)’ at SAC / SPA / Ramsar ecological receptor designations.

17.4.15 Impacts on the nutrient nitrogen CLo are, therefore, predicted to remain ‘not significant’.

Additional Operational Phase Effects

17.4.16 The material amendment is not anticipated to result in any additional operational phase effects to those detailed in the original ES.

Additional Cumulative Effects

17.4.17 The material amendment is not anticipated to result in any additional cumulative effects to those detailed in the original ES.

Consideration of DCO

17.4.18 There are no changes to note from the assessment of effects contained within the original ES.

17.5.0 Requirement for Additional Mitigation

17.5.1 The original ES included suggestions for appropriate mitigation measures from relevant guidance at the time. As discussed in Section 17.2.0, updates to guidance in the interim has resulted in further standard mitigation now being available for application within air quality assessments.

17.5.2 For example, the IAQM construction dust guidance includes a number of mitigation measures that can be applied based on the determined dust impact risk. This concept whereby mitigation measures are determined on the basis of risk is consistent with the approach of the original ES.

DCO Mitigation

17.5.3 Mitigation measures proposed as part of the DCO are set out in Section 17.7 of the original ES.

17.5.4 These include the following measures for construction dust, which are taken from the relevant good practice guidance documents available at the time:

- where possible dust generation activities will be undertaken away from the site boundary, particularly those locations adjacent to sensitive receptors;
- stockpiles of debris and overburden will be kept watered or sheeted as required, and for long term stockpiles the use of surface bonding materials or vegetating will be implemented if practicable;
- disturbance of stockpiles will be minimised;
- open surfaces and working areas will be watered as required to minimise dust, and surfaces will be converted to permanent hardstanding as soon as possible, or sealed or vegetated is practicable;
- wind breaks and barriers will be erected where possible to minimise wind blow across open areas of the site;
- drop heights will be minimised where possible;
- vehicles will be washed to remove any dusty materials or mud on a regular basis;
- vehicles will be washed to remove any dusty materials from the body and wheels immediately before leaving the construction site;
- the construction access routes will be kept clear of dusty materials with the use of streetcleaners or sprayed with water to maintain the entire road surface wet;
- the speed of vehicles will be limited on unpaved surfaces; and
- containers and trucks will be sheeted to prevent escape of dust during transfer to or from site.

17.5.5 The above measures are still considered relevant and applicable and are effectively secured by Requirements 22 and 28 of Schedule 11 of the extant DCO

17.5.6 The original ES details further mitigation measures relating to shipping, the operation of facilities,

and operational phase traffic in line with industry good practice. This is detailed in Section 17.7 of the original ES.

Alternate or Additional Mitigation

17.5.7 No additional mitigation measures are considered to be required within the extant DCO.

17.6.0 Residual Effects

17.6.1 The following sections detail the residual effects of the material amendment.

Construction Phase

17.6.2 Construction phase effects would be considered as short-term and temporary in nature.

17.6.3 With the correct implementation of appropriate dust mitigation measures, residual effects would be rendered 'not significant'.

Operational Phase

17.6.4 There are not considered to be any significant residual effects associated with the operational phase.

Consideration of DCO

17.6.5 There are no changes to the residual effects identified within the original ES of the DCO.

17.6.6 The original ES mentioned that the possible AQMA declaration in Killingholme could have altered this conclusion. However, as discussed in Section 17.3.0, no AQMA was declared and there has been noted improvements in pollutant concentrations in Killingholme. Therefore, the conclusions of the original ES stand and remain precautionary in terms of the assessment of receptor sensitivity and subsequent magnitude of change predicted.

17.7.0 Other Environmental Issues

- 17.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 17.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 17.7.3 Infrastructure has been indirectly considered, in terms of construction and demolition and road traffic/plant associated with this.

Waste

- 17.7.4 The issue of waste has not been directly considered; however, it is recognised that the waste materials from construction activities has the potential to generate dust and therefore this has been covered within the assessment of construction dust.

Population and Human Health

- 17.7.5 The scope of any air quality assessment inherently considers the population and human health, given the known impacts of air pollutants on human health.
- 17.7.6 Potential impacts on human health have been assessed for both the construction and operational phases, and the significance of effects were concluded as 'not significant'.

Climate and Carbon Balance

- 17.7.7 The original ES considered climate change and the carbon balance primarily through consideration and assessment of CO₂ emissions – from road traffic, rail, and shipping.
- 17.7.8 The assessment quantified the predicted CO₂ emissions of the operational phase. The original ES did not draw any conclusions from this. However, the impact on CO₂ emissions identified within the original ES was accepted as part of the DCO: it is noted that material amendment does not relate to operational phase in terms of the air quality scope and, therefore, CO₂ impacts will not change as a result.

Risks of Major Accidents and/or Disasters

- 17.7.9 The risks of major accidents and/or disasters is not considered of relevance to the air quality Chapter.

Summary

- 17.7.10 With regards to the EIA regulations 2017, in terms of air quality there are not considered to be any

likely significant effects with regards to Other Environmental Issues.

17.8.0 Summary of Effects

- 17.8.1 An air quality assessment was undertaken to assess potential impacts and effects of both the construction and operational phases of the AMEP. Full details of the assessment can be found in the original ES (Chapter 17).
- 17.8.2 A summary of the predicted effects for air quality, consistent with the original ES is presented below in Table 17-20.
- 17.8.3 It is assumed that construction and operational activities would be undertaken in line with recognised industry good practice.

Table 17-20: Summary of Effects for Air Quality

Effect	Receptor	Significance of effect prior to mitigation ^(A)	Summary of mitigation	Residual Effect
Construction Phase				
Changes in dust emissions from construction activities	All considered receptors	Moderate to Negligible / - / T / D / ST	Implementation of dust control measures – detailed in Section 17.5.0	Negligible / - / T / D / ST
Changes in pollutant concentrations from emissions of NO _x /NO ₂ , PM ₁₀ and PM _{2.5} from road traffic and plant	All considered receptors	Negligible / - / P / D / LT	Not considered to be required, detailed in original ES.	Negligible / - / P / D / LT
Operational Phase				
Changes in pollutant concentrations from emissions from non-road sources i.e. rail and shipping	All considered receptors	Negligible / - / P / D / LT	Not considered to be required, detailed in original ES.	Negligible / - / P / D / LT
Changes in pollutant concentrations from emissions of NO _x /NO ₂ , PM ₁₀ and PM _{2.5} from road traffic and plant	All considered receptors	Negligible / - / P / D / LT	Not considered to be required, detailed in original ES.	Negligible / - / P / D / LT
Changes in VOC emissions from operational activities i.e. paint spraying	All considered receptors	Negligible / - / P / D / LT	Not considered to be required, detailed in original ES.	Negligible / - / P / D / LT
Changes in odour emissions from operational activities i.e. paint spraying	All considered receptors	Negligible / - / P / D / LT	Not considered to be required, detailed in original ES.	Negligible / - / P / D / LT
Table note: ^(A) + / - = Positive or Negative, P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable				

17.9.0 Conclusions

- 17.9.1 The Air Quality Chapter of the original ES which supported the DCO Application, included detailed qualitative and quantitative air quality assessments to assess the construction and operational phases of the AMEP.
- 17.9.2 The assessment considered several pollutants and several emissions sources, across a range of human and ecological receptors existing within the study area.
- 17.9.3 This PEIR has considered the predicted effects of the original ES, and the current and future baseline, in the context of the material amendment and whether the material amendment and current baseline will materially alter the conclusions of the original Air Quality Chapter to the ES. This includes an assessment of the increased duration of dredging and associated vessel movements and emissions. **It has been concluded that the original ES conclusions, which predicted all effects as ‘not significant’ remain valid.**
- 17.9.4 Furthermore, the assessment of the material amendment associated with increased vessel movements and emissions remain to conclude a ‘not significant’ effect at all relevant receptors. The material amendment is therefore not considered to result in any new/different effects or effects of a greater magnitude than were previously assessed.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 18: MARINE ARCHAEOLOGY

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

18.1.0 INTRODUCTION	18-1
Development Consent Order Context.....	18-1
Consideration of Material Amendments.....	18-2
Purpose and Structure of Chapter	18-3
18.2.0 METHODOLOGY.....	18-4
Changes in Legislation, Guidance and Planning Policy.....	18-4
Scoping Opinion	18-5
Additional Consultation.....	18-6
Assessment Methodology	18-6
Effects Not Requiring Further Assessment.....	18-8
18.3.0 CHANGES IN BASELINE CONDITIONS.....	18-10
DCO Baseline	18-10
DCO Future Baseline.....	18-10
Current Baseline	18-10
Future Baseline.....	18-12
Changes in Baseline	18-12
18.4.0 ASSESSMENT OF EFFECTS	18-13
Additional Construction Phase Effects	18-13
Additional Operational Phase Effects.....	18-14
Additional Cumulative Effects	18-14
Consideration of DCO	18-14
18.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	18-15
DCO Mitigation.....	18-15
Alternate or Additional Mitigation.....	18-16
18.6.0 RESIDUAL EFFECTS	18-17
Construction Phase	18-17
Operational Phase.....	18-17
Consideration of DCO.....	18-17
18.7.0 OTHER ENVIRONMENTAL ISSUES.....	18-18
Other Environmental Issues of Relevance	18-18

Summary	18-18
18.8.0 SUMMARY OF EFFECTS	18-19
18.9.0 CONCLUSIONS	18-20

DOCUMENT REFERENCES

TABLES

Table 18-1: Scoping Opinion.....	18-5
Table 18-2: Sensitivity Criteria.....	18-7
Table 18-3: Significance of potential receptors.....	18-13

FIGURES

Figure 18-1: Site location and marine heritage receptors (extract).....	18-11
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APPENDICES

Appendix U18-1: Figure 18-1: Site location and marine heritage receptors

Appendix U18-2: Wessex Archaeology 2021 Able Marine Energy Park: Marine Archaeological Written Scheme of Investigation. Unpublished report. Ref: 237310.01

Appendix U18-3: Wessex Archaeology 2012a Able Marine Energy Park and Compensation Site, Written Scheme of Investigation. Unpublished report. Ref: 76490.02

Appendix U18-4: Wessex Archaeology 2011 Able Marine Energy Park (AMEP), Humber Estuary: Geoarchaeological Recording and Sub-sampling. Unpublished report. Ref: 76490

Appendix U18-5: Wessex Archaeology 2012b Able Marine Energy Park (AMEP), Humber Estuary, Stage 2/3 Geoarchaeological Recording and Sub-sampling. Unpublished report. Ref: 76491.01

18.1.0 Introduction

Development Consent Order Context

18.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279 m frontage, of which 1,200 m is solid quay and 79 m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

18.1.2 The associated development for the above proposals includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

18.1.3 The impacts of the development on the Historic Environment were originally considered in Chapters 18¹ and 40² of the original ES to the DCO. A marine archaeological Written Scheme of Investigation (WSI) was produced in 2012 in order to set out the mitigation agreed to limit the development's impacts on the marine Historic Environment (Wessex Archaeology 2012a). A copy of this WSI is provided within Technical Appendix U18-3. This WSI was based on a review of geoarchaeological data (Wessex Archaeology 2011 & 2012b; Technical Appendices U18-4 and U18-5) and geophysical survey data captured by Emu Limited in 2010 (Emu 2010).

18.1.4 Schedule 11 Requirement 17 of the DCO (Appendix U1-1) required that:

(1) No stage of the authorised development is to commence until, for that stage, a written project design for the investigation of areas of archaeological interest as identified in chapters 18 and 40 of the environmental statement has been submitted to and approved by the relevant planning authority.

(2) The project design must accord with the evaluation results and mitigation measures included in the document Able UK Ltd Marine Energy Park: Framework for archaeological investigation and mitigation strategies prepared by AC Archaeology Ltd (ref: ACW283/3/1 revised June 2012)³, and the Written Scheme of Investigation: Coastal and Marine prepared by Wessex Archaeology (ref 79490.02 revised March 2012) and subsequent updates, to be agreed by the relevant planning authority.

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000323-18%20-%20Historic%20Environment.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000345-40%20-%20Historic%20Environment.pdf>

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001598-SOCG005%20TR030001%20Able%20Humber%20Ports%20Ltd%20Statement%20of%20Common%20Ground%20with%20English%20Heritage.pdf>

(3) *The project design must identify—*

(a) areas where fieldwork is required;

(b) measures to be taken to identify, protect, record and recover any archaeological remains that may be found including artefacts and ecofacts;

(c) methodologies for post-excavation assessment and analysis of artefacts and ecofacts;

(d) arrangements for dissemination and publication of reports;

(e) preparation of archive material and its deposition with recognised repositories;

(f) an implementation timetable;

(g) monitoring arrangements, including notification and commencement of work;

(h) details of contractors involved in the implementation of archaeological works; and

(i) proposals for publicity and community outreach work.

(4) Any archaeological works carried out under the scheme must be carried out by a suitably qualified person or body.

(5) Any archaeological works must be carried out in accordance with the approved scheme and timings, subject to any variation approved by the relevant planning authority.

18.1.5 In line with this requirement an updated marine WSI was prepared in 2021 in order to incorporate the most recent design proposals, receptor baseline, identification of potential impacts and design of measures to mitigate potentially significant effects (Wessex Archaeology 2021). That WSI was intended:

- to fulfil the requirements of Historic England and North Lincolnshire Council in respect of archaeological monitoring and mitigation works associated with the Proposed Development of AMEP;
- to propose measures for the mitigation of unexpected archaeological remains encountered during dredging, excavation or construction work associated with the project; and
- to establish the reporting and archiving requirements for the archaeological works undertaken during construction and post-construction monitoring.

18.1.6 The 2021 WSI was further updated in light of the proposed Material Amendments. A copy of this latest WSI (Wessex Archaeology 2021) is provided within Technical Appendix U18-2 and has been considered in the preparation of this Chapter of the PEIR.

Consideration of Material Amendments

18.1.7 The only elements of the Material Amendments of relevance to the marine Historic Environment are those associated to the proposed quay layout and the dredging volumes. The proposals will reclaim the specialist berth at the southern end of the quay, and set back the quay line at the northern end of the quay to create a barge berth. However, the overall footprint of the quay is

largely unchanged so it is judged unlikely that there will be more extensive physical impacts and significant adverse effects on the marine environment that are not mitigated by the measures proposed in detail within the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2).

18.1.8 In addition, the dredging permissions are proposed to be changed to the extent necessary to dredge the berthing pockets and approaches for the amended quay line. Provided there is no alteration to the depths of the dredging (-11 m CD in the berthing pocket, -9 m CD in the approach channel and turning area), this does not induce additional effects on the marine Historic Environment that are not mitigated by the measures outlined in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2).

Purpose and Structure of Chapter

18.1.9 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed Material Amendments on the Historic Environment. Given the scope of the proposed Material Amendments, the content of this chapter is limited to the consideration of the marine Historic Environment and there is no need to consider terrestrial Historic Environment beyond that contained within the original ES for the DCO.

18.1.10 This chapter includes consideration of:

- changes in legislation, policy and guidance relating to marine Historic Environment since the DCO application;
- physical changes in the baseline context at the site as relevant to marine Historic Environment and the proposed material amendments;
- changes in the understanding of risk for both the current day situation and future scenarios; and
- the material amendments to the proposed scheme and how these influence the marine Historic Environment.

18.2.0 Methodology

- 18.2.1 As part of the DCO application an archaeological impact assessment was undertaken for the AMEP. The impact assessment evaluated how the proposed development will affect the site and its surroundings as well as the terrestrial and marine Historic Environment.
- 18.2.2 Within the Historic Environment ES chapter (Chapter 18) the impact of the proposed development on the marine Historic Environment was evaluated to determine the likelihood of the AMEP causing impacts to:
- impacts on paleo-land surfaces;
 - impacts on maritime archaeology; and
 - Impacts on aviation archaeology.
- 18.2.3 Adverse direct impacts and adverse secondary impacts were expected on these receptors from the construction of the new quay (ES para. 18.6.6 to 18.6.9). No adverse indirect impacts on marine heritage assets through changes in the hydrology and sedimentation / erosion regimes were expected (ES para. 18.6.10).
- 18.2.4 Adverse direct impacts and adverse secondary impacts were also expected from the dredging of the berthing pocket, approach channel and turning area (ES para. 18.6.21 to 18.6.22). No adverse indirect impacts on marine heritage assets through changes in the hydrology and sedimentation/ erosion regimes were expected (ES para. 18.6.23).

Changes in Legislation, Guidance and Planning Policy

Legislation

- 18.2.5 There have been no changes in legislation relevant to the marine historic environment since the original ES for the DCO.

Commercial Renewable Energy Development and the Historic Environment (Historic England 2021)

- 18.2.6 Historic England published its Advice Note 15 in 2021 relating to Commercial Renewable Energy Development and the Historic Environment. This describes the potential impacts on the historic environment of commercial renewable energy proposals, which could occupy large areas of land or sea.

Marine Policy Statement (HM Government 2011).

- 18.2.7 The Marine Policy Statement (MPS) was jointly published by all UK Administrations in March 2011 as part of a new system of marine planning being introduced across UK seas. The MPS sets out the framework for preparing Marine Plans and making decisions affecting the marine environment. The MPS also states that Marine Plans must ensure a sustainable marine environment that will protect heritage assets.

The National Planning Policy Framework

18.2.8 The previous assessments reference Planning Policy Statement 5 (2010). This was superseded in 2012, and again updated in 2019, by the National Planning Policy Framework (NPPF) and the associated Planning Practice Guide (PPG) for the Historic Environment, published in 2014 and updated in 2019. The NPPF and associated PPG now provide the framework for assessing the impact of certain developments on heritage assets.

Scoping Opinion

Table 18-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within original ES
Table 7	4.12.1	The Scoping Report proposes to scope out any updated assessment of impacts to historic environment features as a result of the proposed change. The Inspectorate does not agree to this approach and considers that updated assessment should be undertaken to assess impacts that occur from the altered quay alignment. The updated assessment should be informed by the updated assessment of impacts to the hydrodynamic and sedimentary regime, particularly where impacts from erosion or accretion of sediment may have changed from the original assessment.	This document updates the assessment in light of the altered quay alignment. The hydrodynamic modelling is reported in Chapter 8 and there is no significant change in impacts and therefore no additional impacts on the marine historic environment than those assessed in the original ES.	Chapter 08; Paras. 18.6.10, 16.6.23
Table 7	4.12.2	The Scoping Report suggests that the existing requirement for the WSI will be sufficient to address any necessary changes to mitigate differing impact characteristics as a result of the proposed changes. The Applicant should make effort to agree this position with relevant consultation bodies. If alterations to the WSI are required to support this position the details should be explained within the updated assessment.	2021 WSI is included in Technical Appendix U18-2 for consultation with Regulatory authorities	
n/a	4.12.3	The Inspectorate notes the comments received by Historic England that relate to the greater knowledge gained from pre-construction WSI activities. The Inspectorate considers that the updated assessment should be informed by this information and used to assess the impacts on the coastal and marine historic environment.	There have been no pre-construction activities completed under the 2012 WSI, and therefore no new information to form the basis of an updated assessment.	Baseline conditions are outlined in Section 18.3.

Additional Consultation

- 18.2.9 The 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2) has been submitted to North Lincolnshire Council for approval in relation to the extant DCO and in accordance with Schedule 11 Requirement 17. It will be submitted to Historic England, and mitigation measures approved, prior to the commencement of any works. This document was updated prior to, and unconnected to, the PEIR. It has been included as an Appendix to the PEIR. Minor textual modifications will be needed to reflect the proposed changes.
- 18.2.10 Outside of the EIA scoping process no further consultation has been undertaken.

Assessment Methodology

- 18.2.11 The assessment methodology for the Historic Environment was defined within Chapter 18 of the original ES for the DCO. However, an updated baseline, assessment of impacts and suggested mitigation were utilised within the most recent WSI (Wessex Archaeology 2021; Technical Appendix U18-2).
- 18.2.12 The sections below detail where any changes to this methodology in light of more recently adopted policy.

Study Area

- 18.2.13 The site lies between the C.Ro Port Killingholme and ABP Immingham Port centred on National Grid Reference (NGR) TA 16145 19906. The marine areas under study covers approximately 31.5 ha of existing intertidal area and 13.5 ha of existing subtidal area. These are located within the Humber Estuary and extend from the existing tidal defences towards the deep-water channel that serves the C.Ro Port Killingholme. Indirect impacts from the hydrodynamic and sedimentary regime on the marine historic environment could cover an area greater than this, but the original ES concluded that these would have no adverse indirect impacts on the marine historic environment (ES Paras. 18.6.10, 16.6.23), meaning relevant impacts are limited to within the site boundary.
- 18.2.14 The study area has not been expanded from the study area utilised within the original ES for the DCO (ES Section 4.3).

Sensitivity Criteria

- 18.2.15 The sensitivity criteria utilised have been updated in light of more recent policy relating to the Historic Environment. The sensitivity criteria utilised in undertaking this Chapter of the PEIR is outlined below.
- 18.2.16 The capability of a receptor to accommodate change and its ability to recover if affected is a function of its sensitivity. Receptor sensitivity is typically assessed via the following factors:
- Adaptability – the degree to which a receptor can avoid or adapt to an effect;
 - Tolerance – the ability of a receptor to accommodate temporary or permanent change without significant adverse impact;
 - Recoverability – the temporal scale over and extent to which a receptor will recover

following an effect; and

- Value – a measure of the receptor’s importance, rarity and worth.

18.2.17 Since archaeological receptors cannot adapt, tolerate or recover from physical impacts caused by a proposed development for the purpose of this assessment, the sensitivity of each asset will be quantified only by its value. The UK Marine Policy Statement (HM Government, 2011) describes a heritage asset as holding a degree of significance. Significance is the value of a heritage asset to this and future generations because of its heritage interest, which may be archaeological, architectural, artistic or historic.

18.2.18 The value of known archaeological and cultural heritage assets is assessed on a five point scale using professional judgement informed by the criteria provided in Table 18-2 below.

Table 18-2: Sensitivity Criteria

Sensitivity	Definition
High	<ul style="list-style-type: none"> • Best known, only example, or above average example and/ or high potential to contribute to knowledge and understanding and/ or outreach. • Receptors with a demonstrable international dimension to their importance are likely to fall within this category. • Wrecked ships and aircraft that are protected under the Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value. • Known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material. Palaeogeographic features with demonstrable potential to include artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape.
Medium	<ul style="list-style-type: none"> • Average example and/ or moderate potential to contribute to knowledge and understanding and/ or outreach. • Receptors with a demonstrable district level dimension to their importance are likely to fall within this category. • Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation. • Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	<ul style="list-style-type: none"> • Below average example and/ or low potential to contribute to knowledge and understanding and/ or outreach. • Receptors with a demonstrable local dimension to their importance are likely to fall within this category. • Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of

Sensitivity	Definition
	their importance in terms of build, use, loss, survival and investigation. <ul style="list-style-type: none"> • Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Negligible	<ul style="list-style-type: none"> • Poor example and/ or little or no potential to contribute to knowledge and understanding and/ or outreach. Assets with little or no surviving archaeological interest.
Unknown	<ul style="list-style-type: none"> • There is not presently enough information available about the site to assess its value.

Magnitude of Change (Impact)

18.2.19 The magnitude of effect is defined in the original ES for the DCO (ES Para. 18.6.1).

Significance of Effect

18.2.20 The significance matrix based on the above sensitivity criteria and magnitude of effect is defined in the original ES for the DCO (ES Para. 18.3.7-8).

Mitigation Hierarchy

18.2.21 While not defined within the ES for the original DCO application, a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.

Effects Not Requiring Further Assessment

18.2.22 The effects not requiring further assessment that were assessed in the original ES are those relating to the:

- Terrestrial Historic Environment from;
 - Topsoil stripping, earthmoving and infilling;
 - Infilling site to new levels;
 - Use of large construction plant, cranes etc;
 - Lowering of water levels;
- Marine Historic Environment due to the new quay construction, including;
 - Installation of tubular piles and sheet piles for new quay and piling to support relieving slab and jetty;
 - Rainbowing and hydraulic fill of reclamation area; installation of rock revetment;
 - Relocation of outfall and works associated with existing seawall;

- Marine Historic Environment within the berthing pocket, approach channel and turning area due to;
 - Construction of Reinforcement of berthing pocket; and
- Effects on setting of significant heritage assets during

18.3.0 Changes in Baseline Conditions

DCO Baseline

- 18.3.1 The baseline conditions were initially set out in the original ES (ES Section 18.5). Within the broad study area, covering both the terrestrial and marine historic environment, there were 29 Scheduled Monuments, one Registered park, 176 grade II Listed Buildings, 30 grade II* Listed Buildings, 27 Grade I Listed Buildings and two Conservation Areas within the 10 km radius (ES Table 18.3). There were no shipwrecks designated under the *Protection of Wrecks Act 1973*, there were no shipwrecks or known aircraft remains protected under the *Protection of Military Remains Act 1986*.
- 18.3.2 All maritime archaeology receptors, including the recorded losses and charted wrecks (Sites 22-25, 109-115), foul ground (Sites 128, 129 and 130) and magnetometer anomalies (Sites 12, 27-30, 131-133, 167) were assessed to be of either local significance due to their archaeological, architectural, artistic or historic interest, i.e. they would score low using the non-statutory criteria for assessing scheduled monuments, or of no significance, i.e. they were not considered to be of archaeological, architectural, artistic or historic interest (ES Table 18.4).

DCO Future Baseline

- 18.3.3 No future baseline for the marine or terrestrial historic environment was provided in the original ES.

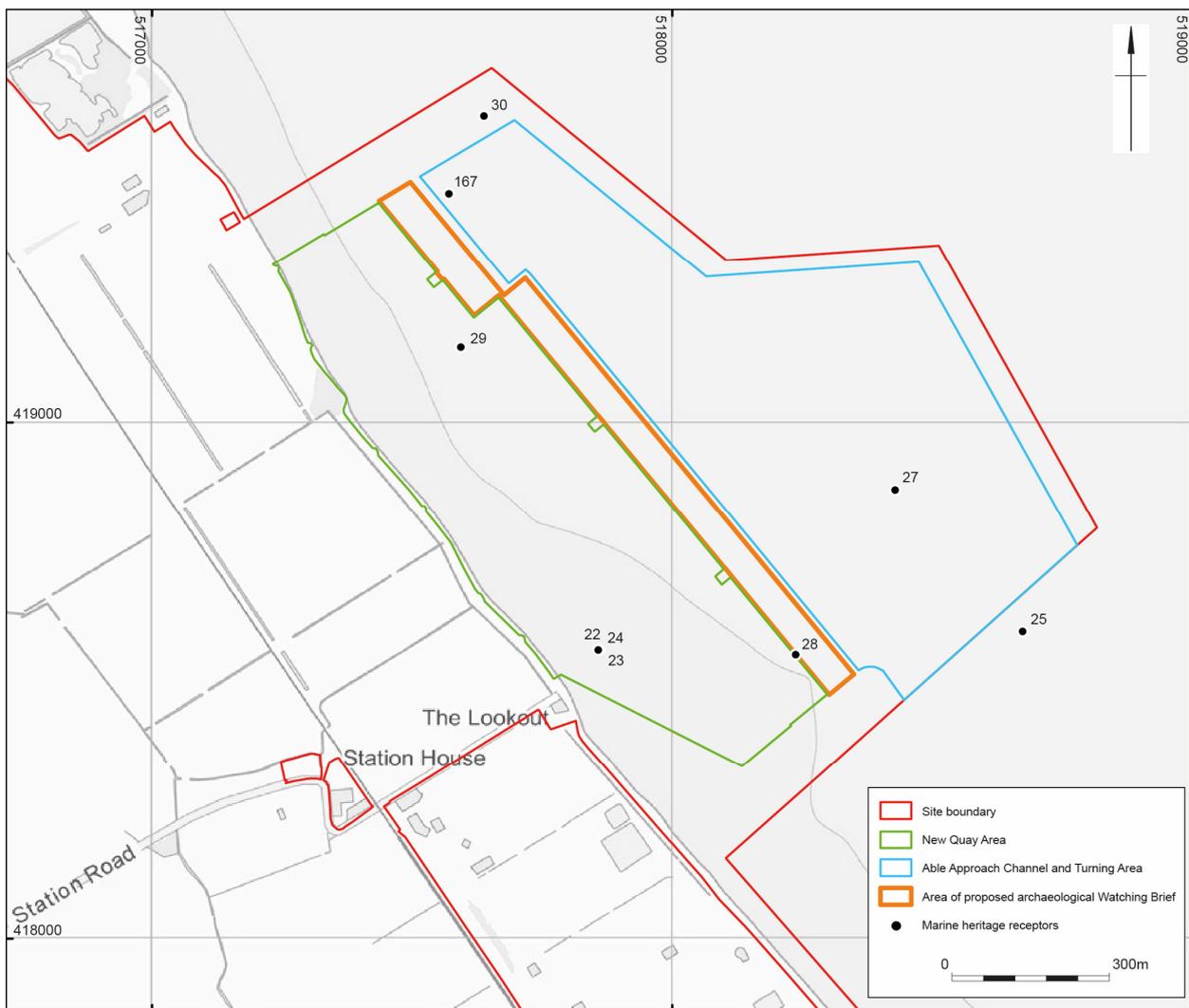
Current Baseline

- 18.3.4 A review of the current baseline is outlined in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2). The sections below provide a brief overview of the baseline established within the 2021 WSI.

Overview

- 18.3.5 Within the area of the development site there are ten possible archaeological receptors. A summary gazetteer can be seen in Appendix 1 of the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2), whilst Figure 18-1 below provides a drawing extract of their locations. The full figure is included in Appendix U18-1.
- 18.3.6 There are no shipwrecks designated under the *Protection of Wrecks Act 1973*.
- 18.3.7 There are no known aircraft remains within the proposed development, and therefore there are no aircraft remains protected under the *Protection of Military Remains Act 1986*. However, there is one reported loss of a Halifax MKIII MZ576 bomber to the south of the AMEP, the remains of which have not yet been located (site 122).

Figure 18-1: Site location and marine heritage receptors (extract)



The New Quay

- 18.3.8 Vibrocores VC20 and VC21 within the area of the new quay contained organic material indicative of the presence of prehistoric land surfaces and deposits (Wessex Archaeology 2011; Technical Appendix U18-4). In addition, recording and sub-sampling has been carried out on six core samples from three boreholes by Wessex Archaeology and the logs of 77 boreholes reviewed (Wessex Archaeology 2012b; Technical Appendix U18-5). This indicated that Pleistocene and Holocene sediments including glacial, alluvial, peat and estuarine alluvial sediments of prehistoric archaeological and palaeoenvironmental interest exist in the area of the Deepwater Frontage of the AMEP at a depth which is to be dredged using backhoe dredging techniques.
- 18.3.9 There is one unidentified magnetometer anomaly (site 28) and records of two recorded losses (sites 22 and 23) within the quay area, though as the named shipwrecks are documentary references only, their locations are unknown, and their remains may lie elsewhere.
- 18.3.10 In addition to the features that are known from coring and desk-based study there is potential for as yet unknown features and sites to be present in the area of the new quay. These sites range from prehistoric land surfaces, and associated sites, to the remains of vessels, from the prehistoric to

modern periods, and aircraft crash sites. The anchorage of Whitebooth Roads, off Killingholme, is believed to have been heavily used and a focus for shipping in this stretch of the river.

The Berthing Pocket, Approach Channel and Turning Area

- 18.3.11 Vibrocores VC07, VC09 and VC13 within the dredging area, and adjacent VC05, VC06, and VC08, contained organic material indicative of the presence of prehistoric land surfaces and deposits (Wessex Archaeology 2012b; Technical Appendix U18-5). However, the levels of these land surfaces are all below the maximum depth of dredging planned.
- 18.3.12 There are four unidentified magnetometer anomalies (sites 27, 29, 30 and 167) in the dredging area. Just outside the southern extent of the turning area and approach channel dredging pocket are two UKHO records for two 20th century wrecks which have associated geophysical anomalies (sites 24 and 25). Both of these wrecks (the *Sergei*, an 1899 Hull-built screw steamer wrecked in 1923 and the *Cook S26*, a barge wrecked in 1955) are reported to have been lifted following their wrecking, and so the anomalies may relate to broken/lost parts of the wrecks.
- 18.3.13 In addition to the features that are known from coring and desk-based study, there is potential for as yet unknown features and sites to be present in the area of the new quay, ranging from prehistoric land surfaces and associated sites to hitherto unknown wrecks of dating from the prehistoric to modern periods, to aviation remains. These sites, if present, could range from low to high sensitivity and, in the case of military aviation remains, be subject to automatic legal protection under the *Protection of Military Remains Act 1986*.

Future Baseline

- 18.3.14 As in the original ES, no future baseline needs to be considered.

Changes in Baseline

- 18.3.15 Paragraphs 18.3.3 to 18.3.15 of the original ES establish the current baseline considerations for the AMEP DCO. Upon review, it can be confirmed that there have been no changes in the baseline since the original ES.

18.4.0 Assessment of Effects

Additional Construction Phase Effects

18.4.1 The construction phase impacts altered by the change in quay design and dredging from the original ES are:

- Additional Dredging of alluvium from the reclamation area; and
- Dredging operations in a realigned Berthing Pocket (ES Section 18.6).

18.4.2 The original effects of dredging within the reclamation area and the berthing pocket on palaeo-land surfaces, maritime archaeology and aviation archaeology were considered of minor to moderate significance within the original ES (ES Tables 18.7 and 18.8).

18.4.3 The 2021 WSI considered the significance of potential receptors within the consented quay development area and the berthing pocket (Table 18-3). The significance of these receptors is unchanged by the proposed changes.

Table 18-3: Significance of potential receptors

Sensitivity of Receptor (if present)	Palaeo-land surfaces		Maritime Archaeology		Aviation Archaeology	
	Description	Significance	Description	Significance	Description	Significance
	<i>In-situ</i> Prehistoric sites	High	As yet unknown shipwrecks	Low to High	As yet unknown aircraft wrecks (civil)	Low to High
	Submerged landscape features (without associated archaeological material)	Medium	Features indicated by post alignments and former jetties	Low to High	As yet unknown aircraft wrecks (military)	High
	Isolated Prehistoric finds	Medium	Isolated Maritime finds	Medium	Isolated Aviation finds	Medium
	Isolated examples of Palaeo-environmental evidence	Low				
Overall significance	Minor to High Significance		Minor to High Significance		Minor to High Significance	

18.4.4 The 2021 WSI concluded that the area impacted by the construction of the consented Quay contains only potential receptors related to Recorded Losses, and two low potential magnetometer anomalies (Wessex Archaeology 2021; Technical Appendix U18-2). The potential for geoarchaeological remains that may be impacted by the works was identified as low.

18.4.5 The potential for impacts on archaeological receptors within the berthing pocket dredge area was also identified, in particular deposits of geoarchaeological interest (palaeo-land surfaces). Within this area, geoarchaeological deposits containing palaeoenvironmental evidence were identified within VC20 and VC21 of the geoarchaeological assessment (Wessex Archaeology 2012b; Technical

Appendix U18-5). Their significance was classed as Medium. Within the turning area and approach channel, the dredging works will either be removing deposits containing low/negligible potential for palaeoenvironmental evidence or will not be excavating to a level which would impact deposits with potential for palaeoenvironmental evidence.

- 18.4.6 The new proposals will reclaim the specialist berth at the southern end of the quay and set back the quay line at the northern end of the quay to create a barge berth. However, the overall footprint of the quay is largely unchanged. In addition, the dredging permissions are proposed to be changed to the extent necessary to dredge the berthing pockets and approaches for the amended quay line. Provided there is no alteration to the depths of the dredging (up to -11m CD in the berthing pocket, -9m CD in the approach channel and turning area), this does not induce additional effects on the marine Historic Environment.
- 18.4.7 The relationship of the new quay to the magnetic anomaly Site 28 remains unchanged. The magnetic anomaly site 167 is now located outside the berthing pocket, as the quay line has been set back at its northern end for the barge berth. The magnetic anomalies Sites 27 and 30 remain within the site boundary. Sites 22, 23, 24 and 29 remain under the new quay. Sites 22, 23 and 24 are merely recorded losses, and have no wreck material associated with their locations. The effects on these anomalies remains unchanged.
- 18.4.8 Similarly, the effects on geoarchaeological deposits containing palaeoenvironmental evidence remain unchanged, the only difference being the location of the berthing pocket.

Additional Operational Phase Effects

- 18.4.9 Operational phase impacts associated with marine Historic Environment will be unchanged from those considered in the DCO application (ES Para. 18.6.30 – 34).

Additional Cumulative Effects

- 18.4.10 There will be no additional cumulative effects associated with the marine Historic Environment (Section 18.9 of the original ES for the DCO).

Consideration of DCO

- 18.4.11 Following this review, it is concluded that the changes in baseline understanding and the changes to the scheme will not result in any new or significant increased effects on marine Historic Environment.

18.5.0 Requirement for Additional Mitigation

DCO Mitigation

- 18.5.1 Proposed mitigation measures for AMEP were originally set out in the original ES (ES Section 18.7), and the 2012 WSI (Wessex Archaeology 2012a; Technical Appendix U18-3).
- 18.5.2 The original ES set out mitigation measure relevant to the marine historic environment in works relating to new quay and the berthing pocket, approach channel and turning area. For the new quay it stated: *'Detailed mitigation measures to accompany construction of the new quay are being set out in a Written Scheme of Investigation (WSI) for marine and intertidal archaeology that has been drafted to accompany this Environmental Statement. The WSI provides for a further phase of investigations to enable detailed design of mitigation measures, as well as an outline of the mitigation measures that will be provided. The mitigation measures set out in the WSI will include monitoring by NLC/English Heritage and make provision for post-investigation assessment, material conservation, archaeological analysis, interpretation and publication of significant results, and preparation and deposition of a publicly-accessible archive. The WSI is subject to the agreement of NLC and English Heritage. It is anticipated that implementation of the WSI will be secured through a condition' (ES para. 18.7.4). For the berthing pocket, approach channel and turning area it stated: 'Detailed mitigation measures to accompany dredging of the berthing pocket, approach channel and turning area are being set out in the Written Scheme of Investigation (WSI) for marine and intertidal archaeology referred to above' (ES para. 18.7.5).*
- 18.5.3 The 2012 WSI set out possible measures that could be carried out during the design phase to supplement archaeological information identified by studies carried out prior to submission of the licence application (Wessex Archaeology 2012a; Technical Appendix U18-3, Section 5.1). These could inform the detailed design of the archaeological mitigation to take place during and after construction of the Marine Energy Park and Compensation Site, to be set out in an updated WSI. The investigations suggested were:
- Review of existing geophysical data;
 - Acquisition and interpretation of additional geophysical data;
 - Geoarchaeological investigation, including the development of a deposit model taking account of previous work;
 - Additional documentary research notably into the brick and tile yards and historic shipping records relating to the anchorage of Whitebooth Roads (off Killinghome);
 - Investigation of unidentified foreshore sites;
 - Diver-based investigations of geophysical anomalies;
 - Development of dredge reporting protocol.
- 18.5.4 The 2012 WSI also set out measures that will be carried out during the construction phase, as well as further possible measures (Wessex Archaeology 2012a; Technical Appendix U18-3, Section 5.2). The measures that were stated will happen were:

- implementation of Dredge Reporting Protocol; and
- investigations in response to discoveries arising from Dredge Reporting Protocol.

18.5.5 Other possible measures included archaeological excavation and recording and recovery of archaeologically important material pre-construction, and intertidal watching briefs, marine-based watching briefs, and investigations in response to discoveries arising from watching briefs during construction.

18.5.6 Updated mitigation measures are outlined in the updated WSI, based on an updated understanding of the design proposal (Wessex Archaeology 2021; Technical Appendix U18-2, Section 7). This document has not yet been submitted to English Heritage. These measures will primarily take the form of watching briefs during the backhoe dredging operations and the implementation of a Protocol for Archaeological Discoveries at all times and for all works activities.

18.5.7 An archaeological watching brief is a formal programme of archaeological monitoring and will be carried out by a suitably qualified archaeologist, subject to prior and adequate notification being given by the Client, on dredging activities within the Development Area, where the method of works allows. This is expected to be carried out for the backhoe dredging taking place within the Berthing Pocket.

18.5.8 The Protocol for archaeological discoveries will allow for the documentation of any other discoveries that are made during dredging activities for the AMEP and will follow bespoke Protocol guidelines. It is assumed that TSHD will be the main dredging method in the main water body. In this instance, the Protocol for Archaeological Discoveries will be the primary form of mitigation.

18.5.9 The protocol for archaeological discoveries would fulfil the duty for the implementation of Dredge Reporting Protocol contained in the 2012 WSI. The watching brief was suggested as a possible measure in the 2012 WSI. The measures in the 2021 WSI would supersede all the measures suggested in the 2012 WSI.

Alternate or Additional Mitigation

18.5.10 No alternate or additional mitigation is required beyond that set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2, Section 7). The only alteration is the change in the location of the archaeological watching brief to match the updated location of the berthing pocket (Figure 18-1, Technical Appendix U18-1).

18.6.0 Residual Effects

Construction Phase

- 18.6.1 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the construction phase (Section 18.8 of original ES).

Operational Phase

- 18.6.2 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the operational phase (Section 18.8 of original ES).

Consideration of DCO

- 18.6.3 Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO.

18.7.0 Other Environmental Issues

- 18.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 18.7.2 Please see Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 18.7.3 The risks associated with Infrastructure are not of relevance to this Chapter.

Waste

- 18.7.4 The risks associated with Waste are not of relevance to this Chapter.

Population and Human Health

- 18.7.5 The risks associated with Population and Human Health are not of relevance to this Chapter.

Climate and Carbon Balance

- 18.7.6 The risks associated with Climate and Carbon Balance are not of relevance to this Chapter.

Risks of Major Accidents and/or Disasters

- 18.7.7 The risks associated with Risks of Major Accidents and/or Disasters are not of relevance to this Chapter.

Summary

- 18.7.8 With regards to the EIA regulations 2017, in terms of marine Historic Environment there are not considered to be any likely significant effects with regards to Other Environmental Issues.

18.8.0 Summary of Effects

- 18.8.1 The construction phase impacts altered by the change in quay design and dredging from the original ES are:
- Additional Dredging of alluvium from intertidal area; and
 - Amended dredging operations in the Berthing Pocket (Section 18.6 of the original ES).
- 18.8.2 The overall footprint of the quay is largely unchanged and provided there is no alteration to the depths of the dredging in the in the Berthing Pocket, Approach Channel and Turning Area these changes do not induce additional effects on the marine Historic Environment to those assessed in the original ES.
- 18.8.3 Operational phase impacts associated with marine Historic Environment will be unchanged from those considered in the DCO application.
- 18.8.4 There will be no additional cumulative effects associated with the marine Historic Environment.
- 18.8.5 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the construction phase or the operational phase. Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO.
- 18.8.6 The proposed material amendments will not alter the effects as identified within the original ES.

18.9.0 Conclusions

- 18.9.1 The material amendments relating to the footprint of the new quay and the dredging volumes may impact the marine Historic Environment. However, the effects of these impacts are negligible as compared to those assessed in the original ES. The risks to the marine Historic Environment can be adequately mitigated through the mitigation measures set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2), with the location of the archaeological watching brief altered to correspond with the updated location of the berthing pocket (Figure 18-1, Technical Appendix U18-1).
- 18.9.2 The proposed material amendments will make no difference to the potential effects and no additional mitigation will be required to those set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2).

REFERENCES

- Emu 2010 North Killingholme Geophysical Report. Unpublished report no. 10/J/25/1695
- HM Government 2011 UK Marine Policy Statement
- Ministry of Housing, Communities and Local Government 2019 National Planning Policy Framework
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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 19: LIGHT

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

19.1.0 INTRODUCTION	19-1
Development Consent Order Context.....	19-1
Consideration of Material Amendments.....	19-1
Purpose and Structure of Chapter	19-1
19.2.0 METHODOLOGY.....	19-3
Legislation, Guidance and Planning Policy	19-3
Scoping Opinion	19-5
Additional Consultation.....	19-5
Assessment Methodology	19-5
Effects Not Requiring Further Assessment.....	19-7
19.3.0 CHANGES IN BASELINE CONDITIONS.....	19-8
DCO Baseline	19-8
DCO Future Baseline.....	19-10
Current Baseline	19-11
Changes in Baseline	19-11
19.4.0 ASSESSMENT OF EFFECTS	19-13
Additional Construction Phase Effects	19-13
Additional Operational Phase Effects.....	19-13
Additional Cumulative Effects	19-13
Consideration of DCO	19-13
19.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	19-14
DCO Mitigation.....	19-14
Alternate or Additional Mitigation	19-14
19.6.0 RESIDUAL EFFECTS	19-15
Construction Phase	19-15
Operational Phase	19-15
Consideration of DCO	19-15
19.7.0 OTHER ENVIRONMENTAL ISSUES.....	19-16
Other Environmental Issues of Relevance	19-16
Summary	19-17

19.8.0	SUMMARY OF EFFECTS	19-18
19.9.0	CONCLUSIONS	19-19

DOCUMENT REFERENCES

TABLES

Table 19-1: Scoping Opinion.....	19-5
Table 19-2: Sensitivity Criteria.....	19-6
Table 19-3: Magnitude of Change (Impact)	19-6
Table 19-4: Significance of Effect	19-7
Table 19-5: Sensitive Receptors	19-8
Table 19-6: Monitoring Locations	19-9
Table 19-7: Summary of Effects for Lighting	19-18

APPENDICES

Appendix U19-1: AMEP Light Column Layout 2011-2021 (drawing no. AME-001-00391 Rev A)

19.1.0 Introduction

Development Consent Order Context

19.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

19.1.2 The associated development also consented by the DCO includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

19.1.3 The lighting assessment prepared for the DCO application¹ included baseline light monitoring, a construction phase assessment and an operational phase assessment.

Consideration of Material Amendments

19.1.4 The Lighting Chapter of the Environmental Statement (ES) that accompanied the DCO application ('the original ES) has been reviewed with consideration of the material amendment described in Chapter 4 of this document. With regard to the proposed material amendment, the following elements are of relevance when considering light and the potential for light impacts:

- Layout of the quay and re-positioning of lighting columns for both construction and operational lighting;
- Proximity to sensitive receptors; and,
- Changes to lighting baseline since the original DCO application in 2012. Reference should be made to drawing AME-002-00102 (Appendix U19-1) for details on lighting column changes.

Purpose and Structure of Chapter

19.1.5 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed material amendment on planning policy and the impact of lighting from the development on local receptors.

19.1.6 This Chapter, includes:

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000324-19%20-%20Light.pdf>

- review of legislation, guidance and policy;
- review of changes to assessment methodology;
- consideration of changes to baseline conditions;
- consideration of additional effects, including residual and cumulative effects, as result of the material change; and
- summary of effects.

19.2.0 Methodology

19.2.1 In the interim since the 2012 DCO Application was submitted, the changes in legislation, policy and guidance detailed in the following subsections have occurred.

Legislation, Guidance and Planning Policy

Clean Neighbourhood and Environment Act 2005 (CNEA 2005)

19.2.2 The CNEA 2005 has not been updated in the interim since the DCO Application was submitted and the legislation remains valid.

Land Compensation Act 1973

19.2.3 The Land Compensation Act 1973 has not been updated in the interim since the DCO Application was submitted and the legislation remains valid.

Planning Policy Statement 23: Planning and Pollution Control

19.2.4 PPS23 has been withdrawn since the DCO Application, and replaced by the National Planning Policy Framework (NPPF) originally published in March 2012 and revised in June 2018 and February 2019. A range of Planning Practice Guidance (PPG) supports the NPPF.

National Planning Policy Framework

19.2.5 The National Planning Policy Framework (NPPF) was published on 27th March 2012 and was last updated on 19th June 2019 and sets out the Government's core policies and principles with respect to land use planning, including lighting. The document includes the following considerations which are relevant to this assessment:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site on the wider area to impacts that could arise from the development. In doing so they should:

[...]

Limit the impact of light pollution from artificial light on the local amenity, intrinsically dark landscapes and nature conservation".

19.2.6 The implications of the NPPF have been considered within this Chapter.

National Planning Practice Guidance

19.2.7 The NPPF is accompanied by supporting PPG, updated on 1st November 2019, which includes guiding principles on how planning can take account of the impacts of new development on lighting. In regard to light pollution, the PPG states:

"Artificial lighting needs to be considered when a development may increase levels of lighting, or would be sensitive to prevailing levels of artificial lighting. Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential

to a new development. However, for maximum benefit, it is important to get the right light, in the right place and for it to be used at the right time.”

19.2.8 The PPG also states what factors are relevant when considering how much light shines. The following is stated:

“Consideration of how much light shines may include an assessment of the quantitative and spectral attributes of the lighting scheme (eg light source and performance levels) and whether it exceeds the levels required to fulfil its intended purpose. Consideration can also be given to whether the proposed lighting is purely for decorative purposes as opposed to being needed for functional reasons such as security. The character of the area and the surrounding environment may affect what will be considered an appropriate level of lighting for a development. In particular, lighting schemes for developments in protected areas of dark sky or intrinsically dark landscapes need to be carefully assessed as to their necessity and degree.”

19.2.9 The policies within the NPPF and accompany PPG in relation to light pollution are considered within this Chapter.

Institute of Lighting Professionals Guidance

19.2.10 Institute of Lighting Professional (ILP) Guidance Notes for the Reduction of Obtrusive Light GN01:20² was initially released in 2011 and updated in 2020. The guidance provides good practice on how to control external lighting so that any intrusions are minimal. It also provides detail on how to classify the development locale into the correct environmental zone dependant on the existing brightness. This was not done within the original Lighting Assessment for the DCO Application but would now be relevant and the environmental zone should be classified.

19.2.11 The ILP guidance was not referenced within the Lighting Assessment for the DCO Application.

North Lincolnshire

19.2.12 The North Lincolnshire Local Plan was replaced by the North Lincolnshire Local Development Framework (LDF). The North Lincolnshire LDF is a suite of Development Plan Documents (DPDs) which set out the local planning policy for the area. The main document is the Core Strategy, which was adopted in June 2011, sets out the long-term vision for North Lincolnshire and provides a blueprint for managing growth and development in the area up to 2026.

19.2.13 The Core Strategy does not contain any policies relating to light pollution or external lighting.

East Riding Yorkshire Council

19.2.14 The ERYC Holderness District Wide Local Plan was replaced by the East Riding Local Plan 2012 – 2019 Strategy Document. This was adopted in April 2016. The East Riding Local Plan is currently being reviewed, with plans to consult on the Draft Local Plan in September 2020. Until the new Local Plan is adopted the policies contained within the East Riding Local Plan 2012 – 2019 remain valid.

19.2.15 The East Riding Local Plan 2012 – 2019 Strategy document states, *“It will be necessary to ensure that lighting levels are appropriate to the need, lights are aimed where required, and do not result in*

²Institute of Lighting Professionals, (2020) *Guidance Notes for the Reduction of Obtrusive Light GN01:20*

unacceptable light pollution or nuisance through light spillage”.

- 19.2.16 Additionally, *“Developers will be expected to ensure that lighting installations are fully shrouded. In order to consider potential light pollution, it will be necessary to submit an assessment of light spillage if floodlighting is proposed”.*
- 19.2.17 There are no policies within the East Riding Local Plan 2012 – 2019 Strategy Document which relate directly to external lighting.

Scoping Opinion

- 19.2.18 The Scoping Opinion received from the Planning Inspectorate on behalf of the Secretary of State has been reviewed, with regards to light, and the outcomes summarised below.

Table 19-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
Page 38, Section 4.13.1	Lighting can be scoped out of the updated assessment	The Inspectorate notes that the precise arrangements for the lighting levels on the site are reserved matters requiring the submission of written details and their subsequent approval in accordance with Schedule 11, paragraph 24 of the DCO, and that that the list of new, revised and retained plans shows that the lighting column details shown in drawing AME-02012-B are to be retained with no amendment.	The Scoping Report concludes that as there would be no changes or amendments to lighting emissions, that there would be no new or different impacts and as such it can be scoped out.	Section 19.9.0

Additional Consultation

- 19.2.19 No additional consultation has been undertaken with regard to Light with either professional officers or other third party consultees.

Assessment Methodology

Study Area

- 19.2.20 The baseline study area is defined within Section 19.5 of Chapter 19 of the original ES.
- 19.2.21 The baseline light assessment was undertaken at locations within 1km of the development site boundary. This is in accordance with the original Scoping Opinion undertaken for the DCO Application³.

³[https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000566-10%20-%20Scoping%20Report%20\(14b\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000566-10%20-%20Scoping%20Report%20(14b).pdf)

Sensitivity Criteria

19.2.22 Table 19-2 below details the sensitivity criteria for surrounding receptors, as used within the Lighting Assessment for the DCO Application. The Lighting Assessment for the DCO Application utilises the words ‘Large’ and ‘Small’ rather than ‘High’ and ‘Low’. This matrix is still considered relevant.

Table 19-2: Sensitivity Criteria

Sensitivity	Definition
High (Large)	<ul style="list-style-type: none"> Residential dwellings Ecological receptors of international (RAMSAR), national (i.e. Site of Special Scientific Interest (SSSI)) and local importance
Medium	<ul style="list-style-type: none"> Ecological receptors which have minor ecological importance
Low (Small)	<ul style="list-style-type: none"> Roads and other access routes Places of Work
Negligible	<ul style="list-style-type: none"> Un-developed land that is already subject to significant light

Magnitude of Change (Impact)

19.2.23 Table 19-3 below details the Magnitude of Change used within the Lighting Assessment for the DCO Application. This matrix is still considered relevant.

Table 19-3: Magnitude of Change (Impact)

Magnitude	Criteria	Definition
High	Results in major and lasting exacerbation of risk	Where the light source under consideration is the only source and introduces glare and intrusion
Medium	Results in exacerbation of risk	Where the light source under consideration is one of several sources but is close to the receptor or the source is at some distance with intermittent screening
Low	Results in minor exacerbation of risk	Where the light is at such a distance that its effect is negligible and/ or there are many other light sources or an adjacent more dominant source.
Negligible	No impact to risk or level of change not significant.	Any situation where there would be no change to light

Significance of Effect

19.2.24 The significance matrix shown in Table 19-4 below, is based on the above sensitivity criteria and magnitude of change.

19.2.25 There is no significance matrix provided in the Light Assessment for the DCO Application (footnote 1) and the ‘significance and commentary’ detailed in Table 19.4 of the original ES does not follow a set matrix and refers more to professional judgement. The following matrix has been created based on the results of the Lighting Assessment for the DCO Application.

Table 19-4: Significance of Effect

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Effect	High	Substantial / Major	Substantial / Major	Moderate	Neutral / Negligible
	Medium	Substantial / Major	Moderate	Minor	Neutral / Negligible
	Low	Moderate	Minor	Minor	Neutral / Negligible
	Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible

19.2.26 Where appropriate, the significance of effect will be classified as being direct/indirect effects, secondary, cumulative, short/medium/long term, permanent/temporary and beneficial/adverse effects arising from the development. The consideration of effects is contained within Section 19.4.0 of this Chapter and summarised in Section 19.8.0 of this Chapter.

Mitigation Hierarchy

19.2.27 There is no specific mitigation hierarchy detailed within the Lighting Assessment for the DCO Application however, mitigation measures are proposed in Section 19.5.0 of this Chapter.

Effects Not Requiring Further Assessment

19.2.28 No changes are proposed to the lighting levels on the site. The precise arrangements for external lighting are reserved matters requiring the submission of written details and their subsequent approval by the local planning authority following consultation with the highway authority and Natural England, in accordance with Schedule 11, paragraph 24 of the DCO.

19.2.29 The Scoping Opinion, referenced in Table 19.1, confirms that light can be scoped out of the updated environmental assessment.

19.3.0 Changes in Baseline Conditions

DCO Baseline

Sensitive Receptors

- 19.3.1 Sensitive receptors and locations were identified in the Lighting Assessment for DCO Application.
- 19.3.2 The main ecological receptors are the North Killingholme Haven Pits SSSI located adjacent to the site and the intertidal mud flats associated with the Humber Estuary (SSSI, RAMSAR, Special Area of Conservation (SAC)) also located adjacent to the site. Both of these designations support nationally important bird species.
- 19.3.3 Additional ecological receptors are the wooded areas west of the site i.e. Burkinshaw’s Covert (part of the National Forest Inventory) and Chase Hill Wood (Priority Habitat and part of the National Forest Inventory), which may support nocturnal mammal activities.
- 19.3.4 In terms of human (amenity) sensitivities, there is only one remaining occupied residential property in proximity to the site boundary, Hazeldene on Marsh Lane. Other properties are at the edges of settlements at distances of over 2 km from the site boundary. Rural areas in relative darkness are sensitive to light impacts.
- 19.3.5 Table 19.1 within Chapter 19 of the original ES details both ecological sensitive receptors and sensitive receptors relating to amenity. They are listed below in Table 19-5 for ease of reference.

Table 19-5: Sensitive Receptors

Ecology	Amenity
Bird interests in adjacent Mitigation Fields	Residential at East Halton
Burkinshaw’s Covert	Residential at North Killingholme
Chase Hill Wood	Residential at South Killingholme
North Killingholme Haven Pits (SSSI)	Road users Rosper Road
Mudflats (SPA)	Residential at Station House
Feeding Areas for Birds in adjacent fields.	LPG Terminal
	Residential at Hazel Dene
	Residential at Immingham
	Coastal Path along the North Humber bank and Paull

Existing Lighting

- 19.3.6 Chapter 19 of the original ES detailed existing lighting within the study area and the wider area. In summary, the Lighting Assessment for the DCO Application states that existing light sources in the immediate vicinity are varied. At the time, there was a car storage area with existing 30m high lighting columns to the north but within the curtilage of the DCO boundary. To the east of this and

south of North Killingholme Haven Pits SSSI was an area with 21m high lighting columns. The majority of the remainder of the proposed site was in relative darkness. None of the public roads surrounding the site are illuminated by streetlights. Reference should be made to Technical Appendix U19-1 for the location of lighting columns present on the site in 2011.

19.3.7 Lighting in the wider context was very much dominated by the Lindsey (now Prax) Oil Refinery located to the west of the site. The villages of East Halton, North and South Killingholme and Immingham are all within 3.5km of the site boundary.

Fieldwork

19.3.8 Light measurements were undertaken on the 19th November 2010 between 20:30 and 23:45 at 17 locations surrounding the site boundary. A single reading was taken at chosen locations to represent nearby receptors. Locations are detailed below in Table 19.3 of the original ES, with further detail in Table 19.4 (*ibid*). For ease of reference, they are repeated in Table 19-6 below.

Table 19-6: Monitoring Locations

ID	Location	Sensitivity (as defined in DCO Application)
1	Residential Amenity – Eastern end of Kettlebridge Lane, East Halton	High
2	Residential Amenity – 10m west of final house of Swinster Lane, East Halton	High
3	Residential Amenity – Field entrance 20m east of final house on Scrub Lane, East Halton	High
4	Residential Amenity – Property entrance, halfway along Brick Lane, East Halton	High
5	Residential Amenity – Field entrance approx. 45m east of final property on Nicholson Road, North Killingholme	High
6	Ecology - Site Boundary- Side of Rosper Road Adjacent mitigation fields with Bird Interest	Medium
6a	Amenity - Side of Rosper Road adjacent to above ground oil pipelines	Low
7	Amenity - Opposite side of road to transport deport	Low
7a	Ecology - Opposite side of road to transport deport, Adjacent Burkinshaw’s Covert	Medium
8	Amenity At Junction of Rosper Road and Haven Road	Low
8a	Ecology - At Junction of Rosper Road and Haven Road, Adjacent Burkinshaw’s Covert	Medium
9	Ecology – Roadside near entrance to HST [sic] at end of close off layby, Near Chase Hill Wood	Medium
10	Ecology - North Killingholme Haven Pits SSSI/SPA Corner of Able Area A	High

ID	Location	Sensitivity (as defined in DCO Application)
10a	Ecology - North Killingholme Haven Pits SSSI/SPA, Foreshore in small bay under Centrica pumping station	High
11	Ecology –Mudflats SPA – Birds, South of E.ON pumping station, 4m from the fence on Able site Area C	High
11a	Ecology - Mudflats SPA – Birds, Foreshore immediately adjacent to E.ON pumping station	High
12	Residential Amenity - On Station Road level with sluice gate in ditch, approx. 60m from sea wall (Residential at nearby lighthouse)	High
12	Ecology - On Station Road level with sluice gate in ditch, approx. 60m from sea wall (Mudflats SPA)	High
12a	Ecology – On station Road, approx. 100m east of level crossing (Feeding Area – Birds)	High
12b	Ecology – Station Road, adjacent to MOD entrance (Feeding Area - Birds)	High
13	Residential Amenity – Corner of Station Road adjacent to Centrica compound	High
14	Amenity - Entrance to LPG Terminal gas caverns compound on Marsh Lane (Place of Work)	Low
15	Residential Amenity - Outside Hazel Dene	High
15	Ecology – Outside Hazel Debe (Close to designated Wildlife Site)	High
16	Residential Amenity – Footpath on Washdyke Lane on residential estate in Immingham	High
16a	Residential Amenity – NE of Location 16 out of street lit area, behind houses, Immingham	High
17	Residential Amenity – Side of Staple Road, South Killingholme	High
17a	Residential Amenity – 10m east of Location 17, out of street lit zone, South Killingholme	High
17b	Residential Amenity – Outside final house at east end of Staple Road, South Killingholme	High

19.3.9 Results of the fieldwork highlighted that in general night-time lux levels across the local area and close to the proposed site were 1 lux and under. Exceptions to this are where existing lighting provides local illumination.

DCO Future Baseline

19.3.10 There are three residential receptors which are detailed in the DCO baseline which were not included in the DCO Future baseline because they would cease to be residential due to their planned compulsory acquisition by the Applicant. These properties are: the lookout; North Killingholme Low

Lighthouse and Station House.

- 19.3.11 Reference should be made to Table 1.1 and Table 1.2 within Chapter 1 of this Environmental Information report for detail of other relevant development planned at the time of the DCO application.

Current Baseline

- 19.3.12 Those receptors detailed within the DCO Baseline are still considered to be relevant and have the same sensitivity as previously detailed, except that the three residential properties excluded from the original ES lighting impact assessment are now vacant and have been acquired by the Applicant.
- 19.3.13 Updates to the fieldwork carried out in 2010 have not been undertaken.
- 19.3.14 All of the AMEP Planning Consents which have been consented since 2012 are shown in Drawing reference: AME-002-00102 (Appendix U1-3).
- 19.3.15 Since the DCO application new development that includes additional lighting, has taken place within the DCO boundary, notably the lighting constructed at Area D1 and D2 in 2019 (application reference: PA/2008/0571) and Area E (application reference: PA/2008/1375). However, these are in areas that would be lit pursuant to the implementation of the DCO. A plan showing lighting columns erected at the time of the DCO and the additional lighting now operating is provided within Appendix U19-1.
- 19.3.16 In line with Institute of Lighting Professionals (ILP) Guidance (Ref 2) the Environmental Zone for the area is classified as E4, "High District Brightness" due to the heavy industrial nature of the immediate surrounding area.

Changes in Baseline

- 19.3.17 All receptors considered within the original DCO application are also still relevant and their sensitivity remains the same.
- 19.3.18 Since the DCO application new development that includes additional lighting, has taken place within the DCO boundary, these developments can be seen in Drawing AME-002-00102 (Appendix U1-3). One of the larger developments is the BMW PDI facility (Planning reference: PA/2016/1654). However, lighting of this area had already received consent when the original DCO Application was submitted.
- 19.3.19 The Environmental Zone was not classified in Chapter 19 of the original DCO Application. However, in line with current ILP Guidance (Ref 2) the Environmental Zone would likely have been classified a E4, "High District Brightness". The area would also currently be classified as Environmental Zone E4 in line with ILP Guidance (Ref 2).
- 19.3.20 E4 is the highest Environmental Zone and therefore any changes to the baseline in the interim period between original submission of the DCO Application and the present would not affect the Environmental Zone classification and as a result also not change the assessment outcome.
- 19.3.21 No changes are proposed to the lighting levels on the site. The precise arrangements for external lighting are reserved matters requiring the submission of written details and their subsequent

approval by the local planning authority following consultation with the highway authority and Natural England, in accordance with Schedule 11, paragraph 24 of the DCO.

19.4.0 Assessment of Effects

Additional Construction Phase Effects

- 19.4.1 There are no additional potential construction phase impacts which require assessment beyond those detailed in the DCO Application. Therefore, the construction phase effects detailed in the DCO Application are considered to remain robust and valid.

Additional Operational Phase Effects

- 19.4.2 The material amendment will result in the repositioning of two lighting columns near to the Inset Berth, but light spill off the site will materially change as a result. The changes to the lighting column positions between the 2011 DCO Application and the 2021 Material Amendment can be seen in Drawing AME-001-00391 (Appendix U19-1).
- 19.4.3 As noted in Table 19-1, lighting can be scoped out of the updated assessment and the lighting levels at receptors are not considered to increase. The Environmental Zone classification will remain the same, E4 "High District Brightness".
- 19.4.4 Therefore, the operational phase effects detailed in the DCO Application are considered to remain robust and valid.

Additional Cumulative Effects

- 19.4.5 The Lighting Assessment for the DCO Application (paragraph 19.9.4) states "*within this local context it is considered that the AMEP will add cumulatively to the night time baseline. However, due to the existing levels of illumination, it is considered that this is not a significant cumulative impact*".
- 19.4.6 There are no additional potential cumulative effects to those detailed in the DCO Application.

Consideration of DCO

- 19.4.7 There are not considered to be any changes from the assessment of effects contained within the DCO Application.
- 19.4.8 While ILP Guidance is now available this would not change the overall determination of impact, the significance of effect and conclusions of the assessment undertaken as part of the DCO Application. Therefore, the lighting effects detailed in the DCO Application are considered to remain robust and valid.

19.5.0 Requirement for Additional Mitigation

DCO Mitigation

19.5.1 The mitigation measures proposed as part of the Lighting Assessment for the DCO Application have been suggested in line with relevant guidance and legislation.

19.5.2 The following mitigation measures were proposed in the original ES:

- Light towers will be fitted within directional luminaires to limit light spill outside of the working areas;
- Downlights will be fitted outside buildings to provide localised lighting for safe access to buildings;
- For aviation safety, Humberside Airport request that all external lighting shall be flat glass, full cut off design with horizontal mountings to avoid light spill above the horizontal in the interest of aviation safety, which is also in line with best practice with the Institute of Lighting Engineers;
- Final details of the lighting proposals are to take cognisance of the requirements of BS 5489 Part 8 with regard to lighting and railways; and
- Planting of tree belts and woodland areas.

19.5.3 Controls of the details of external lighting during construction and operation are secured in the extant DCO by virtue of Schedule 11 Requirement 24.

Alternate or Additional Mitigation

19.5.4 No additional mitigation is required to that detailed in the DCO Application.

19.6.0 Residual Effects

Construction Phase

- 19.6.1 There will be no residual lighting effects arising from the development on sensitive receptors, both amenity and ecological.

Operational Phase

- 19.6.2 With mitigation measures in place, there will be no change to the residual effect on amenity as stated within Chapter 19 of the original DCO Application.
- 19.6.3 With mitigation measures in place there are no residual effect on ecological receptors.

Consideration of DCO

- 19.6.4 There are no changes to the residual effects to those stated within the DCO Application.

19.7.0 Other Environmental Issues

- 19.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 19.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

Infrastructure

- 19.7.3 Infrastructure required as part of the development includes 30m and 50m lighting columns.
- 19.7.4 The changes to the lighting column positions between the 2011 DCO Application and the 2021 Material Amendment can be seen in Drawing AME-001-00391 (Appendix U19-1).

Waste

- 19.7.5 In terms of waste, no significant effects are considered likely.

Population and Human Health

- 19.7.6 Effects on population have not been directly considered within this Chapter. However, it is generally considered that the population would not be impacted upon by the proposed lighting changes. The Environmental Zone classification would remain the same despite additional development in the area and changes to the baseline. As such, in terms of population, no significant effects are considered likely.
- 19.7.7 In terms of human health, both the construction and operational phase light assessment conclude that impacts associated with the proposed lighting result in a 'not significant' effect,
- 19.7.8 Chapter 24 of the original DCO refers to health and the following is stated with regards to construction phase lighting:

"Construction activities are therefore likely to result in visual disturbances to nearby residential receptors. These visual disturbances may impact on residents' quality of life and cause anxiety and concern as well as decreased wellbeing. In particular light pollution in the wintering months at the construction site may cause annoyance and discomfort to nearby residential receptors (see Section 19.6.9 of Ch 19 Light for more details) if lighting is not properly angled and consideration is not given to the potential for glare. However, these visual impacts will be temporary during the construction phase and due to the existing visual baseline it is thought that any negative health impacts will be minimal."

- 19.7.9 Based on the above, it is considered that any effect on human health is 'negligible'.

Climate and Carbon Balance

- 19.7.10 In terms of climate and carbon balance, no significant effects are considered likely.

Risks of Major Accidents and/or Disasters

- 19.7.11 The site will operate on a 24/7 basis and the purpose of the lighting is to ensure the workplace is lit to sufficient standards so as to allow operations to be carried out safely.

Summary

- 19.7.12 With regards to the EIA Regulations 2017, no significant effects in terms of lighting are considered likely with regards to the other environmental issues of relevance.

19.8.0 Summary of Effects

- 19.8.1 There are not considered to be any changes to the lighting impacts predicted as part of the Lighting Assessment submitted with the original ES.
- 19.8.2 Although development has taken place within the DCO Application boundary since 2012, there would be no change to the Environmental Zone of the area which is still considered to be E4, “High District Brightness”. This is the highest Environmental Zone detailed within ILP Guidance (Ref 2).
- 19.8.3 No changes are proposed to the lighting levels on the site which are intended to permit safe working. The precise arrangements for external lighting are reserved matters requiring the submission of written details and their subsequent approval by the local planning authority following consultation with the highway authority and Natural England, in accordance with Schedule 11, paragraph 24 of the DCO.
- 19.8.4 It is considered that the conclusions associated with the Lighting Assessment undertaken as part of the DCO Application remain valid. The summary of effects are summarised in Table 19-7 below.

Table 19-7: Summary of Effects for Lighting

Effect	Receptor	Significance of effect prior to mitigation ^(A)	Summary of mitigation	Residual Effect
Light spill due to construction activities	All considered receptors	Negligible - / T / D / ST	Implementation of industry good practice measures	Negligible - / T / D / ST
Light spill due to operational activities on Amenity receptors	R1 – 5, R6, R7, R8, R12 – R17	Moderate - Negligible - / P / D / LT	Mitigation measures detailed in Section 19.5.0 include directional luminaires and planting of tree buffers	Moderate at R15, Minor at R6 and Negligible at all other receptors - / P / D / LT
Light spill due to operational activities on Ecological receptors	R6 – R12	Negligible - / P / D / LT	Mitigation measures detailed in Section 19.5.0 include directional luminaires and planting of tree buffers	Negligible - / P / D / LT

Table note:

^(A) + / - = Positive or Negative, P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable

19.9.0 Conclusions

- 19.9.1 The lighting assessment for the DCO application looks at impacts associated with both construction and operational phase lighting associated with the proposals.
- 19.9.2 The DCO baseline is still considered representative of the current baseline situation. Despite new development, including the lighting. The area is still classified as Environmental Zone E4, “high district brightness”.
- 19.9.3 Effects of the external lighting associated with the proposed development are still considered to be 'not significant'. As such, it is considered that lighting does not represent a material constraint to the development proposals, which conform to the principles of National Planning Policy Framework and Local Policy. **On this basis, this topic will be ‘scoped out’ of the updated ES.**

REFERENCES

- Ref 1: Chapter 19 Light (2012) DCO Application
- Ref 2: Institute of Lighting Professionals, (2020) Guidance Notes for the Reduction of Obtrusive Light GN01:20
- Ref 3: DCO Application, <https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/able-marine-energy-park/?ipcsection=docs>, accessed February 2021.
- Ref 4: DCO Application Drawing reference AME-02012-B – Lighting Column details 30m and 50m

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 20: LANDSCAPE AND VISUAL

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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April 2021



BASIS OF REPORT

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CONTENTS

20.1.0 INTRODUCTION	20-1
Development Consent Order Context.....	20-1
Consideration of Material Amendment	20-1
Purpose and Structure of Chapter	20-2
20.2.0 METHODOLOGY.....	20-3
Changes in Legislation, Guidance and Planning Policy.....	20-3
Scoping Opinion	20-4
Additional Consultation.....	20-4
Assessment Methodology	20-4
Effects Not Requiring Further Assessment.....	20-5
20.3.0 CHANGES IN BASELINE CONDITIONS.....	20-7
DCO Baseline	20-7
DCO Future Baseline.....	20-7
Current Baseline	20-7
Changes in Baseline	20-7
20.4.0 ASSESSMENT OF EFFECTS	20-9
Additional Construction Phase Effects	20-9
Additional Operational Phase Effects.....	20-9
Additional Cumulative Effects	20-10
Consideration of DCO	20-10
20.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	20-11
DCO Mitigation.....	20-11
Alternate or Additional Mitigation	20-11
20.6.0 RESIDUAL EFFECTS	20-12
Construction Phase	20-12
Operational Phase	20-12
Consideration of DCO	20-12
20.7.0 OTHER ENVIRONMENTAL ISSUES.....	20-13
Other Environmental Issues of Relevance	20-13

20.8.0	SUMMARY OF EFFECTS	20-14
20.9.0	CONCLUSIONS	20-15

20.1.0 Introduction

Development Consent Order Context

20.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

20.1.2 The associated development also consented through the DCO includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

20.1.3 Chapter 20 of the Environmental Statement (ES) prepared in support of the original DCO application ('the original ES')¹ detailed an assessment of the potential landscape and visual effects of the proposed AMEP.

20.1.4 The Examiner's Report submitted to the Secretary of state, following completion of the examination observed the following:

"8.70 Landscape and visual impacts ... have not been a major issue in the examination. The main development site is in an industrial landscape, with a background (from the river) primarily of a very large oil refinery.

8.71 The impacts are addressed in Chapter 20 of the Environmental Statement [APP075] and in the Landscape Masterplan [APP111].

8.72 These matters are to be managed through Requirements 5, 6 and 7 of the draft DCO.

8.73 The Panel believes that this issue has been addressed adequately."

Consideration of Material Amendment

20.1.5 The proposed change as identified in Chapter 4: Description of Changes to the Development and Alternatives which have relevance to potential landscape and visual effects include:

- a minor amendment to the re-routing of public footpath FP50 to avoid crossing over operational Network Rail track;

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000325-20%20-%20Landscape%20and%20Visual%20Impact.pdf>

- the reclamation of the specialist berth at the southern end of the quay; and
- the setting back of the northern quay line by 61 m over 288 m to create a barge berth.

Purpose and Structure of Chapter

20.1.6 This chapter of the PEIR considers the impact of the proposed material amendment identified above on the landscape and visual resource. It should be read in conjunction with Chapter 20 of the original ES.

20.1.7 The purpose of this chapter is to identify any significant landscape or visual effects that are predicted as a result of the change to the Project. As part of a proportionate approach, this chapter does not consider effects of a marginal or negligible nature where significant effects would not occur.

20.1.8 This Technical Chapter includes the following:

- a summary of any changes to legislation, Guidance and Planning Policy relevant to the landscape and visual resource;
- a review of the methodology used in the assessment and confirmation that no substantial revision / changes are required;
- a review of baseline conditions;
- a review of the assessment of effects;
- a review of mitigation measures proposed in the original ES chapter and presentation of additional mitigation measures, if required; and
- a summary of any other environmental effects which have been introduced into EIA requirements through the EIA Regulations 2017.

20.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

National Planning Policy

- 20.2.1 The National Policy Statement (NPS) for Ports was designated in January 2012.
- 20.2.2 The National Planning Policy Framework (NPPF), which was published in March 2012, and has since been updated twice, replaced Planning Policy Statements (PPSs) including PPS7 referenced in Chapters 20 and 41² of the original ES. The NPPF sets out the government's planning policies for England and how these are expected to be applied.
- 20.2.3 Paragraph 11 sets out the fundamental principle of the document: that there is a presumption in favour of sustainable development. All development that is in accordance with the development plan should be approved "without delay" and that "*where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date*" permission should be granted for development "*unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the Framework taken as a whole.*"
- 20.2.4 In relation to landscape, the NPPF defines sustainability as including the protection and enhancement of the "*natural, built and historic environment*" (paragraph 8).
- 20.2.5 Paragraph 98 relates to rights of way and access, stating that these should be "*protected and enhanced*". It is noted that better facilities should be provided for users of rights of way, for example by "*adding links to existing rights of way*". Paragraph 98 does not deal with the protection and enhancement of views rather the functionality, facilities and connectivity of physical route.

Local Planning Policy

- 20.2.6 The North Lincolnshire Local Plan was replaced by the Core Strategy (Adopted 2011), but Saved policies remain. The following policies detailed in Chapter 20 of the original ES no longer form part of the policy baseline:
- Policy LC8 which defined Areas of High Landscape Value; and
 - Policy LC10 which related to development within Areas of High Landscape Value.
- 20.2.7 The North East Lincolnshire Local Plan 2003 has been replaced by the North East Lincolnshire Local Plan 2013 to 2032 (Adopted 2018). The following policies have relevance to the landscape and visual resource:
- Policy 42 Landscape which states that "*Landscape character should be given due consideration in the nature, location, design and implementation of development proposals*".

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000346-41%20-%20Landscape%20and%20Visual%20Context.pdf>

20.2.8 The East Riding of Yorkshire Council – Holderness District Wide Local Plan 1999 has been replaced by the East Riding Local Plan 2012 – 2029 Strategy Document (Adopted April 2016). The following policies have relevance to the landscape and visual resource:

- Policy ENV2: Promoting a high quality landscape states that “*Development proposals should be sensitively integrated into the existing landscape, demonstrate an understanding of the intrinsic qualities of the landscape setting and, where possible, seek to make the most of the opportunities to protect and enhance landscape characteristics and features*”.

The Guidelines for Landscape and Visual Impact Assessment (GLVIA) 2nd Edition (2002, Landscape Institute and Institute of Environmental Management and Assessment)

20.2.9 GLVIA 2nd Edition (2002, Landscape Institute and Institute of Environmental Management and Assessment) has been replaced by GLVIA 3rd Edition (2013, Landscape Institute and Institute of Environmental Management and Assessment).

Scoping Opinion

20.2.10 Section 4.14, p39, of the Scoping Opinion for Able Marine Energy Park (AMEP) Material Change 2 (Case Reference: TR030006, March 2021) the Inspector states:

“The Inspectorate agrees that the proposed changes are unlikely to alter the characteristics of these impacts such that new or different significant effects would occur. The Inspectorate agrees that this aspect can be scoped out of the updated assessment”.

20.2.11 This is in agreement with the Scoping Report submitted in January 2021 and correspondingly an assessment of landscape and visual impacts will be scoped out of the ES. However, in the interests of a comprehensive pre-application consultation, the landscape and visual impacts of the proposed material changes are addressed in this PEIR.

Additional Consultation

20.2.12 No consultation has been undertaken specifically for landscape and visual matters beyond the scoping exercise.

Assessment Methodology

20.2.13 Chapter 20 of the original ES set out the Assessment Methodology and Criteria used in the assessment of landscape and visual impacts. The assessment methodology considered the landscape resource separately from the visual resource. No changes to the assessment methodology are proposed and as such reference should be made to Chapter 20 of the original ES for further detail on this. Whilst GLVIA 2nd Edition has been replaced by GLVIA 3rd Edition a review of the assessment and the changes to the development proposed here has indicated that any updates to the methodology as a result of GLVIA 3rd Edition would not result in a significant change to the level and type of landscape and visual effect assessed within Chapters 20 and 41 and would not result in any new and additional significant effects.

Study Area

20.2.14 No changes to the assessment methodology for the assessment of landscape and visual effects have

been proposed and the study area would remain the same as that defined in paragraph 20.5.1 of the original ES.

Sensitivity Criteria

- 20.2.15 As noted above, no changes to the assessment methodology for the assessment of landscape and visual effects have been proposed and the sensitivity criteria remain the same as those set out in Chapter 20 of the ES, Tables 20.1 and 20.2.

Magnitude of Change (Impact)

- 20.2.16 As noted above, no changes to the assessment methodology for the assessment of landscape and visual effects have been proposed and the magnitude of change criteria remain the same as those set out in Chapter 20, Tables 20.1 and 20.2 of the original ES.

Significance of Effect

- 20.2.17 As noted above, no changes to the assessment methodology for the assessment of landscape and visual effects have been proposed and the significance of effect criteria remain the same as those set out in Chapter 20, Tables 20.1 and 20.2 of the original ES.

Mitigation Hierarchy

- 20.2.18 No significant changes have been assessed with regard to the nature, type and level of landscape and visual effects. No new or additional landscape and visual effects have been assessed. No additional mitigation has, therefore, been proposed. Landscape and visual mitigation would remain the same as that under the DCO as detailed in Section 20.7 of Chapter 20 of the original ES.

Effects Not Requiring Further Assessment

Construction

- 20.2.19 No changes are proposed to construction methods in the terrestrial development and therefore no further assessment has been undertaken of potential landscape and visual effects for the construction period.

Operation

- 20.2.20 No changes have been proposed to the Compensation Site proposals, which comprise developing farmland at Cherry Cobb Sands to create over 100 ha of new intertidal habitat and the provision of wet grassland habitat also at Cherry Cobb Sands. No further assessment of potential landscape and visual effects has, therefore, been required for this element of the DCO and, correspondingly, no update has been undertaken of Chapter 41 of the ES, and as further reviewed in EX28.3 Part 6 of the ES³.
- 20.2.21 No changes are proposed to the onshore development of facilities for the manufacture, assembly and storage of components related to offshore renewable infrastructure. No further assessment of

³https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

potential landscape and visual effects has, therefore, been required for this element of the DCO. Whilst there are no proposed changes to the terrestrial operations of the proposed development consideration given in the sections above to the potential landscape and visual effects of the proposed change to the consented footpath diversion and changes to the proposed quay layout.

- 20.2.22 No changes are proposed to any of the highways improvement works in the local area. This is considered further in Chapter 13 of the PEIR. No further assessment of the potential landscape and visual effects of this element is required. The relevant highway improvements have, in any event, been completed.
- 20.2.23 The DCO provides for a new passing loop to be constructed on the North Killingholme Branch Line. This has not been amended and therefore no further assessment has been undertaken of potential landscape and visual effects for this element.
- 20.2.24 The dredging permissions are proposed to be changed to the extent necessary to dredge the berthing pockets and approaches for the amended quay line. This would not result in significant change to the level and type of landscape and visual effects already assessed and would not result in new or different landscape and visual effects and, therefore, no further assessment has been undertaken.
- 20.2.25 No changes are proposed to the arrangements for the disposal of surface water and foul water from the development site. A foul water pumping station suitable for the AMEP development has been constructed pursuant to planning permission PA/2017/265. No further assessment of potential landscape and visual effects has, therefore, been required for this element of the DCO.
- 20.2.26 No changes are proposed to the lighting levels on the site, whilst the precise arrangements for external lighting are reserved matters requiring the submission of written details and their subsequent approval in accordance with Schedule 11, paragraph 24 of the DCO. No further assessment of potential landscape and visual effects has, therefore, been required for this element of the DCO.
- 20.2.27 No changes are proposed to the arrangements for parking detailed on the consented Indicative Masterplan. Parking arrangements are identical in the revised Indicative Masterplan. No further assessment of potential landscape and visual effects has, therefore, been required for this element of the DCO.

20.3.0 Changes in Baseline Conditions

DCO Baseline

- 20.3.1 Details on the baseline conditions for the original assessment of landscape and visual resource are comprehensively described in Chapter 20, Section 20.5, paragraphs 20.5.1 to 20.5.10 and Tables 20.3 to 20.8 of the original ES and are not repeated in detail here.
- 20.3.2 Baseline details include information on the landscape character of the site and surrounding context and identify sensitive visual receptors and detail potential sensitive views.

DCO Future Baseline

- 20.3.3 No future baseline was identified in the original ES for landscape and visual matters.

Current Baseline

- 20.3.4 Details of the baseline conditions for the original assessment of landscape and visual resource are detailed in chapter 20 of the original ES prepared for the DCO and are not repeated in detail here.
- 20.3.5 The current baseline is described in Chapter 1 of the PEIR.

Changes in Baseline

- 20.3.6 There have been a number of changes to the visual baseline described for the DCO as follows (see Section 6.4.0 of Chapter 6 of the PEIR for details):
- Killingholme Power Station (Centrica) has been closed and demolished;
 - Construction of Hornsea Offshore Wind Farm (Zone 4) Project One is complete;
 - Work completed on Humber Hull Frontages (flood defence scheme); and
 - 6 no. 50m high, 36m diameter biomass silos have been constructed at the HIT Terminal (ABP Port of Immingham).
- 20.3.7 Additional and updated sources of landscape character assessment have been prepared in the intervening period as follows:
- The North East Lincolnshire Landscape Character Assessment (February 2010) remains current but should be read in conjunction with the North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (January 2015); and
 - The East Riding of Yorkshire Landscape Character Assessment (November 2005) was re updated in October 2018.
- 20.3.8 The main changes resulting from these documents are as follows:

North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (January 2015)

- 20.3.9 The site is not located within the area assessed within this document. The landscape character type (LT) which adjoins the character area within which the site is located site is described in this assessment as LT1: Industrial Landscape. LT 1 is described as *“visually intrusive, stretching from the north-western edge of Grimsby up to and around Immingham. It is dominated by on-shore oil and gas refineries and other large scale industrial units and extends inland to the A180”*.

East Riding of Yorkshire Landscape Character Assessment (January 2015)

- 20.3.10 This character assessment relates purely to the two compensation areas located on the northern side of the Humber Estuary. No changes are proposed to these sites within the material amendment and so no further detail is provided here of the updated assessment.

20.4.0 Assessment of Effects

Additional Construction Phase Effects

- 20.4.1 No additional construction phase effects have been identified as a result of the material amendment.

Additional Operational Phase Effects

- 20.4.2 The proposed change to the existing DCO footpath diversion extends the diversion route to the north west for a distance of approximately 220m so that the crossing point of the railway line can be gained across land that is not part of the operational railway, using an existing agricultural access. As there is no railway at the crossing point, it avoids the potential need for the construction of a bridge crossing.
- 20.4.3 The proposed change would impact the route of the Footpath 50 diversion and England Coast Path diversion by increasing the length of the route by a total distance of approximately 440m, along the extension loop to the agricultural crossing.
- 20.4.4 The additional distance would not offer any scenic benefits and would cause a slight delay in re-joining the coastal section. However, the proposed change to the diversion route would add only a negligible additional distance to the route of the England Coast Path for those users who are travelling a long section of the route.
- 20.4.5 This would result in no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from this change.
- 20.4.6 Whilst the footpath diversion is longer, as noted above, the change to the composition of views experienced by walkers along the footpath would be very limited. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 20.4.7 The specialist berth which formed part of the DCO would be omitted. This would result in no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from this change.
- 20.4.8 Whilst the shape of the proposed quay would change this would be largely indiscernible to visual receptors where views towards this part of the quay are available. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 20.4.9 The northern section of the quay would be set back by 61m over 288m to create a barge berth. This would result in no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from this change.
- 20.4.10 Whilst the shape of the proposed quay would change this would be largely indiscernible to visual receptors where views towards this part of the quay are available. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.

Additional Cumulative Effects

- 20.4.11 No additional cumulative effects have been identified as a result of the material amendment.

Consideration of DCO

- 20.4.12 The proposed material amendment would result in very limited changes to the composition of available views towards the quay line and when walking along the footpath. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 20.4.13 There would be no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from the proposed material amendment.

20.5.0 Requirement for Additional Mitigation

- 20.5.1 No additional mitigation measures, beyond those outlined within the original ES, are proposed based on this updated assessment.

DCO Mitigation

- 20.5.2 Landscape and visual mitigation was proposed as part of the DCO and is detailed in Section 20.7 of Chapter 20 of the original ES and within Chapter 41 of the original ES

Alternate or Additional Mitigation

- 20.5.3 No significant changes have been assessed with regard to the nature, type and level of landscape and visual effects. No new or additional landscape and visual effects have been assessed. No additional mitigation has, therefore, been proposed. Landscape and visual mitigation would remain the same as that permitted under the DCO detailed in Section 20.7 of Chapter 20 of the original ES and within Chapter 41 of the original ES.

20.6.0 Residual Effects

- 20.6.1 The changes proposed as part of this material amendment do not result in any additional residual effects, beyond those identified in the original ES for the DCO.

Construction Phase

- 20.6.2 The changes proposed as part of this material amendment do not result in any additional residual construction phase effects, beyond those identified in the original ES for the DCO.

Operational Phase

- 20.6.3 The changes proposed as part of this material amendment do not result in any additional residual operational phase effects, beyond those identified in the original ES for the DCO.

Consideration of DCO

- 20.6.4 This assessment demonstrates there no changes to the Residual Effects previously identified as part of the DCO.

20.7.0 Other Environmental Issues

- 20.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 20.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

- 20.7.3 There are no effects associated with the additional topics introduced into EIA requirements that relate to the landscape and visual resource. No further assessment is considered necessary.

20.8.0 Summary of Effects

- 20.8.1 The proposed material amendment has been reviewed to assess whether they would result in a significant change to the level and type of effects assessed in Chapter 20 of the original ES on the landscape and visual resource and whether any additional effects would result during the construction and operational phases.
- 20.8.2 The proposed material amendment would result in very limited changes to the composition of available views towards the quay line. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 20.8.3 They would also result in limited changes to the views available to walkers along the footpath diversion with a change in crossing point to avoid the Killingholme Branch railway. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 20.8.4 There would be no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from the proposed material amendment.

20.9.0 Conclusions

- 20.9.1 On the basis of the above review, SLR considers that the proposed material amendment would result in very limited, and not significant, changes to the landscape and visual resource of the study area and to the effects already assessed in Chapter 20 of the original ES for the DCO.
- 20.9.2 As such SLR concludes that the extant landscape and visual assessment contained within the original ES remains adequate.
- 20.9.3 On the basis of the assessment contained within this PEIR, and the associated Scoping Opinion issued by PINS, this topic will not be brought forward within the Updated ES.**

REFERENCES

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013, Landscape Institute and Institute of Environmental Management and Assessment)

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 21: SOCIO-ECONOMIC

Able Marine Energy Park, Killingholme, North
Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

21.1.0 INTRODUCTION	21-1
Development Consent Order Context.....	21-1
Consideration of Material Amendment	21-1
Purpose and Structure of Chapter	21-1
21.2.0 METHODOLOGY.....	21-3
Changes in Legislation, Guidance and Planning Policy.....	21-3
Scoping Opinion	21-4
Additional Consultation.....	21-5
Assessment Methodology	21-5
Effects Not Requiring Further Assessment.....	21-7
21.3.0 CHANGES IN BASELINE CONDITIONS.....	21-8
DCO Baseline	21-8
DCO Future Baseline.....	21-8
Current Baseline	21-8
Changes in Baseline	21-8
21.4.0 ASSESSMENT OF EFFECTS	21-9
Additional Construction Phase Effects	21-10
Additional Operational Phase Effects.....	21-10
Additional Cumulative Effects	21-10
Consideration of DCO	21-10
21.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	21-11
DCO Mitigation.....	21-11
Alternate or Additional Mitigation	21-11
21.6.0 RESIDUAL EFFECTS	21-12
21.7.0 OTHER ENVIRONMENTAL ISSUES.....	21-13
Other Environmental Issues of Relevance	21-13
Summary	21-13
21.8.0 SUMMARY OF EFFECTS	21-14
21.9.0 CONCLUSIONS	21-15

DOCUMENT REFERENCES

TABLES

Table 21-1: Scoping Opinion.....	21-4
Table 21-2: Magnitude of Change (Impact)	21-6
Table 21-3: Significance of Effect	21-7

APPENDICES

Appendix U21-1: Consultation Correspondence	
Appendix U21-2: Rights of Way Key Plan (Rev 1) and Sheet No. 5 (Rev 1)	
Appendix U21-3: AME-036-00004 D Changes to Footpath No.50 Diversion	

21.1.0 Introduction

Development Consent Order Context

21.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

21.1.2 The associated development for the above proposals includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

21.1.3 The original DCO application was accompanied by a socio-economic assessment (Chapter 21 of the Environmental Statement¹ (ES)) that considered the following potential effects:

- economic effects of the proposed development on the local area and the wider community of the Hull and Humber sub-region including assessment of the likely direct, indirect and induced effects of the project in terms of employment and skills; and
- effects on local communities including community infrastructure such as accommodation, education, healthcare and recreation.

21.1.4 The above potential effects were assessed in respect of both construction and operational phases.

Consideration of Material Amendment

21.1.5 The proposed changes to the scheme are described in Chapter 4: Description of Changes to the Development and Alternatives. The changes comprise changes to the design of the Quay and Reclamation dredging, changes to the construction methodology, and changes to the proposed diversion routes for a Public Right of Way.

21.1.6 Only the changes to the proposed diversion routes for the Public Rights of Way are relevant to the assessment of onshore socio-economic effects. The other proposed changes are considered to be unlikely to result in any material change to effects on the economy including employment effects.

Purpose and Structure of Chapter

21.1.7 This chapter of the Preliminary Environmental Information Report (PEIR) considers the extent to which the proposed changes affect the findings of the ES and assesses the impact of the proposed

¹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000326-21%20-%20Socio-Economic.pdf>

material amendment on the baseline situation.

21.1.8 The proposed changes do not affect the assessment of economic effects of the proposed development. Similarly, the proposed changes have no impact on community service provision. This Chapter therefore is confined to addressing the following:

- effect of the proposal to amend the authorised diversion route for a Public Rights of Way, Footpath 50 in order to avoid creating a new rail crossing on an active line. Footpath 50 forms part of the proposed route of the England Coast Path in this area.

21.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

- 21.2.1 There is no specific legislation or guidance relevant to the assessment of socio-economic effects. The following planning policy changes have occurred since the original ES was prepared in 2012:

National Policy Statement

- 21.2.2 The NPS for Ports was designated on 26 January 2012 and remains unchanged.

National Planning Policy Framework (NPPF)

- 21.2.3 The NPPF was last updated in 2019. The principles of sustainable development and commitment to the three overarching objectives: economic, social and environmental, remain unchanged.

- 21.2.4 In the 2019 update to the NPPF, policy on public rights of way was amended slightly but significantly to include reference to decision making as well as preparation of policies (underlining added): *“Planning policies and decisions should protect and enhance public rights of way and access, including taking opportunities to provide better facilities for users, for example by adding links to existing rights of way networks including National Trails”.*

- 21.2.5 The omission of specific reference to local authorities as decision makers compared with the previous version broadens the scope of the policy to include other decision makers, including the Secretary of State. Despite these changes, the broad thrust of national policy which seeks to protect and enhance the network of recreational routes remains unchanged.

Planning Policy Guidance

- 21.2.6 National planning policy guidance in respect of Sustainable Economic Growth remains unchanged.

Regional Economic Strategy

- 21.2.7 A Strategic Economic Plan was produced for the Greater Lincolnshire region in 2016, covering the period 2016 – 2030. This largely supersedes the Regional Economic Strategy (RECS) which was referred to in the original ES Chapter 21 but was considered to carry little weight given the Secretary of State’s intention to abolish Regional Spatial Strategies and Regional Development Agencies. The Strategic Economic Plan carries weight as being a current strategic document for the local authorities that comprise Greater Lincolnshire, together with the Local Enterprise Partnership (LEP) for the area.

- 21.2.8 The priorities for growth as set out in the Strategic Economic Plan are similar to those of the RECS with specific support for the AMEP project as part of the region’s ambition to be the renewable energy and offshore wind capital of Europe. The effective replacement of the RECS with the Strategic Economic Plan is considered to strengthen economic development support within the region particularly with regard to projects that contribute to the low carbon and ports agenda.

North Lincolnshire Development Plan

- 21.2.9 The saved local plan policies from the North Lincolnshire Local Plan (2003) have been replaced by the Local Development Framework (LDF) for North Lincolnshire Council. The LDF comprises:

- North Lincolnshire Core Strategy 2011;
- North Lincolnshire Housing and Employment Land Allocations DPD;
- Lincolnshire Lakes Area Action Plan; and
- a number of supplementary planning documents (SPDs).

21.2.10 The draft replacement Local Plan which will supersede the LDF has completed its Preferred Options stage and is likely to be a material consideration in decision making. The draft Local Plan reaffirms that economic growth is a priority for North Lincolnshire, as is keeping people safe and well and enabling communities to flourish. There is a commitment to develop a Visitor Economy Plan that will be a live document and promote North Lincolnshire as a destination of choice for visitors.

Scoping Opinion

21.2.11 A Scoping Opinion was issued by the Planning Inspectorate in March 2021 with regard to the proposed material amendment.

Table 21-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within ES
P.34, ID 4.9.1	The Inspectorate agrees that impacts to the footpath as a result of the proposed change to the approved route should be assessed. The assessment should include impacts that result during construction and operation. The assessment should also consider whether additional options for alternative access during prolonged periods of disruption are required should they occur.	The footpath will be diverted before the start of the quay construction work. The assessment of effects of the proposed change to the footpath are considered with regard to access and connectivity within the Traffic & Transport chapter (Chapter 15).	This chapter focuses on the potential impact of the proposed change with regard to recreational users and the tourism economy and concludes that the proposed change would not result in any material effect.	n/a
P.40, ID 4.15.1	The Inspectorate agrees that the proposed changes are unlikely to alter the characteristics of the socio-economic impacts previously reported in the original ES such that new or different significant effects would occur. The Inspectorate agrees that this aspect does not need to be scoped into the updated assessment.	Effects on the economy including employment effects have been scoped out of further assessment.	Scoped out	n/a

Additional Consultation

- 21.2.12 Consultation was undertaken between the developer, AMEP, and Network Rail in August 2020. Network Rail advised that, whilst the licensing authority for a new rail crossing lay with the Office of Rail and Road (ORR), in their view the ORR would be unlikely to approve a new rail crossing other than by means of construction of a new footbridge, and that changing the agreed new route of the footpath to avoid crossing any tracks would be preferable.
- 21.2.13 ORR responded in September 2020 that it is not within their remit to approve any new crossing, but that ORR have no objections to the proposed right of way, including the foot crossing, subject to satisfactory completion of a risk assessment.
- 21.2.14 Correspondence has also taken place between the Applicant and North Lincolnshire Council (Principal Access and Commons Officer) with regard to amending the consented diversion of the public right of way. Email correspondence dated 6 April 2021 confirms that North Lincolnshire Council did not receive any adverse comments in response to the pre-order consultation conducted in 2020 with respect to where the new footpath would cross the 'operational' railway, including no adverse comments from Natural England who are responsible for the establishment of the England Coast Path along this section of footpath.
- 21.2.15 Copies of the above correspondence is provided within Appendix U21-1.

Assessment Methodology

- 21.2.16 The assessment methodology set out within Chapter 21 of the original ES described how the EIA would assess the magnitude of impacts by analysing the scale of changes in comparison with baseline conditions. It also provided a list of receptors that were considered sensitive, as follows:
- economy: site-specific, wider local, wider regional, and wider national employment and GVA;
 - housing;
 - recreation and amenity; and
 - social infrastructure: education and health care.
- 21.2.17 It did not however indicate how the level of sensitivity, nor how the magnitude of impacts, would be determined. This is addressed below in relation to this PEIR. Significance of effects is assessed depending on the magnitude of impact and the sensitivity of the receptor.

Study Area

- 21.2.18 The study areas for the DCO ES were only defined in relation to employment affects; there was no specific consideration of a study area for recreation or the tourism sector of the economy. For the purposes of this assessment it is proposed that the study area for recreational effects is the site area plus a 'local area of influence' of 250m, and the study area for tourism effects is the administrative area of North Lincolnshire.

Sensitivity Criteria

- 21.2.19 There are no published standards that define receptor sensitivity relating to socio-economic

assessment. The sensitivity of each receptor or receptor group for this assessment, based on experience on similar projects, is based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects. In assigning receptor sensitivity, consideration has been given to the following:

- the importance of the receptor e.g. local, regional, national, international;
- the availability of comparable alternatives;
- the ease at which the resource could be replaced;
- the capacity of the resource to recover or adapt to identified impacts over a period of time; and
- the level of usage and nature of users (e.g. sensitive groups e.g. such as people with disabilities).

Magnitude of Change (Impact)

21.2.20 Similarly, there are no published standards that define thresholds of magnitude for socio-economic impacts. In order to aid clear and robust identification of significant effects, specific and targeted criteria for defining the magnitude of impacts have been developed for this assessment based on experience on other similar projects.

21.2.21 The following four levels of magnitude have been adopted using professional judgement: high; medium; low and negligible. These impacts can be beneficial, adverse or neutral.

Table 21-2: Magnitude of Change (Impact)

Receptor Group	High	Medium	Low	Negligible
Tourism and visitor economy	An impact that would dominate over baseline tourism and visitor economy conditions.	An impact that would be expected to result in a moderate change to baseline tourism and visitor economy conditions.	An impact that would be expected to result in a perceptible difference to baseline tourism and visitor economy conditions	An impact that would not be expected to result in a measurable variation from baseline tourism and visitor economy conditions
Tourism and visitor assets	An impact that would be expected to cause a major restriction of access to or availability of tourism and visitor assets in the study area or would result in a major change to existing patterns of use.	An impact that would be expected to have a moderate restriction of access to or availability of tourism and visitor assets in the study area or would result in a moderate change to existing patterns of use.	An impact that would be expected to have a small restriction of access to or availability of tourism and visitor assets in the study area or would result in a small change to existing patterns of use.	An impact that would be unlikely to result in a noticeable difference to tourism and visitor assets in the study area.

Significance of Effect

21.2.22 The level of effect of an impact on socio-economic receptors is initially assessed by combining the magnitude of the impact and the sensitivity of the receptor.

Table 21-3: Significance of Effect

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Effect	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

21.2.23 Effects may be positive (beneficial) or negative (adverse). Where an effect is classified as major, this is considered to represent a ‘significant effect’ in terms of the EIA Regulations. Where an effect is classified as moderate, this may be considered to represent a ‘significant effect’ but should always be subject to professional judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is intermittent.

Mitigation

21.2.24 The assessment takes account of any environmental principles that are incorporated into the design of the proposed Development. These include good practice construction measures with regard to traffic management, control of noise and dust, signage and provisions for maintaining access for walkers. Any additional mitigation measures that would reduce the level of any significant effects would be set out and considered prior to assessing residual effects.

Effects Not Requiring Further Assessment

21.2.25 The DCO ES assessed the effects of the proposed development on the local, regional and national economy with regard to the employment, housing and social infrastructure. The proposed changes to the design of the Quay and dredging, and construction methodology, are not expected to have any impact on these receptors during the operational phase.

21.2.26 Impacts on direct employment, the supply chain and the economic productivity (GVA) resulting from investment in the project during the construction phase were based on broad assumptions in the original ES, as follows: *“The [cost] estimate [is] based on an outline design for the quay and benchmark prices per square metre of industrial buildings. It is therefore not a precise cost of the Project but a reasonable estimate at this stage”*, (ES paragraph 21.6.1). It is considered that the scope of the design changes to the Quay and dredging, and construction methodology, lie within the scope of the original assumptions, and therefore the proposed changes would not result in any material changes to the assessment of such effects.

21.2.27 The only proposed change which is considered to require further assessment is the proposed diversion of Footpath 50, which also is the route of the England Coast Path in this location.

21.3.0 Changes in Baseline Conditions

DCO Baseline

- 21.3.1 Footpath 50 follows the section of coast along the Humber Bank to the south of North Killingholme Haven. The DCO baseline identified that the proposed development would have an impact on the coastal footpath, which was identified as “*a significant local amenity*”. The sensitivity of the receptor was not addressed, but the use of the term “local” suggests that it would have been rated as being of low sensitivity.
- 21.3.2 At the time the DCO baseline was reviewed, the route of the England Coast Path in this area had not been defined, nor was there any other designated long distance trail covering this section of coast.

DCO Future Baseline

- 21.3.3 The DCO consents the permanent stopping up of a length of Footpath 50 along the Humber Bank to the south of North Killingholme Haven to allow construction of the proposed Quay. The consented alternative route would be slightly inland.
- 21.3.4 From the south, the route would turn inland from the coast to follow Rosper Road and Haven Road, then proceed northwards across open land to connect with Footpath 77 for a short distance. Thereafter the route would turn back towards the coast to join Footpath 74.
- 21.3.5 This section of the route between Footpaths 77 and 74 would cross the Killingholme Branch railway.
- 21.3.6 Information provided by North Lincolnshire Council’s access officer dated 24 August 2020 in the informal consultation for the footpath diversion indicates the alternative route would form part of the Mablethorpe to Humber Bridge leg of the England Coastal Path, and that the consented realignment of the England Coast Path would therefore cover a distance of 5.18 km.

Current Baseline

- 21.3.7 Footpath 50 is expected to form part of the Mablethorpe to Humber Bridge section of the England Coast Path. This section is identified by Natural England (3 February 2021) as being at the ‘Develop and Propose’ stage of progress, which is the least developed of all the categories of progress. A date for opening of this section of the England Coast Path is not yet available.

Changes in Baseline

- 21.3.8 As the England Coast Path is still under development, it is not possible to estimate the level of likely use, or the extent to which the Path will draw additional visitors to the area. Based on experience of long distance route development elsewhere, the presence of a National Trail is considered likely to be seen as a tourist attraction in its own right. The sensitivity of the receptor is assessed as high due to its national importance.
- 21.3.9 The England Coast Path is expected to contribute to the tourism economy in North Lincolnshire when in place. Tourism is an important element of the local economy which is promoted in the Regional Economic Plan for Greater Lincolnshire, with the intention of doubling its contribution to the local economy in the Plan period. The sensitivity of the local tourism economy is assessed as medium due to its regional importance.

21.4.0 Assessment of Effects

- 21.4.1 The consented DCO includes the diversion of Footpath 50, with a crossing point of the Killingholme Branch railway.
- 21.4.2 The proposed change to the authorised diversion route is proposed in order to avoid the diversion crossing the Killingholme Branch railway, at a point where the railway is still formally listed as operational, albeit that it has been unused for many years. Network Rail has advised that a crossing of the operational line would require an engineering solution, possibly even a bridge.
- 21.4.3 The authorised crossing point is shown on the Rights of Way Plan Sheet No. 5². The proposed revision is shown on the application plan: Rights of Way Plan Sheet No. 5 Rev 1, and the proposed changes are further shown on drawing AME-036-00004 D Changes to Footpath No.50 Diversion. These drawings are provided in Appendix U21-2 and U21-3 respectively.
- 21.4.4 The proposed change extends the diversion route to the north west for a distance of approximately 220m so that the crossing point of the railway line can be gained across a closed section, using an existing agricultural access. This access is at grade (level) with the railway line and avoids the need for construction of a bridge crossing.
- 21.4.5 The proposed change would impact the route of the Footpath 50 diversion and England Coast Path diversion by increasing the length of the route by a total distance of approximately 440m, along the extension loop to the agricultural crossing.
- 21.4.6 The additional distance would not offer any scenic benefits and would cause a slight delay in re-joining the coastal section. However, the proposed change to the diversion route would add only a negligible additional distance to the route of the England Coast Path for those users who are travelling a long section of the route. The slight additional distance and delay for some users would be offset by the avoidance of a bridge crossing, which would result in a benefit to accessibility for all users, but especially ambulant disabled users, for whom using a bridge would be at best inconvenient or at worst potentially prohibitive.
- 21.4.7 On balance, the overall magnitude of impact is assessed as negligible, and even allowing for the high sensitivity for the England Coast Path the resulting level of effect would be minor and not significant.
- 21.4.8 The proposed use of an existing agricultural crossing would not require any upgrade and therefore construction phase effects would be limited to minor works required to facilitate the new route, such as signage and grass cutting. These works would take place prior to the new footpath being brought into use, and would therefore not have any impact on users of Public Rights of Way network or the England Coast Path.
- 21.4.9 With regard to potential effects on the tourism economy, it is expected that the England Coast Path would, when in place, contribute to the tourism economy. The proposed change to the route would cause negligible inconvenience to users of the Path that is not expected to noticeably affect users experience of the route in North Lincolnshire and would be inconsequential with regard to the impact of the tourism economy. As the magnitude of impact is negligible, and the sensitivity of the

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000558-Rights%20of%20Way%20Plan%20Sht%20No.%205%20of%2012.pdf>

receptor is medium, the level of effect is negligible and no significant.

Additional Construction Phase Effects

- 21.4.10 There are no additional construction phase effects beyond those considered within the original ES for the DCO.

Additional Operational Phase Effects

- 21.4.11 As the operational phase effects are not significant, there is no change to the conclusions of the DCO ES.

Additional Cumulative Effects

- 21.4.12 The original ES addressed cumulative effects arising from other large-scale projects that were known at the time.
- 21.4.13 Chapter 6 of this PEIR provides an updated list of projects that may potentially give rise to cumulative effects when considered in conjunction with the proposed material amendment.
- 21.4.14 As none of these projects are located within the local study area for effects on recreation there are no cumulative effects.
- 21.4.15 The tourism economy of North Lincolnshire is robust having developed alongside heavy industry and port-related development. The additional contribution of the proposed change in combination with other projects would remain negligible in the context of the tourism economy and there would be no significant cumulative effects.

Consideration of DCO

- 21.4.16 As no adverse significant effects have been identified, there is no change to the effects previously identified in the original ES for the DCO.

21.5.0 Requirement for Additional Mitigation

DCO Mitigation

- 21.5.1 The DCO requires (Requirement 9 of Schedule 11) that *“no stage of the authorised development shall commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority”*.

Alternate or Additional Mitigation

- 21.5.2 As no significant adverse effects have been identified, there is no requirement for additional mitigation. The change to the agreed diversion route would be incorporated into the written implementation plan and specification as required under Requirement 9.

21.6.0 Residual Effects

- 21.6.1 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in Chapter 21 of the original ES.

21.7.0 Other Environmental Issues

- 21.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 21.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

- 21.7.3 This section considers only those 'other' environmental issues of relevance to this chapter.

Infrastructure

- 21.7.4 The proposed change does not introduce any new requirement for infrastructure, or result in impact on infrastructure, although the change to the footpath diversion does remove the potential requirement for a new footbridge crossing of an active railway line, resulting in a solution that is potentially more sustainable with regard to maintenance in the long term.

Climate and Carbon Balance

- 21.7.5 In removing the potential requirement for a new footbridge crossing, there is a potential saving in infrastructure requirements that would have a slight beneficial effect on the carbon balance.

Risks of Major Accidents and/or Disasters

- 21.7.6 Both the agreed diversion route and the proposed change would only be installed in accordance with strict health and safety criteria in conjunction with relevant authorities including Network Rail and the local authority. There is therefore no change in this regard.

Summary

- 21.7.7 The proposed change to the footpath diversion would result in slight benefits with regard to the sustainability of the infrastructure required in respect of maintenance and carbon balance.

21.8.0 Summary of Effects

- 21.8.1 The proposed changes to the DCO with regard to socio-economic effects are confined to impacts on recreational routes that form part of the Public Rights of Way network and the proposed route of the England Coast Path, a National Trail. Whilst Public Rights of Way in this area have only local importance, the England Coast Path is of national importance and therefore is considered a receptor of high sensitivity.
- 21.8.2 The presence of the England Coast Path in this location did not form part of the baseline in the original ES. Progress with opening the route around England as a whole, including defining the proposed route in this location, has altered the baseline and this is taken into account in this PEIR.
- 21.8.3 The proposed amendment to the agreed diversion route around the Quay is required to avoid construction of a new bridge crossing of the Killingholme Branch line. The proposed new route would, by means of a 440m diversion, relocate the path onto a closed section of the railway line where there is an existing agricultural crossing. The proposed addition to the length of the route is considered to be offset by the benefit to users of removing the proposed footbridge, especially for users such as ambulant disabled users for whom using a bridge would be at best inconvenient or potentially prohibitive. The proposed changes are therefore not assessed to have a significant effect on users of the England Coast Path.
- 21.8.4 As the proposed changes are negligible in the context of the route of the England Coast Path through North Lincolnshire, they are not assessed to have a significant effect on the tourism economy. It is therefore concluded that the diversion of the England Coast Path is not material to the socio-economic assessment. As other aspects of the socio-economic assessment have already been scoped out, it is concluded that this topic will not be taken forward into the updated ES.

21.9.0 Conclusions

- 21.9.1 The proposed changes include a change to the proposed route of the England Coast Path, a recreational asset of national importance. This assessment takes account of the fact that, since the original ES was prepared, progress on opening the England Coast Path has resulted in a substantial change to the socio-economic baseline.
- 21.9.2 The assessment has taken into account both the change to baseline as well as the proposed amendment to the scheme, and has concluded that there would be no significant effect and the matter will be scoped out of the updated ES.

REFERENCES

- Greater Lincolnshire Local Enterprise Partnership 2016: Strategic Economic Plan 2014-2030.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 22: AVIATION

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

22.1.0 INTRODUCTION	22-1
Development Consent Order Context.....	22-1
Consideration of Material Amendment	22-1
Purpose and Structure of Chapter	22-2
22.2.0 METHODOLOGY.....	22-3
Changes in Legislation, Guidance and Planning Policy.....	22-3
Scoping Opinion	22-4
Additional Consultation.....	22-4
Assessment Methodology	22-4
Effects Not Requiring Further Assessment.....	22-5
22.3.0 CHANGES IN BASELINE CONDITIONS.....	22-6
DCO Baseline	22-6
DCO Future Baseline.....	22-6
Current Baseline	22-6
Changes in Baseline	22-6
22.4.0 ASSESSMENT OF EFFECTS	22-8
Additional Construction Phase Effects	22-8
Additional Operational Phase Effects.....	22-8
Additional Cumulative Effects	22-8
Consideration of DCO	22-8
22.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	22-9
DCO Mitigation.....	22-9
Alternate or Additional Mitigation	22-9
22.6.0 RESIDUAL EFFECTS	22-11
Construction Phase	22-11
Operational Phase	22-11
Consideration of DCO	22-11
22.7.0 OTHER ENVIRONMENTAL ISSUES.....	22-12
Other Environmental Issues of Relevance	22-12
Summary	22-12

22.8.0	SUMMARY OF EFFECTS	22-13
22.9.0	CONCLUSIONS	22-14
	Effects Not Requiring Further Assessment.....	22-14

DOCUMENT REFERENCES

TABLES

Table 22-1: Scoping Opinion re Aviation	22-4
---	------

FIGURES

Figure 22-1: Humberside Airport ILS and Surrounding Tall Structures	22-7
Figure 22-2: Crane Aviation Warning Lighting Examples	22-10

22.1.0 Introduction

Development Consent Order Context

22.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour will comprise a quay of 1,279 m frontage, of which 1,200 m is solid quay and 79 m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

22.1.2 The associated development also consented through the DCO includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

22.1.3 Documents, relevant to this chapter, that were within the Environmental Statement prepared in support of the DCO application ('the original ES') include:

- Environmental Statement Chapter 4: Description of Development¹.
- Environmental Statement Chapter 19: Light².
- Environmental Statement Chapter 22: Aviation³.

Consideration of Material Amendment

22.1.4 The proposed changes relevant to the material amendment of the Proposed Development include the following:

- Quay Changes: including the proposed quay layout so as to reclaim the specialist berth at the southern end of the quay, and to set back the quay line at the northern end of the quay to create a barge berth; additional options to the form of construction of the quay; an amendment to the sequencing of works to enable them to commence at the southern end of the quay and progress northwards; and
- Consideration of cranes located on the quay reaching a maximum potential height of 200 m.

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000309-04%20-%20Description%20of%20Development.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000324-19%20-%20Light.pdf>

³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000327-22%20-%20Aviation.pdf>

Purpose and Structure of Chapter

22.1.5 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed material amendment on aviation.

22.1.6 Consideration is given to:

- changes in legislation, policy and guidance relating to aviation safeguarding with particular focus on obstacle lighting and marking;
- changes in risk associated with operational changes to surrounding aviation operations, with a focus on nearby Humberside Airport (IATA: HUY, ICAO: EGNJ); and
- changes in the potential impact of “tall” structures (especially any structures >150 m) associated with the amended proposal.

22.2.0 Methodology

22.2.1 As part of the DCO application, an aviation risk assessment was undertaken to determine the potential impact of the AMEP on aviation in the area and whether mitigation measures were needed to minimise the impact of the development.

22.2.2 Key elements within the Aviation ES chapter were as follows:

- A focus on the potential impact of “tall” structures on aviation, during both the construction and operational phases of the AMEP; and
- The OLS (Obstacle Limiting Surface) of nearby Humberside Airport (IATA: HUY, ICAO: EGNJ).

Changes in Legislation, Guidance and Planning Policy

Civil Aviation Authority (CAA) CAP 168 Licensing of Aerodromes (Ed.11, January 2019)

22.2.3 The updated version of CAP 168 (Chapter 4) summarises key elements of the marking and lighting of obstacles, aligned with the 2016 update of ICAO Annex 14 (refer below) and EASA (European Union Safety Agency) Easy Access Rules for Aerodromes Regulation (EU) No 139, May 2019.

Civil Aviation Authority (CAA) CAP 738 Safeguarding of Aerodromes (Ed.3, October 2020)

22.2.4 The updated version of CAP 738 provides expanded guidance regarding the identification of so-called “obstacles” in relation to aerodrome operations and associated safeguarding requirements, through marking and/or lighting. CAP 738 contains a new Appendix B devoted to cranes that is aligned with CAP 1096 (refer below).

Civil Aviation Authority (CAA) CAP 1096 Guidance to Crane Users (Ed.2.1, September 2020)

22.2.5 CAP 1096 is a new guidance note specifically addressing potential impacts of cranes on aviation in recognition of their distinctive character. Between 1 October 2020 and 31 May 2021, CAP 1096 can be adopted by volunteers in a current formalised trial of the guidance note. After 31 May 2021, the guidance note will be applicable to all parties covered by its scope. The following is of note:

- Any crane erected without a positive response from the CAA and/or a relevant aerodrome operator may be considered a hazard to air navigation. The guidance note provides a “Notification Form” (CAP 1096, Annex A) for the purpose of identification of potential hazards associated with the operation of a crane and associated mitigation.
- The lighting recommendations contained in this new guidance note are aligned with ICAO Annex 14.

International Civil Aviation Organisation (ICAO) Annex 14 Aerodromes – Volume 1 Aerodrome Design and Operations (Ed.7, July 2016)

22.2.6 ICAO Annex 14, Vol.1, Chapter 6 contains updated guidance in relation to objects that need to be marked and/or lighted. The following is of note:

- In relation to marking and lighting, the recommendations contained in the July 2016 version of ICAO Annex 14 are mostly similar to those of previous versions, with additional guidance in relation to LED lighting, wind turbines and additional details covering intensity and beam spread of standard lighting types.

Scoping Opinion

22.2.7 Table 22-1 details the Scoping Opinion related to Aviation and associated outcomes.

Table 22-1: Scoping Opinion re Aviation

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within PEIR
ID 4.16.1 Table 7	The Scoping Report identifies that the potential impact to aviation would be through tall structures and that as such the amendments to the proposed design will not give rise to any new or different impacts or significant effects relating to aviation.	The potential maximum height of cranes to be located on the quay may exceed 172.57m AOD quoted in paragraphs 22.3.3 and 22.3.4 of the original ES due to developments in the size of OWT's in the period since the DCO application; therefore an assessment of cranes up to 200m high is appropriate. All other amendments to the proposed design will not give rise to any new or different impacts of significant effects to aviation.	The crane height has the potential to alter the mitigation recommendations related to aviation safeguarding lighting, via updated lighting requirements for the quay-side cranes.	Section 22.4.0

Additional Consultation

- 22.2.8 Outside of the EIA scoping process no further scoping has been undertaken.
- 22.2.9 Notwithstanding, further consultation is proposed to be undertaken with the safeguarding team from Humberside Airport to discuss the potential for 200m craneage at the site. This consultation will be included within any forthcoming Updated ES.

Assessment Methodology

Study Area

- 22.2.10 This is as defined within the original ES for the DCO application.
- 22.2.11 Of particular note is the OLS (Obstacle Limiting Surface) for Humberside Airport. Updated

instrument Approach Charts were produced for Humberside Airport in 2018. There was no change in the OLS in these charts, although new obstacles were identified, specifically associated with two wind farms located east of the airport (south and southeast of the AMEP site).

Sensitivity Criteria, Magnitude of Change (Impact) and Significance of Effect

- 22.2.12 These are defined within the original ES for the DCO application.
- 22.2.13 While new versions of the relevant CAA regulations and guidance notes have been published since the original ES, key aspects related to aviation safeguarding of obstacles pertaining to the tall structures at the AMEP site (ie the newly proposed cranes) remain the same, eg the trigger height of 150 m for determination of crane aviation lighting, type of luminaires, etc.

Mitigation Hierarchy

- 22.2.14 While not defined within the original ES for the DCO application a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.

Effects Not Requiring Further Assessment

- 22.2.15 With the exception of the newly proposed quay cranes at the site, no significant changes have been proposed in relation to key building heights and other structure elements (including lighting poles) relevant to the assessment of aviation safeguarding and marking/lighting of obstacles.
- 22.2.16 Accordingly, the material amendment and the associated changes to the proposed design will not give rise to any new or different impacts on aviation safeguarding.

22.3.0 Changes in Baseline Conditions

DCO Baseline

- 22.3.1 Minor changes have occurred to baseline conditions relevant to aviation safeguarding since the DCO application.
- 22.3.2 In particular, several new “tall” structures now located close to the AMEP site are indicated in the updated (2018) Humberside Airport ILS Chart shown in Figure 22-1.

DCO Future Baseline

- 22.3.3 The following developments were considered for the DCO future baseline scenario and are of note for this PEIR:
- Able Logistics Park;
 - North Killingholme Generating Station;
 - Hornsea Offshore Wind Farm (Zone 4) Project 2;
 - Yorkshire Energy Park; and
 - Outstrays to Skeffling Managed Realignment Scheme.

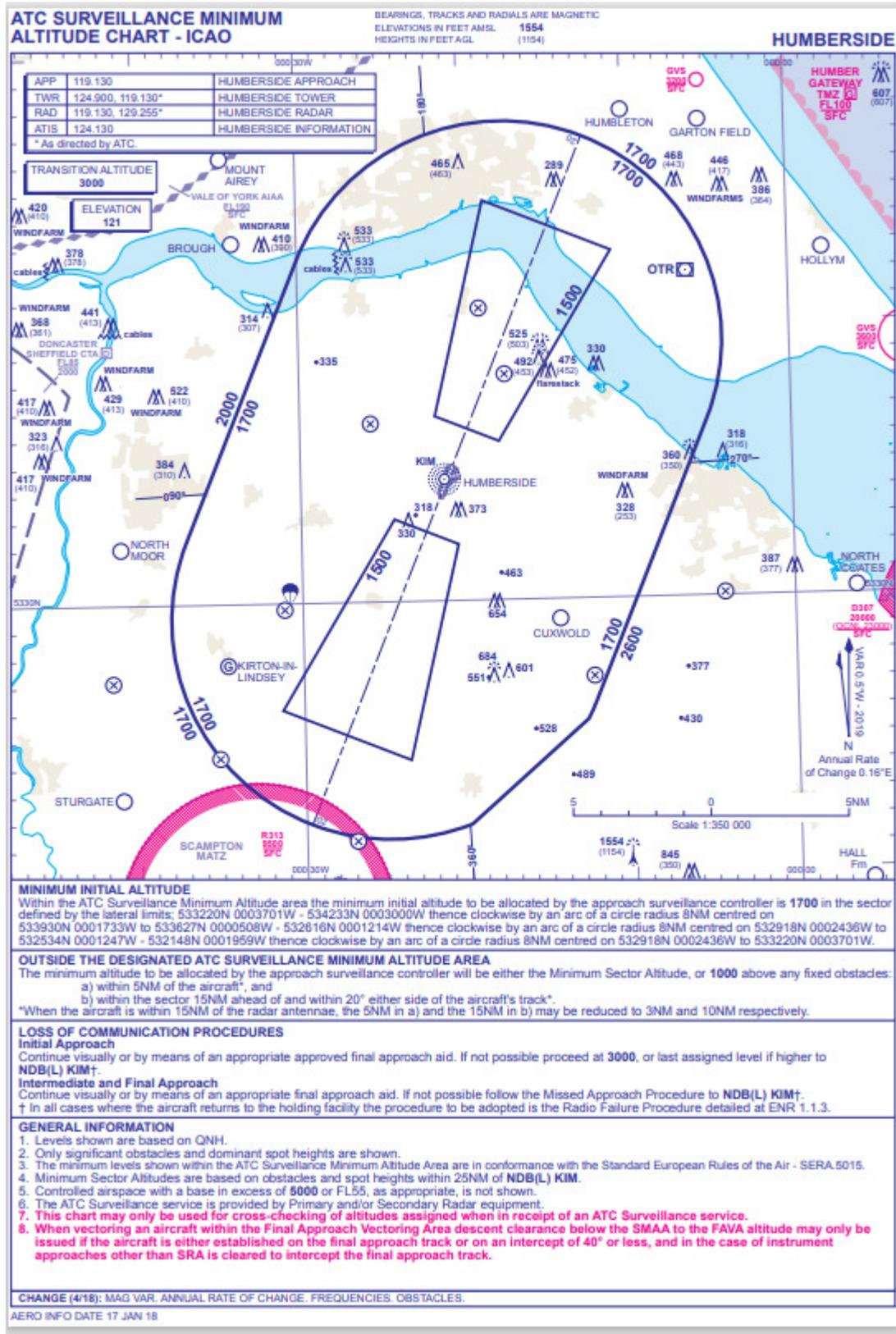
Current Baseline

- 22.3.4 There are no changes to the current baseline as identified within the original ES.

Changes in Baseline

- 22.3.5 Any more recent committed developments, since the original ES, in the vicinity of the AEMP site and Humberside Airport is discussed in Chapter 6: Description of Committed Developments. None of the committed developments identified within Chapter 6 alter the findings of the previous DCO, nor the present assessment of material amendment in relation to aviation safeguarding.

Figure 22-1: Humberside Airport ILS and Surrounding Tall Structures



22.4.0 Assessment of Effects

Additional Construction Phase Effects

- 22.4.1 Construction phase impacts associated with aviation safeguarding in relation to the marking and/or lighting of obstacles will be unchanged from those considered in the DCO application, with the exception of the construction of the newly proposed quay-side cranes, which have the potential to rise to 200 m in height.

Additional Operational Phase Effects

- 22.4.2 As per the above, operational phase impacts associated with aviation safeguarding in relation to the marking and/or lighting of obstacles will be unchanged from those considered in the DCO application, with the exception of the operation of the newly proposed quay-side cranes, which have the potential to rise to 200 m in height.

Additional Cumulative Effects

- 22.4.3 There will be no additional cumulative effects associated with the proposed material amendment to the AMEP proposal.

Consideration of DCO

- 22.4.4 Key elements of the DCO assessment of aviation safeguarding were as follows:
- The AMEP site lies entirely within and only within the so-called “Outer Horizontal Surface” (OHS) of the Humberside Airport OLS (Obstacle Limiting Surface). As per CAP 168 and CAP 738 (pre-DCO and most recent versions), new objects should not extend above the OHS.
 - The height of the OHS is 172.57m above ordnance datum (AOD). The maximum elevation of the AMEP site is 6.3 m AOD.
 - In the DCO assessment, the maximum height AMEP objects were completed turbines approximately 165 m in height. It was also assumed that the cranes used to erect such turbines would be of no greater height than the turbines themselves.
 - Accordingly, the DCO assessment concluded that no AMEP objects would penetrate Humberside Airport’s OHS.
 - In the context of en-route objects, any such objects which extend to a height of 150 m or more above ground elevation are generally regarded as obstacles and should be lit as per the relevant CAA regulations. They can be excluded from such requirements following an aviation hazard risk assessment and concurrence by relevant stakeholders, in this case, Humberside Airport.
- 22.4.5 The potential for 200 m maximum potential height quay-side cranes alter the above conclusions.

22.5.0 Requirement for Additional Mitigation

DCO Mitigation

22.5.1 Key mitigation proposed as part of the DCO was as follows:

- The main impacts are potential for increased bird strike hazard and increased hazard to aviation due to tall structures.
- It is judged unlikely there will be an increased bird strike hazard since birds are likely to be displaced further away from the runway extended centreline. Therefore, mitigation measures for bird strike hazard are unlikely to be required.
- The hazard to aviation presented by tall structures will be mitigated by provision of aviation obstacle warning lighting.
- For structures on the AMEP site less than 45 m above ground level, aviation obstacle warning lighting is not specifically required.
- For structures on the AMEP site between 45-150 m above ground level, deemed to present a hazard to aviation, medium intensity red steady obstacle warning lighting should be provided.
- The DCO noted that there is a pylon of height just under 80 m above mean sea level located close to Humberside Airport's main runway extended centreline which is not lit. On this basis, it was judged unlikely that structures <80 m AMSL would be deemed hazards to aviation. Accordingly, it was concluded that AMEP structures up to 55 m above ground level would not require aviation warning lights.
- For structures 150 m or more above ground level, medium intensity (2000 candelas) steady red obstacle lights should be provided, positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 m.

Alternate or Additional Mitigation

22.5.2 Following this review, it is concluded that further mitigation will be required, over and above that committed to as part of the DCO application, in relation to the potential for 200 m maximum height quay-side cranes.

22.5.3 Since the time of the DCO application, specific guidance in relation to cranes is available:

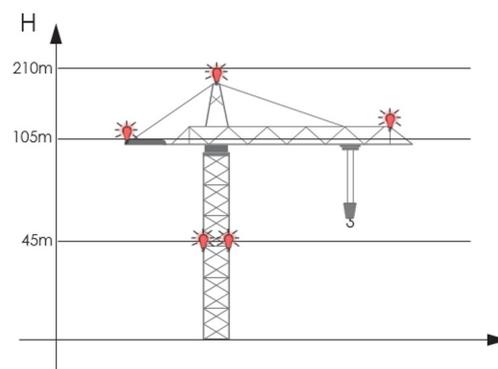
- Civil Aviation Authority (CAA) CAP 738 Safeguarding of Aerodromes (Ed.3, October 2020) contains a new Appendix B devoted to cranes that is aligned with the new CAP 1096 guidance note.
- Civil Aviation Authority (CAA) CAP 1096 Guidance to Crane Users (Ed.2.1, September 2020) is the new guidance note specifically addressing potential impacts of cranes on aviation in recognition of their distinctive character. As previously noted, between 1 October 2020 and 31 May 2021, CAP 1096 can be adopted by volunteers in a current formalised trial of the guidance note. After 31 May 2021, the guidance note will be applicable to all parties covered

by its scope. The following is of note:

22.5.4 With reference to CAP 738 and CAP 1096, the following mitigation is indicated for the amended proposal quay-side cranes:

- The cranes should be provided with Medium-Intensity Steady-Red Lights (minimum luminous intensity of 2,000 Candelas). The lighting configuration should make the cranes visible at night-time from a full range of angles.
- Night-time is defined as half-hour after sunset and half-hour before sunrise.
- Examples of crane lighting are shown in Figure 22-2. Xenon-based lamps are typically used (thanks to their brightness), although LED lighting is increasingly being adopted because of its associated reduced power consumption and longer operating life.
- For a crane of height 200 m, four levels of lighting are recommended: medium intensity (Type B) at the top, low or medium intensity (Type B) at the first intermediate level, medium intensity (Type B) at the second intermediate level and low or medium (Type B) intensity again at the lowest intermediate level.
- Consultation should be undertaken with relevant stakeholders (namely CAA and Humberside Airport) as to whether the newly proposed cranes should also be supplied with daytime (white) lighting (medium intensity Type A, high intensity Types A/B).
- This should follow the submission of the new CAP 1096 Annex A “Notification Form” to CAA to initiate a formal hazard assessment and stakeholder consultation.

Figure 22-2: Crane Aviation Warning Lighting Examples



22.6.0 Residual Effects

Construction Phase

22.6.1 Following consideration of both the DCO mitigation and additional mitigation, the residual effects relating to aviation safeguarding during the construction phase are identified to be:

- With the provision of the aviation warning light mitigation measures made in this report the hazard to aviation presented by construction of the newly proposed cranes will be mitigated to a level in line with those presented at other airports and aerodromes in the UK. Therefore, the residual impact is judged to be low.

Operational Phase

22.6.2 Following consideration of both the DCO mitigation and additional mitigation, the residual effects relating to aviation safeguarding during the operational phase are identified to be:

- As per the DCO, since birds will likely be displaced to locations further away from Humberside Airport, it is judged that the bird strike hazard will not be increased.
- With the provision of the aviation warning light mitigation measures made in this report, the hazard to aviation presented by the newly proposed cranes will be mitigated to a level in line with those presented at other airports and aerodromes in the UK. Therefore, the residual impact is judged to be low.

Consideration of DCO

22.6.3 Following this review and the additional mitigation recommendations contained herein, it is concluded that there are no changes to the residual effects previously identified as part of the DCO.

22.7.0 Other Environmental Issues

- 22.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.

Other Environmental Issues of Relevance

- 22.7.2 There are no other environmental issues of relevance when considering aviation safeguarding.

Summary

- 22.7.3 In relation to aviation safeguarding, there are no considerations nor environmental effects identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017.

22.8.0 Summary of Effects

- 22.8.1 While there have been significant recent updates to the regulations and guidance notes related to aviation safeguarding and the lighting of structures deemed to be “obstacles” by the regulations, none of these has involved a change to the parameters affecting the potential impacts of such obstacles, eg calculation of the Obstacle Limiting Surface (OLS) at an aerodrome, relevant to the previous DCO application.
- 22.8.2 Similarly, no new developments have taken place at Humberside Airport operations with respect to the airport’s OLS, eg no new runways, etc.
- 22.8.3 The key material change to the amended proposal is the potential for quay-side cranes at the AMEP site to reach a maximum potential height above ground of 200 m.
- 22.8.4 In the original ES, the previously assumed maximum crane height was 165 m.
- 22.8.5 The effect of the above amendment is that Humberside Airport’s OLS (specifically its Outer Horizontal Surface) may be penetrated by the taller cranes.
- 22.8.6 In this instance, additional mitigation recommendations have been triggered and further consultation with relevant stakeholders (CAA and Humberside Airport) is now warranted.

22.9.0 Conclusions

- 22.9.1 A review has been undertaken of aviation safeguarding requirements in relation to the amended AMEP proposal with respect to lighting requirements.

Study Area

- 22.9.2 This has not changed from that defined within the original ES for the DCO application, including the location of the OLS (Obstacle Limiting Surface) for Humberside Airport.

Sensitivity Criteria, Magnitude of Change (Impact) and Significance of Effect

- 22.9.3 These have not changed from those defined within the original ES for the DCO application.

Mitigation Hierarchy

- 22.9.4 While not defined within the original ES for the DCO application a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.

- 22.9.5 In the present instance, should the decision to deploy the newly proposed taller cranes be confirmed during detailed design, the recommended notification, consultation and lighting mitigation recommendations should be implemented.

Effects Not Requiring Further Assessment

- 22.9.6 With the exception of the newly proposed quay cranes at the site, no significant changes have been proposed in relation to key building heights and other structure elements (including lighting poles) relevant to the assessment of aviation safeguarding and marking/lighting of obstacles.

- 22.9.7 Accordingly, the material amendment and the associated changes to the proposed design will not therefore give rise to any new or different impacts on aviation safeguarding.

REFERENCES

- Civil Aviation Authority (CAA) CAP 168 Licensing of Aerodromes (Ed.11, January 2019)
- Civil Aviation Authority (CAA) CAP 738 Safeguarding of Aerodromes (Ed.3, October 2020)
- Civil Aviation Authority (CAA) CAP 1096 Guidance to Crane Users (Ed.2.1, September 2020)
- EASA (European Union Safety Agency) Easy Access Rules for Aerodromes Regulation (EU) No 139, May 2019.
- International Civil Aviation Organisation (ICAO) Annex 14 Aerodromes – Volume 1 Aerodrome Design and Operations (Ed.7, July 2016)

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 23: WASTE (TERRESTRIAL)

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

23.1.0 INTRODUCTION	23-1
Development Consent Order Context.....	23-1
Consideration of Material Amendment	23-1
Purpose and Structure of Chapter	23-1
23.2.0 METHODOLOGY.....	23-2
Changes in Legislation, Guidance and Planning Policy.....	23-2
Scoping Opinion	23-3
Additional Consultation.....	23-3
Assessment Methodology	23-3
Effects Not Requiring Further Assessment.....	23-3
23.3.0 CHANGES IN BASELINE CONDITIONS.....	23-4
DCO Baseline	23-4
DCO Future Baseline.....	23-4
Current Baseline	23-4
Changes in Baseline	23-4
23.4.0 ASSESSMENT OF EFFECTS	23-5
Additional Construction Phase Effects	23-5
Additional Operational Phase Effects.....	23-5
Additional Cumulative Effects	23-5
Consideration of DCO	23-6
23.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	23-7
DCO Mitigation.....	23-7
Alternate or Additional Mitigation	23-8
23.6.0 RESIDUAL EFFECTS	23-9
Construction Phase	23-9
Operational Phase	23-9
Consideration of DCO	23-9
23.7.0 OTHER ENVIRONMENTAL ISSUES.....	23-10
Other Environmental Issues of Relevance	23-10

23.8.0	SUMMARY OF EFFECTS	23-11
23.9.0	CONCLUSIONS	23-12

23.1.0 Introduction

Development Consent Order Context

- 23.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.
- 23.1.2 The associated development for the above proposals includes:
- Dredging and land reclamation;
 - The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
 - Works to Rosper Road, the A160 and the A180; and
 - Surface water disposal arrangements.
- 23.1.3 To support the DCO application a Waste chapter was included within the Environmental Statement. The Waste chapter considered wastes resulting from the construction and operation of the AMEP. The previous assessment considered wastes from the aquatic and terrestrial environment.

Consideration of Material Amendment

- 23.1.4 This chapter focuses on the terrestrial wastes arising (aquatic [dredging] wastes are considered elsewhere within the PEIR), reviewing the Waste chapter from the original Environmental Statement for the DCO ('the original ES') and considers whether any components of the original Waste assessment require updating due to the proposed material amendment.

Purpose and Structure of Chapter

- 23.1.5 This chapter of the Preliminary Environmental Information Report (PEIR) considers the impact of the proposed material amendment on terrestrial wastes arising from construction and operation.

23.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

- 23.2.1 The following section summarises the changes in principal waste legislation, guidance and planning policy associated with waste management.

The Site Waste Management Plans Regulations 2008 SI 314

- 23.2.2 The Regulations were repealed on 1 December 2013 and therefore businesses in England are no longer legally obliged to produce a SWMP. However, SWMP's are sometimes required as a condition of planning permission by the planning authority and are still considered to be good practice as they aim to improve resource efficiency within the construction industry in order to reduce the amount of waste produced and recover as much value as possible from the waste that cannot be prevented.

The Hazardous Waste (England and Wales) (Amendment) Regulations 2016

- 23.2.3 The Hazardous Waste (England and Wales) (Amendment) Regulations 2016 came into force on 1st April 2016 and amend The Hazardous Waste (England and Wales) Regulations 2005. The 2016 regulations revoke Part 5 of the 2005 regulations, which means that (in England) if premises produce or hold hazardous waste then the owners or occupiers will no longer have to register the premises.

The Environmental Permitting (England and Wales) Regulations 2016

- 23.2.4 Consolidation of numerous amendments made to the 2010 Regulations to provide one clear set of applicable legislation.

The Waste (Circular Economy) (Amendment) Regulations 2020

- 23.2.5 The Regulations amend a number of primary and secondary legislation on waste, to cross-refer to the updated EU legislation and its requirements. The Regulations require 55% reuse/recycling by 2025, 60% in 2030, and 65% in 2035, as well as a reduction in landfill to 10% of residual waste by 2035.

Resources and Waste Strategy for England, 2018 ('Our Waste, our Resources: A Strategy For England')

- 23.2.6 The strategy sets out to preserve resources by minimising waste, promoting resource efficiency and moving towards a circular economy. It also seeks to minimise the damage caused to the natural environment by reducing and managing waste safely and carefully, and by tackling waste crime. The strategy is largely aligned with the Circular Economy package and the longer-term policy direction contained in the Defra 25 Year Environment Plan. A Waste Management Plan for England 2021 has been published to provide an overview of waste management in England and bring current policies together in one document.

The Local Development Framework (LDF) for North Lincolnshire Council and The Core Strategy

- 23.2.7 The Core Strategy, which was adopted in June 2011, sets out the long term vision for North Lincolnshire and provides a blueprint for managing growth and development in the area up to 2026.

Chapter 12 of The Core Strategy considers Sustainable Waste Management. In addition to requirements for the location of new waste facilities (which is not of relevance to AMEP), Policy CS20 includes promotion of sustainable waste management by a requirement of Site Waste Management Plans for future major developments and requiring integration of facilities for waste minimisation, re-use, recycling and composting, in association with the planning, construction and occupation of new development.

Scoping Opinion

23.2.8 The Scoping Opinion did not raise any matters associated with terrestrial waste arisings.

Additional Consultation

23.2.9 No additional consultation has been undertaken outside of the standard EIA Scoping exercise.

Assessment Methodology

23.2.10 As defined within the original ES for the DCO (section 23.3).

Study Area

23.2.11 As defined within the original ES for the DCO (section 23.3).

Sensitivity Criteria

23.2.12 As defined within the original ES for the DCO (section 23.3).

Magnitude of Change (Impact)

23.2.13 As defined within the original ES for the DCO (section 23.6).

Significance of Effect

23.2.14 As defined within the original ES for the DCO. (section 23.6)

Mitigation Hierarchy

23.2.15 As defined within the original ES for the DCO (section 23.7).

Effects Not Requiring Further Assessment

23.2.16 As defined within the original ES for the DCO (section 23.8).

23.3.0 Changes in Baseline Conditions

DCO Baseline

- 23.3.1 As established for the original Waste chapter of the Environmental Statement for the DCO, the *“site is currently partly in agricultural use (producing and receiving no waste), and partly in use as a vehicle import facility producing relatively small volumes of waste from offices and vehicle finishing.”*

DCO Future Baseline

- 23.3.2 As defined within the original ES for the DCO (section 23.6 Operational Phase).

Current Baseline

- 23.3.3 Changes to baseline have occurred as the Applicant has developed the site, both in accordance with planning permissions extant at the time of the application and in accordance with further planning consents obtained under the Town and Country Planning Act 1990 (TCPA). Please refer to Chapter 1: Introduction of this PEIR for details of development (including land raising activities) which have taken place at the AMEP site outside of the remit of the DCO.

Changes in Baseline

- 23.3.4 Refer above and Chapter 1: Introduction of this PEIR for details of development (including land raising activities) which have taken place at the AMEP site outside of the remit of the DCO. Changes to development (with regards to land use for car storage) are likely to generate only small volumes of waste, and therefore no changes or only limited changes to baseline for terrestrial waste arisings has resulted.

23.4.0 Assessment of Effects

- 23.4.1 SLR has reviewed the assessment of effects from the original ES waste chapter. Although no detailed analysis has been completed by SLR itself to validate the waste quantities forecasted to be generated, the original assessment appears to provide a comprehensive assessment of effects for both construction and operational phases.

Additional Construction Phase Effects

- 23.4.2 The proposed material amendment would potentially give rise to changes in construction phase waste effects from two aspects: re-routing of the footpath FP50 and changes to the quay realignment.
- 23.4.3 It is understood that the existing DCO footpath route is 4.29km metres, the consented diversion (Schedule 5 of the DCO) is 5.18km and that the material amendment application footpath route would add a further 440 metres resulting in a total footpath length of 5.62km. The diverted length of footpath lies within agricultural fields and will not require any construction works. It should be noted that the proposed extended footpath FP50 would avoid the construction of a Network Rail crossing point (and thus avoid wastes which would be generated from such crossing point construction activity). The net effect on construction waste from the re-routing of the footpath will therefore deliver a reduction in waste arisings.
- 23.4.4 As identified in Chapter 4: Description of the Changes to the Development, the proposed changes to the quay line would result in a net reduction in reclaimed land from the estuary. The marginal net reduction in reclaimed land from the estuary would translate to a marginal net reduction in construction material requirements, which in turn would result in a marginal net reduction in wastes arising from the construction activity.

Additional Operational Phase Effects

- 23.4.5 No changes to the operational phase effects detailed in the original ES are anticipated due to the proposed material amendment.

Additional Cumulative Effects

- 23.4.6 The original ES stated (bold included for emphasis) *“23.9.2 The principal development identified for consideration with respect to waste arisings is the H&M Estates Business Park proposal (DC/1258/06/IMM) at North Moss Lane. This would entail the greenfield site development of around 20 hectares and include buildings B1 (Light Industrial/Research), B2 (General Industrial) and B8 (Warehousing). The potential waste arisings from this development would be similar in nature to those from AMEP and therefore compete for capacity. **However, this development would also be subject to the requirements of the waste hierarchy to minimise impacts and maximise recycling potential. The local recycling infrastructure is adequate to meet these needs and could readily expand to meet further opportunities.**”*
- 23.4.7 The waste management sector is a resilient and evolving sector which responds to demands for increased capacity from new development. Waste management infrastructure is often operating at below maximum potential and therefore has the ability to operate at higher tonnage throughputs in most cases. As such, the minor changes (positive or negative) to potential waste arisings and composition from construction and operation at AMEP associated with the proposed material

amendment is likely to have minimal impact on the local waste management infrastructure.

Consideration of DCO

- 23.4.8 The proposed material amendment would potentially result in a reduction in construction wastes arising and no change to operational waste arising compared to that identified in the original ES. SLR therefore considers that there is minimal change to the waste management assessment of effects contained in the original ES.

23.5.0 Requirement for Additional Mitigation

- 23.5.1 As waste quantities from AMEP would not vary significantly from those assessed in the original ES, SLR does not consider any additional mitigation is required beyond that outlined within the original ES.

DCO Mitigation

- 23.5.2 The mitigation measures proposed in the original ES for the construction phase are:

“23.7.1 The overall goal during the construction phase, consistent with the waste hierarchy, is to reduce the amount of waste produced to a minimum by the appropriate specification of materials brought to site, the utilisation of site won materials wherever possible and the separation of materials to facilitate recycling. This will be set out in detail, along with targets for reuse, recycling and disposal in the SWMP and in accordance with the CL:AIRE Code of Practice. The SWMP will be a working document and will be updated at regular intervals throughout the construction phase. It will identify and prioritise options for minimisation, reuse and recycling of construction wastes where practicable, and allow any unforeseen changes to the construction of the AMEP to be taken into account.

23.7.2 Spoil and hardcore generated on site will be stockpiled for use in the construction works, thereby reducing the need for imported aggregate. As such, these materials will not be classed as wastes, although an exemption from Environmental Permitting may be required if these materials require processing prior to use. Stockpiles may impact the environment through wind-blown dust and rain run-off, and therefore will be managed to avoid consequent nuisance and environmental impact.

23.7.3 Construction wastes and materials unsuitable for on-site use will require disposal as controlled waste in line with the Duty of Care. This includes general construction wastes, waste wood metals, waste electrical and electronic equipment wastes (WEEE), paints and aerosols, oils and oily rags. It is anticipated that these arisings will average 120 tonnes per month. Assuming an average payload of 4-5 tonnes, this implies between one and two additional HGV movements per day. This additional traffic will not add materially to the traffic impacts of the development.

23.7.4 All construction waste will be segregated on site before being removed. Segregation will include skips for at least general construction wastes, wood, metal, plastic, paper/cardboard and glass to facilitate their recycling. Contracts will also be placed for the separate collection using specialist containers of hazardous wastes such as oils, fluorescent tubes, WEEE, aerosols and paint cans, which also may be recycled or sent on for specialist treatment. All skips and containers will be labelled with the range of materials suitable for each and placed on designated hard standings, to be identified in the SWMP, designed to minimise potential impacts of wind, rain and run-off.”

- 23.5.3 The mitigation measures proposed in the original ES for the operation phase are:

“23.7.5 The operation of the site will be as a manufacturing unit with ancillary support facilities and offices accommodation. Wastes will be managed in accordance with the waste hierarchy through the adoption of best practice to ensure wastes are minimised through the appropriate specification of goods and services, and adherence to segregation regimes at all levels of operation to maximise the recycling potential of wastes arising. Preference will be given to the disposal of residual waste through incineration with energy recovery, with landfill being the disposal option of last resort.

23.7.6 The achievement of best practice will depend to a significant extent on individual behaviour and adherence to the management system(s) in place. These will be designed in accordance with the international standard ISO 14001 (Environmental Management Systems) and supported through the ISO 14001 audit programme, and include as a minimum:

- *identifying waste, highlighting potential for waste minimisation, reuse and recycling at the design stage;*
- *establishing and communicating targets for material consumption;*
- *providing clearly labelled, appropriate containers for segregated collection of materials (including in office accommodation);*
- *providing appropriate collection and storage facilities for segregated materials and wastes;*
- *ensuring the appropriate labelling of wastes to facilitate recycling and appropriate disposal;*
- *audit of chosen contractors to ensure the appropriateness of downstream management facilities;*
- *regular review and updating of the management system; and*
- *staff training in the above.*

23.7.7 Transportation impacts associated with the management of wastes have been shown to be not significant. However, transport requirements will be minimised by ensuring that skips and containers are optimally sized, that only complete loads are transported from the site and that waste is covered to reduce potential for wind blow dust and debris. On-site compaction and pre-treatment of specific wastes will be considered (eg for cardboard and plastic sheeting) where this can further optimise payloads or reduce potential impacts in downstream handling.”

Alternate or Additional Mitigation

- 23.5.4 There is no alternate or additional mitigation needed as a consequence of the proposed material amendment beyond that contained in the original ES.

23.6.0 Residual Effects

- 23.6.1 The original ES (section 23.8) did not identify any effects which remained significant following the application of the mitigation measures (i.e., strict adherence to the waste hierarchy and the adoption of best practice). The proposed material amendment would not alter the outcome of the original ES with regards to residual effects.

Construction Phase

- 23.6.2 As above, no effects considered significant in the original ES or as a result of the proposed material amendment.

Operational Phase

- 23.6.3 As above, no effects considered significant in the original ES or as a result of the proposed material amendment.

Consideration of DCO

- 23.6.4 No changes are identified to the residual effects previously identified within the original ES as part of the DCO.

23.7.0 Other Environmental Issues

- 23.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 23.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

- 23.7.3 There are no such considerations or environmental effects identified during this review of terrestrial waste.

23.8.0 Summary of Effects

- 23.8.1 The proposed material amendment have been reviewed for their potential impacts on wastes arising during the construction and operation phases, with consideration of how the proposed material amendment compare to the waste effects identified in the original ES.
- 23.8.2 Qualitative consideration indicates that the proposed material amendment would, on balance, likely reduce the quantum of construction wastes arising from the project (associated with the footpath re-routing and quay realignment). No changes to the operational wastes detailed in the original ES are anticipated due to the proposed material amendment.
- 23.8.3 Any changes to the construction waste arisings are likely to be minimal in scale, and therefore the original ES is deemed to suitably assess the effects of waste.
- 23.8.4 The original ES provides mitigation measures (for both the construction and operation phases) which would remain in place for the proposed material amendment. This would ensure the residual impacts of terrestrial waste from the development are of no significance.

23.9.0 Conclusions

- 23.9.1 On the basis of the above review, SLR considers that the proposed material amendment would result in minimal change to the waste arisings estimated and the effects considered in the waste chapter of the original ES for the DCO.
- 23.9.2 As such SLR concludes that the extant waste ES remains adequate in its review of the effects of terrestrial wastes. **As such, this topic will not be considered further and will be ‘scoped out’ of the updated ES.**

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 24: HEALTH

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

24.1.0 INTRODUCTION	24-1
Development Consent Order Context.....	24-1
Consideration of Material Amendment	24-1
Purpose and Structure of Chapter	24-2
24.2.0 METHODOLOGY	24-3
Changes in Legislation, Guidance and Planning Policy.....	24-3
Scoping Opinion	24-4
Additional Consultation.....	24-4
Assessment Methodology	24-4
Effects Not Requiring Further Assessment.....	24-5
24.3.0 CHANGES IN BASELINE CONDITIONS.....	24-9
24.4.0 ASSESSMENT OF EFFECTS	24-10
Additional Cumulative Effects	24-10
Consideration of DCO	24-10
24.5.0 REQUIREMENT FOR ADDITIONAL MITIGATION	24-11
DCO Mitigation.....	24-11
Alternate or Additional Mitigation.....	24-11
24.6.0 RESIDUAL EFFECTS	24-12
24.7.0 OTHER ENVIRONMENTAL ISSUES.....	24-13
Other Environmental Issues of Relevance	24-13
Summary	24-13
24.8.0 SUMMARY OF EFFECTS	24-14
24.9.0 CONCLUSIONS	24-15

TABLES

Table 24-1: Review of health effects affected by the proposed material changes.....	24-5
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24.1.0 Introduction

Development Consent Order Context

24.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

24.1.2 The associated development for the above proposals includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

24.1.3 The original DCO application was accompanied by an assessment of health effects (chapter 24 of the Environmental Statement (ES)) that considered the following potential effects on a number of 'determinants of health', in particular:

- employment;
- income;
- access to services;
- transport;
- housing;
- education;
- crime and fear of crime;
- social capital; and
- the physical environment.

24.1.4 The above potential effects were assessed in respect of both construction and operational phases.

Consideration of Material Amendment

24.1.5 The proposed changes to the scheme are described in Chapter 4: Description of Changes to the Development. The changes comprise changes to the design of the Quay and Reclamation dredging, changes to the construction methodology, and changes to the proposed diversion routes for Public Rights of Way.

24.1.6 The proposed changes will not give rise to any material changes to construction methodology as far as land-based operations are concerned.

Purpose and Structure of Chapter

24.1.7 This chapter of the Preliminary Environmental Information Report (PEIR) considers the extent to which the proposed changes affect the findings of the ES and assesses the impact of the proposed material amendment on the baseline situation.

24.1.8 In considering whether the proposed changes would result in any significant changes to effects on health, account has been taken of the methodology used in the original assessment which considered the pathways by which AMEP might affect the determinants of health and by how much. Evidence of how health can be impacted by different determinants and pathways was described under the following headings:

- socio-economics;
- landscape and visual;
- transport;
- noise; and
- air quality.

24.1.9 A similar approach has been adopted in this Chapter.

24.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

EIA Regulations 2017

- 24.2.1 Since the original ES was prepared in 2011/12, the range of topics that require assessment as part of EIA has been extended through the EIA Regulations 2017. Regulation 4 (2) (a) requires that the EIA must identify, describe, and assess in an appropriate manner a range of factors including “*population and human health*”.
- 24.2.2 This PEIR has taken account of this additional requirement and has considered and (where relevant) assessed effects on human health in relation to each technical chapter. This Chapter draws on the findings of these assessments but focuses primarily on identifying any significant changes to the assessment of health that was undertaken in the original ES.

National Planning Policy Framework (NPPF)

- 24.2.3 The NPPF was most recently updated in 2019. Although there are some minor drafting changes to the NPPF compared with the 2012 version with regard to how planning policy and decisions should address health issues, the principles of promoting health and well-being remain unchanged.

Planning Policy Guidance

- 24.2.4 National planning policy guidance in respect of Health and Wellbeing was first issued in 2014 and revised in 2019. The guidance addresses how planning and health need to be considered together in two ways: in terms of creating environments that support and encourage healthy lifestyles, and in terms of identifying and securing health care facilities.
- 24.2.5 The creation of a healthy environment is considered to be one that supports and promotes healthy behaviours and environments and a reduction in health inequalities for people of all ages. Issues of health inequality were addressed in detail in the original ES.

Regional Economic Plan

- 24.2.6 A Regional Economic Plan (REP) was produced for the Greater Lincolnshire region in 2016, covering the period 2016 – 2030. Health and well-being are key issues for the REP, which addresses these issues in the context of economic growth and development. It recognises that deprivation is not automatically addressed through economic growth, and that when planning for growth consideration is given to all sectors of the community.

North Lincolnshire Development Plan

- 24.2.7 The saved local plan policies from the North Lincolnshire Local Plan (2003) have been replaced by the Local Development Framework (LDF) for North Lincolnshire Council. The LDF comprises:
- North Lincolnshire Core Strategy 2011;

- North Lincolnshire Housing and Employment Land Allocations DPD;
- Lincolnshire Lakes Area Action Plan; and
- a number of supplementary planning documents (SPDs), including '*Planning for Health and Wellbeing*' (November 2016).

24.2.8 The draft replacement Local Plan which will supersede the LDF has completed its Preferred Options stage and is likely to be a material consideration in decision making. The draft Local Plan reaffirms that economic growth is a priority for North Lincolnshire, as is keeping people safe and well and enabling communities to flourish.

Scoping Opinion

24.2.9 The Scoping Report explained that the amendments to the proposed design will not give rise to any new or different health impacts and so can be scoped out of the updated ES.

24.2.10 The Inspectorate agreed that the proposed changes are unlikely to alter the characteristics of these impacts such that new or different significant effects would occur, and therefore that Health does not need to be scoped into the updated ES. However, for the purposes of a comprehensive consultation exercise the topic is included in the PEIR.

Additional Consultation

24.2.11 No additional consultation has been undertaken specifically on health issues.

Assessment Methodology

24.2.12 The assessment methodology set out within Chapter 24 of the original ES described how the EIA would assess impacts on health by different determinants and pathways under the following headings:

- socio-economics;
- landscape and visual;
- transport;
- noise; and
- air quality.

For each heading, potential impacts and magnitude of change relative to baseline conditions were identified. Mitigation was accounted for prior to assessing whether any residual effects were significant.

Study Area

24.2.13 The study areas for the original ES were defined in relation to each discipline assessed. For the baseline, a study area comprising North Lincolnshire and North East Lincolnshire was used.

Mitigation

24.2.14 The assessment in the Original ES and this PEIR takes account of any environmental principles that are incorporated into the design of the proposed development, such as good practice construction measures. Any additional mitigation measures that would reduce the level of any significant effects would be set out and considered prior to assessing residual effects.

Effects Not Requiring Further Assessment

24.2.15 The original ES assessed the effects of the proposed development under the topic headings set out in Table 24-1. For each heading, effects identified in the original ES are reviewed and a determination provided as to which effects would be affected by the proposed material changes.

Table 24-1: Review of health effects affected by the proposed material changes

Original ES					Any change due to proposed material changes?
Topic	Phase	Impact	Health Effect?	Issues and Mitigation / Enhancement	
Socio-economics	Construction	Employment creation through direct employment and provision of goods and services.	Beneficial	Local employment and procurement should be encouraged.	No
	Operational	Employment creation	Beneficial	None required	No
Influx of skilled workers		Unlikely to place additional demands on local services	None required	No	
Landscape and visual	Construction	Construction activity creating visual disturbance, esp. to residential receptors	Short term only	None required	No
	Operational	Permanent structures including building, plant (e.g. cranes) and hardstandings.	Residents may experience feelings of decreased quality of life, but in the context of existing industrial landscape unlikely to have negative health impacts	None required	No
Transport	Construction	Some level of annoyance and stress amongst local residents and road users may occur	Potentially	Implementation of Traffic Management Plan as part of the Code of Construction	No

Original ES					Any change due to proposed material changes?
Topic	Phase	Impact	Health Effect?	Issues and Mitigation / Enhancement	
		<p>due to the potential for increased journey times.</p> <p>Increased risk of increased Road Traffic Accidents (RTAs)</p> <p>Delivery of material by sea increasing risk of accidents with recreational boats</p>	<p>Potentially</p> <p>Potentially</p>	<p>Practice (CoCP).</p> <p>Implementation of Traffic Management Plan as part of the Code of Construction Practice (CoCP).</p> <p>Risk assessed as low taking account of Hazard Management Actions (HMA).</p>	<p>No</p> <p>No</p>
	Operational	<p>Large increase in traffic movements along A160 and Humber Road will cause increased journey times for local road users which is likely to result in increased annoyance and stress when driving and decreased wellbeing.</p> <p>Vulnerable groups in the local population will be affected most by the increase in traffic levels. Those such as young children and the elderly may experience negative health impacts</p> <p>Other health impacts associated with the increase in road traffic include annoyance from increased noise and potential</p>	<p>Potentially</p> <p>Potentially</p> <p>Potentially</p>	<p>The Health Assessment (Chapter 24 of Original ES) concluded that mitigation measures to reduce health effects resulting from road traffic accidents during the operational phase would reduce but not eliminate the residual effect.</p> <p>As above</p> <p>As above</p>	<p>No</p> <p>No</p> <p>No</p>

Original ES					Any change due to proposed material changes?
Topic	Phase	Impact	Health Effect?	Issues and Mitigation / Enhancement	
		<p>respiratory problems due to air pollution</p> <p>Increase in vessels numbers may increase the number of accidents at sea with recreational boats causing injury and potential loss of life.</p>	Potentially	Risk assessed as low taking account of Hazard Management Actions (HMA).	No
Noise	Construction	Noise impacts would be low at nearest residential receptors and potential for any health impacts associated with daytime noise during construction is unlikely.	None	None required	No
	Operational	Impacts from operational noise, including Quayside cranes, fork-lift and traffic noise, are considered acceptable.	None, subject to embedded mitigation	Noise reduction measures to be put in place.	No
Air quality	Construction	No significant increase in pollutant concentrations predicted, therefore no adverse effects due to increased road traffic.	None	None required	No
		Significant dust impacts from construction not likely extend more than	None, subject to embedded mitigation	None required	No

Original ES					Any change due to proposed material changes?
Topic	Phase	Impact	Health Effect?	Issues and Mitigation / Enhancement	
		200m from source. Nuisance effects may result in a decreased sense of wellbeing.	Temporary effect only.	None required	No
	Operational	No significant residual air quality impacts identified associated with the operation of the AMEP site or with regard to operational traffic, therefore no negative health impacts.	None	None required	No

24.2.17 Based on the review undertaken above, it is determined that none of the proposed material changes would affect the findings of the Health Assessment as set out in the Original ES.

24.2.18 It is noted that the Health Assessment as set out in the Original ES identified potential residual adverse health effects arising from operational traffic. It is confirmed that the proposed material changes will not affect operational traffic, and therefore there is no requirement to provide an updated Health Assessment in this regard. Nevertheless, attention is drawn to the traffic impact assessment in Chapter 15: Traffic and Transport which considers mitigation measures in relation to operational traffic impacts, including effects on human health. It should also be noted that Requirement 24 (traffic management plan), Schedule 11 of the extant DCO is applicable to the operational phase as well as construction, and requires details to be agreed with the relevant planning authority of how traffic to and from the authorised development will be managed.

24.3.0 Changes in Baseline Conditions

- 24.3.1 The DCO baseline in respect of Health profiled the human population of North Lincolnshire and North East Lincolnshire with regard its socio-economic characteristics including ethnicity, social and demographic structure, and relative deprivation. Whilst the detailed socio-economic baseline is expected to have evolved over the period since 2012, it is not expected that there would be any significant change to the baseline issues described in the Original ES that would be relevant in respect of the proposed material changes.

24.4.0 Assessment of Effects

- 24.4.1 Following the review set out in Table 24-2, it is apparent that none of the proposed material changes would affect the findings of the original Health Assessment. There is therefore no requirement to provide an update of potential effects.

Additional Cumulative Effects

- 24.4.2 The original ES addressed cumulative effects arising from other large-scale projects that were known at the time. It indicated that, due to the number of other proposed developments in the area there were likely to be cumulative health impacts. Additional construction and operation traffic associated with other proposals in the area was identified as a contributor to decreased wellbeing due the stress and annoyance caused by further increased journey times for local residents, and additional traffic was considered to increase the risk of road traffic accidents which could potentially result in injury or death.
- 24.4.3 In addition to cumulative traffic effects, cumulative impact of additional industrialisation of the area was considered to potentially have an increased negative impact on health and impact people's wellbeing, enjoyment of living in the area, sense of wellbeing and result in decreased mental health.
- 24.4.4 However, cumulative beneficial effects were predicted as a result of the AMEP along with other future proposals in the area is likely to have a positive impact on employment levels and therefore the health of those who gain employment, although this was considered likely to be experienced over a wider area than adverse effects.
- 24.4.5 Chapter 6 of this PEIR provides an updated list of projects that may potentially give rise to cumulative effects when considered in conjunction with the proposed material amendment. It is not considered that any of the additional projects are likely to give rise to health effects not previously considered in the original ES.

Consideration of DCO

- 24.4.6 There is not predicted to be any change to the effects previously identified in the DCO.

24.5.0 Requirement for Additional Mitigation

DCO Mitigation

24.5.1 The DCO is accompanied by a schedule of requirements (Schedule 11) that set out required mitigation measures. The requirements cover a wide range of topics, some which relate to issues that may have an impact on human health. Key requirements relevant to potential health effects addressed in the Original ES include the following:

- Requirement 5 – provision of landscaping
- Requirement 6 – implementation of landscaping
- Requirement 18 - Code of Construction Practice
- Requirement 20 - external lighting
- Requirement 21 – construction traffic
- Requirement 22 – control of noise during construction
- Requirement 23 – control of noise during operation
- Requirement 24 – control of emissions
- Requirement 25 – travel plan
- Requirement 26 – traffic management plan.

24.5.2 The above measures are comprehensive and are considered to adequately address the potential adverse health issues.

Alternate or Additional Mitigation

24.5.3 As no significant adverse effects have been identified, there is no requirement for additional mitigation.

24.6.0 Residual Effects

- 24.6.1 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in Chapter 24 of the original ES.

24.7.0 Other Environmental Issues

- 24.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.
- 24.7.2 Refer to Chapter 26 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the ES.

Other Environmental Issues of Relevance

- 24.7.3 This section considers only those 'other' environmental issues of relevance to this chapter.

Climate and Carbon Balance

- 24.7.4 Climate change may potentially adversely affect human health. The purpose of the proposed development, which is provide a new strategic onshore facility to support the development and management of offshore renewable energy, is a positive measure in combatting climate change and would therefore also make a positive contribution to human health. As the effects of climate change are experienced on a global basis, the impact of the climate change benefit on the study area is not expected to be significant. The proposed material changes to the DCO would result in no change in this regard.

Risks of Major Accidents and/or Disasters

- 24.7.5 The health assessment in the Original ES considers the likelihood and effects of accidents on health, specifically in relation to traffic and transport. The assessment concludes that, taking account of embedded mitigation in the form of Hazard Management Actions, the risk of serious accident and injury would be low, although a residual effect was identified with regard to an increased risk of Road Traffic Accidents during the operational phase that would only be partially mitigated by the DCO requirement for a traffic management plan. The proposed material changes to the DCO would result in no change in this regard.

Summary

- 24.7.6 The proposed material changes would result in no change to other environmental issues of relevance.

24.8.0 Summary of Effects

- 24.8.1 The original ES included an assessment of health effects which considered the impact of specified topics (socio-economic, landscape and visual, traffic, noise and air quality) on the health and well-being of the local population. The assessment considered both construction phase and operational phase effects.
- 24.8.2 The potential impacts identified by the Health Assessment were assessed in relation to specified sensitive receptors and took into account both embedded measures and bespoke mitigation. As the proposed material changes would have similar impacts and adopt similar mitigation measures it is considered none of the proposed material changes would affect the findings of the Health Assessment as set out in the Original ES. It is therefore concluded that this topic will not be taken forward into the updated ES.

24.9.0 Conclusions

- 24.9.1 The proposed changes do not affect the findings of the original ES which concluded that there would be no significant adverse health effects arising from the proposed development other than an increased risk of injury from road traffic accidents, which would be mitigated (reduced) through proposed measures that are now embedded in the DCO. There would also be no change to the findings of the original ES with regard to beneficial effects due to the impact on health and wellbeing from employment creation.
- 24.9.2 The assessment has taken into account both the change to baseline as well as the proposed amendment to the scheme, and has concluded that there would be no significant effect and **the matter will be scoped out of the updated ES.**

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 25: OTHER ENVIRONMENTAL ISSUES

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

25.1.0 INTRODUCTION	25-1
Requirement for Consideration	25-1
Updated ES	25-1
25.2.0 CONSIDERATION OF 'OTHER ENVIRONMENTAL ISSUES'	25-2
Scoping of Other Environmental Issues	25-2
Consideration Other Environmental Issues.....	25-2
Summary Table.....	25-4

DOCUMENT REFERENCES

TABLES

Table 25-1: Summary Table of 'Other Environmental Issues' Consideration	25-5
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25.1.0 Introduction

- 25.1.1 In accordance with the EIA Regulations 2017, which have come into force since the AMEP DCO application was made, each Chapter has duly considered a number of new topics which have been introduced (infrastructure, waste, population and human health, climate and carbon balance, and risks of major accidents and/or disasters).
- 25.1.2 This Chapter of the Preliminary Environmental Information Report (PEIR) provides a summary of the 'Other Environmental Issues' as considered by the technical assessments undertaken in support of the proposed material amendment to the DCO.
- 25.1.3 It should be recognised that the consideration of 'Other Environmental Issues' is limited to the effects of the proposed material amendments alone and does not seek to re-visit the findings of original Environmental Statement ('the original ES') given that the DCO remains extant and is the 'fall back' position should the material amendment application not be approved.

Requirement for Consideration

- 25.1.4 As outlined above, an ES should provide 'any additional information specified in Schedule 4' of the 2017 EIA Regulations. With regard to 'Other Environmental Issues' Schedule 4(4) states that a description should be provided of the factors specified in Regulation 4(2) likely to be significantly affected by the development with regard to: *"population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape"*.
- 25.1.5 The majority of these factors are inherently considered within the various Chapters of this PEIR. However, in accordance with the scope of the original ES, a standalone chapter has been prepared for Health (Chapter 24). Furthermore, to ensure compliance with the EIA Regulations 2017, consideration of these 'Other Environmental Issues' are contained within this Chapter of the PEIR.

Updated ES

- 25.1.6 This Chapter of the PEIR will be used to inform the scope and content of any forthcoming Updated ES submitted in support of the material amendment application. As such, whilst this Chapter provides a useful overview of the considerations associated with the 'Other Environmental Issues', it does not represent a full assessment at this stage.

25.2.0 Consideration of ‘Other Environmental Issues’

Scoping of Other Environmental Issues

25.2.1 As detailed within Chapter 5 of this PEIR, the Scoping Report (Appendix U5-1) submitted in support of the proposed material amendment identifies that the submission will be subject to the more recently adopted Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

25.2.2 Paragraph 5.5 of the Scoping Report details that:

‘The Applicant has reviewed the changes in the requirements for EIA between the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as contained in Regulation 5 and Schedule 4 of the 2017 Regulations. In the context of the proposed development, the Applicant considers that the key changes can be summarised as follows:

- *The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; and*
- *A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.’*

25.2.3 Notwithstanding the above, and as detailed within Chapter 5 of this PEIR, the Scoping Opinion issued by the Planning Inspectorate (PINS) (Appendix U5-2) identifies that matters relating to ‘Climate and Climate Change’, as well as ‘Risks of Major Accidents and/or Disasters’ should be duly ‘scoped in’ to any Updated ES. Paragraphs 3.3.2 to 3.3.5 (page 12) of the Scoping Opinion identify that:

- Appropriate Guidance should be used to undertake the assessment of likely significant effects associated with the ‘Risks of Major Accidents and/or Disasters’ (i.e. the HSE Annex to Advice Note 11);
- A risk assessment should be undertaken to consider the vulnerability of the proposed development to, and the potential for the proposed development to cause, a potential accident or disaster; and
- A description and, where relevant, an assessment of the likely significant effect the proposed development has on climate and the vulnerability of the project to climate change.

Consideration Other Environmental Issues

25.2.4 This section brings together any considerations raised within the various technical Chapters of this PEIR. For ease of reference a summary table is provided below, whilst further information is provided within the individual technical chapters themselves.

Infrastructure

25.2.5 The purpose of the project is to provide the infrastructure necessary to enable new sustainable electricity generating infrastructure to be built and transported its offshore location.

25.2.6 With regard to the development itself, there is a range of proposed infrastructure to be delivered as part of the AMEP scheme design. This includes improvements to the highways, drainage, electricity and lighting infrastructure on or within proximity to the DCO development area. These are all considered to have been inherently considered throughout the development design and consenting process (including the original ES).

Waste

25.2.7 A standalone 'Waste' Chapter (Chapter 23) has been prepared in support of this PEIR, whilst each individual technical chapter has detailed the risks for significant effects associated with waste for the topic being considered.

25.2.8 The impacts of the scheme on the hydrodynamic and sedimentary regime will result in changes to maintenance dredging and this could result in more waste being generated. Maintenance dredging within the Humber Estuary varies significantly from year to year and the additional volume of waste will be relatively trivial (<1%). The disposal of this waste is controlled by the Marine Management Organisation to ensure it is disposed of appropriately.

25.2.9 It is recognised that the waste materials from construction activities has the potential to generate dust and therefore this has been covered within the assessment of construction dust within Chapter 17: Air Quality.

Population and Human Health

25.2.10 Population and Human Health has been inherently considered throughout the various technical chapters of this PEIR. However, specific reference should be made to the following Chapters:

- Chapter 7 – Geology, Hydrogeology and Ground Conditions;
- Chapter 13 – Drainage and Flood Risk;
- Chapter 14 – Commercial and Recreational Navigation;
- Chapter 15 – Traffic and Transport;
- Chapter 16 – Noise and Vibration;
- Chapter 17 – Air Quality;
- Chapter 19 – Light;
- Chapter 20 – Landscape and Visual;
- Chapter 21 – Socio-Economic; and
- Chapter 24 – Health.

25.2.11 Notwithstanding, there has been no need to consider potential impacts on Population and Human Health beyond those contained within the original ES.

Climate and Carbon Balance

- 25.2.12 In accordance with Section 4.21 of the Scoping Opinion (Appendix U5-2), this PEIR has included consideration of carbon dioxide emissions (Chapter 17: Air Quality), flood risk and climate change (Chapter 13: Drainage and Flood Risk), hydrodynamics (Chapter 8: Hydrodynamics and Sedimentary Regime) and adaptation of the development design (Chapter 4: Description of Changes to Development).
- 25.2.13 The original assessment quantified the predicted CO₂ emissions of the operational phase. The original ES did not draw any conclusions from this. However, the impact on CO₂ emissions identified within the original ES was accepted as part of the DCO: it is noted that material amendment does not relate to the operational phase in terms of the air quality scope and, therefore, CO₂ impacts will not change as a result.
- 25.2.14 The assessment has duly considered the risks associated with climate change through assessment of a suitable future flood risk scenario with raised sea levels. As such, the consideration of climate change is inherently contained within the existing assessment for flood risk and overtopping.

Risks of Major Accidents and/or Disaster

- 25.2.15 In accordance with Section 4.22 of the Scoping Opinion (Appendix U5-2), this PEIR has included consideration of risks to Humberside Airport (Chapter 22: Aviation) and Navigation and Vessel Traffic (Chapter 14: Commercial and Recreational Navigation) and major accident hazard sites, including 'one major hazard pipeline' (various chapters).
- 25.2.16 Whilst the impacts of the scheme on the hydrodynamic and sedimentary regime will not give rise to consequential increase in the risk of major accidents or disasters, the indirect effects of dredging are assessed in Chapter 14 of this document.
- 25.2.17 The Flood Risk Assessment duly considers the risks associated with major accidents and/or disasters through assessing the risks associated with flooding, especially with regard to a breach flood scenario. A Flood Warning and Evacuation Plan is already secured in the extant DCO by virtue of Schedule 11 Requirement 33.
- 25.2.18 The Risk Assessment for the project will be updated to include an assessment of major accidents, as they relate to commercial and recreational navigation. The risk of major accidents and disasters as they relate to Commercial and Recreational Navigation will therefore be scoped into the Navigational Risk Assessment (NRA) update and subsequent Updated ES.
- 25.2.19 This NRA will give due consideration to the five major accident hazard sites, and one major hazard pipeline within the application boundary identified by the HSE during scoping where they are applicable to commercial and recreational navigation. Relevant regulators will be consulted with regards to scope and approach prior to assessment.

Summary Table

- 25.2.20 Table 25-1 below provides a summary of whether consideration of 'Other Environmental Issues' has been necessary by the technical chapters contained within this PEIR. Please see sections above and individual chapters of this PEIR for further information

Table 25-1: Summary Table of ‘Other Environmental Issues’ Consideration

PEIR Chapter		Other Environmental Issues				
		Infrastructure	Waste	Population and Human Health	Climate and Carbon Balance	Risk of Major Accidents and/or Disasters
7	Geology, Hydrogeology & Ground Conditions	None	None	Yes	None	None
8	Hydrodynamics and Sedimentary Regime	None	Yes	None	None	Yes
9	Water and Sediment Quality	None	None	None	None	None
10	Aquatic Ecology	None	None	None	None	None
11	Ecology and Nature Conservation	None	None	None	None	None
12	Commercial Fisheries	None	None	None	None	None
13	Drainage and Flood Risk	None	None	Yes	Yes	Yes
14	Commercial and Recreational Navigation	None	None	Yes	None	Yes
15	Traffic and Transport	None	None	Yes	None	None
16	Noise and Vibration	None	Yes	Yes	None	None
17	Air Quality	None	Yes	Yes	Yes	None
18	Marine Archaeology	None	None	None	None	None
19	Light	Yes	None	Yes	None	None
20	Landscape and Visual	None	None	Yes	None	None
21	Socio-Economic	Yes	None	Yes	Yes	Yes
22	Aviation	None	None	None	None	None
23	Waste	None	Yes	None	None	None
24	Health	None	None	Yes	Yes	Yes

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 26: ASSESSMENT OF CUMULATIVE AND IN-COMBINATION EFFECTS

Able Marine Energy Park, Killingholme, North Lincolnshire



SLR Ref: 416.01148.00004
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CONTENTS

26.1.0 INTRODUCTION	26-1
Defining Cumulative and In-Combination Effects	26-1
Defining Transboundary Effects	26-2
26.2.0 ASSESSMENT OF CUMULATIVE AND IN-COMBINATION EFFECTS.....	26-3
In-Combination Effects.....	26-3
Cumulative Effects.....	26-3
26.3.0 TRANSBOUNDARY EFFECTS	26-7
Commercial Fisheries	26-7
Commercial and Recreational Navigation.....	26-7
Aquatic Ecology	26-7
Ecology and Nature Conservation	26-8
Transboundary Effects Conclusion	26-8

26.1.0 Introduction

- 26.1.1 Schedule 4, Paragraph 5 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) states that an Environmental Statement (ES) should provide a ‘... *description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, **cumulative, transboundary**, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development*’ (emphasis added).
- 26.1.2 Paragraph continues by identifying that ‘*This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(1) and Directive 2009/147/EC(2)*’.
- 26.1.3 In assessing cumulative, in-combination and transboundary effects, Regulation 14(3)(b) of the EIA Regulations requires an ES to ‘*include the information **reasonably required** for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment...*’ (emphasis added).
- 26.1.4 This Chapter of the PEIR draws together a summary of the potential cumulative, in-combination and transboundary effects of the proposed development together with other committed developments identified within the vicinity of the application site. Further detailed information regarding the methodology of the technical assessments undertaken and the inclusion of likely cumulative, in-combination and transboundary effects is provided within the relevant chapters of this PEIR and, where appropriate, within the associated technical appendices.

Defining Cumulative and In-Combination Effects

- 26.1.5 As detailed within EIA guidance, cumulative and in-combination effects can be considered as:
- The **combined** effect of individual effects arising as a result of the proposed development: i.e. a single receptor experiencing multiple effects as a result of noise, air quality, transport etc.; and
 - The **cumulative** effect of the proposed development in combination with other development schemes in the locality: i.e. effects which on an individual basis are insignificant but in combination with other development schemes would lead to a significant effect.
- 26.1.6 The methodology for assessing the combined and cumulative effects used in this PEIR has followed guidance in DMRB Volume 11, Section 2, Part 5, ‘Environmental Impact Assessment: A guide to good practice and procedures, A Consultation Paper’ and ‘Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions’ prepared by the European Commission, EC DGZ1 Environment, Nuclear Safety and Civil Protection.
- 26.1.7 The undertaking of the assessment of cumulative and in-combination effects has also been informed by the Scoping Opinion adopted by the Planning Inspectorate (PINS) (Appendix U5-2). As with any assessment of cumulative and in-combination effects, a level of professional judgement has been utilised.

Defining Transboundary Effects

26.1.8 Regulation 32 of the EIA Regulations applies where the Secretary of State is of the view that the development is likely to have significant effects on the environment in another European Economic Area (EEA) State. A potential significant effect on another EEA State is utilised as the definition of a 'Transboundary Effect' for the purpose of this PEIR.

26.1.9 As identified within paragraphs 3.3.2 and 3.3.3 (page 12) of the Scoping Opinion adopted by PINS (Appendix U5-2):

'The Inspectorate recommends that the updated ES should identify whether the Proposed Development has the potential for significant transboundary impacts and if so, what these are, and which EEA States would be affected.'

'Having considered the nature and location of the Proposed Development, the Inspectorate is not aware that there are potential pathways of effect to any European Economic Area (EEA) states but recommends that, for the avoidance of doubt, the updated ES details any such consideration and assessment.'

26.1.10 The above statement implies that the proposed material amendment has been subject to an initial high-level Transboundary Screening which, subject to the findings of the PEIR, confirms that the Transboundary Effects are considered unlikely.

26.1.11 Notwithstanding, it is noted that the Environmental Statement prepared for the DCO ('the original ES') was subject to a Transboundary Consultation Process in accordance with PINS Advice Note 12 and considered the potential for such effects on the basis of Commercial Fisheries, Commercial and Recreational Navigation and Ecology (Marine Mammals, Designated Sites and Birds). A copy of this Transboundary Consultation Process document is available on the PINS website¹ and, as can be noted, Iceland was the notified EEA State.

26.1.12 The possible need for further Transboundary Consultation Process is addressed within Section 26.3.0 of this Chapter based on the findings of the PEIR.

¹https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001351-120816_Able_Transboundary%20Screening%20Matrix.pdf

26.2.0 Assessment of Cumulative and In-Combination Effects

- 26.2.1 The assessment of cumulative and in-combination effects was contained within Chapter 44 of the original ES and subsequently updated through the submission of supplementary reports, EX44.1² and EX 44.2³. These reports, part of the original ES, identified potential for a range of topic effects to interact and for potential in-combination impacts to occur as was further consideration of cumulative effects with committed development in the vicinity of the application site.
- 26.2.2 However, it is duly recognised by the Applicant that the proposed material amendment necessitates a review of the potential in-combination effects as a result of any changes in significance at topic level, whilst there have also been a number of additional committed developments which are present in the vicinity since the preparation of the original ES and the DCO was made.

In-Combination Effects

- 26.2.3 As confirmed within the various technical chapters of this PEIR, no additional or alternate sensitive receptors have been identified beyond those contained within the original ES. Furthermore, no additional or alternate significant effects have been identified by the technical chapters and their associated assessments.
- 26.2.4 In undertaking this PEIR, SLR has not identified any additional or alternate potential interaction linkages (i.e. ways for individual effects to interact across topics) beyond those identified within the original ES.
- 26.2.5 On this basis, with a nil change scenario for both sensitive receptors and significant effects, there is no alteration to the consideration of in-combination effects beyond those contained within the original ES.

Cumulative Effects

- 26.2.6 Chapter 6 (Description of Committed Developments) of this PEIR provides an overview of the committed development in the vicinity of the application site at this point in time (April 2021), whether any previously identified committed developments are no long of relevance (i.e. expiry of a planning permission), and which more recent committed developments are of relevance when considering cumulative effects.
- 26.2.7 Each individual topic chapter contained within this PEIR has duly considered the list of committed developments identified within Chapter 6 (Description of Committed Developments) and provided an assessment of the potential for additional cumulative effects beyond those identified within the original ES. A summary of the findings is provided in the sections below.

²https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001612-OS-003_TR030001_Able%20UK%20Ltd_Supplementary%20Environmental%20Information_File%202%20of%202.zip

³https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-001740-121012_TR030001_Leslie%20Hutchings%20of%20Able%20Humber%20Ports%20Limited.zip

Geology, Hydrology and Ground Conditions

26.2.8 No additional cumulative effects have been identified as a result of the material amendment.

Hydrodynamic and Sedimentary Regime

26.2.9 No additional cumulative effects have been identified as a result of the material amendment.

Water and Sediment Quality

26.2.10 No additional cumulative effects have been identified as a result of the material amendment.

Aquatic Ecology

26.2.11 No substantive deleterious cumulative impacts have been identified from multiple developments in the Zone of Impact (ZoI) from those addressed in the original ES e.g. dredge disposal is ongoing from ports activity in the Humber, power station cooling water abstraction and discharge.

26.2.12 Based on the assessment of impacts from the material amendment, and plans and projects in the ZoI, it has been concluded that there are no additional significant cumulative effects arising from the development.

Ecology and Nature Conservation

26.2.13 No additional cumulative effects have been identified in the PEIR that would lead to any change to the conclusions reached previously in relation to Terrestrial Ecology and Nature Conservation.

Commercial Fisheries

26.2.14 No substantive deleterious cumulative impacts have been identified from multiple developments in the ZoI from those addressed in the original ES e.g. dredge disposal is ongoing from ports activity in the Humber, power station cooling water abstraction and discharge.

26.2.15 Based on the assessment of impacts from the material amendment, and plans and projects in the ZoI, it has been concluded that there are no additional significant cumulative effects arising from the development.

Drainage and Flood Risk

26.2.16 No additional cumulative effects have been identified as a result of the material amendment.

Navigation

26.2.17 Preliminary consultation with the Harbour Master did not establish any cumulative effects of significance to shipping and navigation.

Traffic and Transport

26.2.18 No additional cumulative effects have been identified as a result of the material amendment.

Noise and Vibration

- 26.2.19 A review of committed developments (additional to those considered within the original ES) indicates that noise emissions will be unlikely to lead to a perceptible additional increase in sound levels at receptor locations, due to distance and existing ambient and background sound levels. Further consideration of cumulative effects is not required.

Air Quality

- 26.2.20 The material amendment is not anticipated to result in any additional cumulative effects to those detailed in the original ES.

Marine Archaeology

- 26.2.21 No additional cumulative effects have been identified as a result of the material amendment.

Light

- 26.2.22 The Lighting Assessment for the DCO Application (paragraph 19.9.4) states “*within this local context it is considered that the AMEP will add cumulatively to the night time baseline. However, due to the existing levels of illumination, it is considered that this is not a significant cumulative impact*”.
- 26.2.23 There are no additional potential cumulative effects to those detailed in the DCO Application.

Landscape and Visual Impact

- 26.2.24 No additional cumulative effects have been identified as a result of the material amendment.

Socio-Economic

- 26.2.25 None of the committed development projects identified are located within the local study area for effects on recreation. As such, there are no cumulative effects.
- 26.2.26 The tourism economy of North Lincolnshire is robust having developed alongside heavy industry and port-related development. The additional contribution of the proposed change in combination with other projects would remain negligible in the context of the tourism economy and there would be no significant cumulative effects.

Aviation

- 26.2.27 No additional cumulative effects have been identified as a result of the material amendment.

Waste

- 26.2.28 The minor changes (positive or negative) to potential waste arisings and composition from construction and operation at AMEP associated with the proposed material amendment is likely to have minimal impact on the local waste management infrastructure when considered cumulatively with other committed developments.

Health

- 26.2.29 It is not considered that any of the additional projects are likely to give rise to health effects not previously considered in the original ES.

Summary

- 26.2.30 As can be noted from the above summary, none of the technical chapters contained within this PEIR has identified a change or an increased risk of cumulative effects associated with the committed developments identified as a result of the proposed material amendment. As such, the consideration of cumulative effects remains consistent with those contained within the original ES and found to be acceptable in the making of the DCO.

26.3.0 Transboundary Effects

- 26.3.1 As outlined within Section 26.1.11 above, the original ES for the DCO was subject to a Transboundary Consultation Process in accordance with PINS Advice Note 12 and considered the potential for such effects on the basis of Commercial Fisheries, Commercial and Recreational Navigation and Ecology (Marine Mammals, Designated Sites and Birds).
- 26.3.2 On this basis, the following section draws together the findings from this PEIR to inform whether the Applicant considers it necessary that a further Transboundary Consultation Process would be necessitated by the proposed material amendment to the DCO.

Commercial Fisheries

- 26.3.3 The actual likelihood of any significant effects to occur to the commercial fisheries of the area from the material amendment has been discounted, with it being concluded that the effects as identified in the original ES remain valid in the context of Commercial and Recreational Fisheries, with any alteration in effect arising from the material amendment being either so small as to not be measurable or accommodated within the natural variability of the estuarine system.
- 26.3.4 Mitigation measures provided in the original ES are considered to remain valid, with no significant residual impacts to the Commercial and Recreational Fisheries of the Humber Estuary in the vicinity of the AMEP development expected following their discharge.

Commercial and Recreational Navigation

- 26.3.5 All effects assessed as part of the existing DCO application are scoped into the Navigational Risk Assessment (NRA) update. One additional effect 'Impact on mooring / break out risk' has been identified for assessment.
- 26.3.6 A preliminary NRA review of effects anticipates little significant change to the 2011 assessment of commercial and recreational navigation as a result of the material change.
- 26.3.7 Possible additional risk controls may be identified, and the most appropriate mitigation measures will be recommended in light of their assessed effectiveness, ensuring navigational risks are 'As Low As Reasonably Practicable' (ALARP).
- 26.3.8 Early review of the anticipated effect of the material amendment to the consented AMEP project is anticipated to be low given information available to date. Detailed assessment of individual hazards and stakeholder consultation is required and will be undertaken as part of an updated NRA to fully consider the effect of the material change.

Aquatic Ecology

- 26.3.9 The actual likelihood of any significant effects to occur to the aquatic ecology of the area from the material amendment have been discounted, with it being concluded that the effects as identified in the original ES from the DCO remain valid. Only very small scale localised alterations to these are expected, these not measurable against the background natural variability of the estuarine system.
- 26.3.10 Mitigation measures for aquatic ecology proposed in the original ES and secured through the DCO are considered to remain valid, with no significant residual impacts to the aquatic ecology of the

Humber Estuary expected following their discharge.

Ecology and Nature Conservation

- 26.3.11 A Preliminary Ecological Appraisal of the site and its surroundings was carried out in March 2021 and found some minor changes in baseline habitat, but none that would materially affect the original assessment or indicate that the habitat was more favourable to any species now compared to 2012.
- 26.3.12 The assessment of potential changes to the terrestrial ecology and nature conservation of the area against conditions identified in the original ES baseline, and from the assessment of the material amendments, no significant effects have been identified other than those assessed in the original ES from the DCO.
- 26.3.13 Mitigation measures provided in the original ES and secured in the DCO (principally by the requirement to obtain approvals for a series of Environmental Management and Monitoring Plans) are considered to remain valid.
- 26.3.14 Overall, there are no changes to the residual effects identified within the original ES and the approved compensatory habitat will remain suitable to offset effects that cannot be mitigated.

Transboundary Effects Conclusion

- 26.3.15 On the basis of the above, it is duly contended that the proposed material amendment will not raise any additional or alternate Transboundary Effects beyond those considered within the original Transboundary Consultation Process. As such, no further consultation need be undertaken as a result of the proposed material amendment.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 27: SUMMARY OF MITIGATION AND MONITORING

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

27.1.0 INTRODUCTION	27-1
27.2.0 MITIGATION AND MONITORING	27-2
Geology, Hydrogeology and Ground Conditions.....	27-2
Hydrodynamics and Sediment Quality	27-2
Water and Sediment Quality	27-3
Aquatic Ecology	27-4
Ecology and Nature Conservation	27-4
Commercial Fisheries	27-5
Drainage and Flood Risk	27-6
Commercial and Recreational Navigation	27-7
Traffic and Transport	27-8
Noise and Vibration	27-11
Air Quality	27-12
Marine Archaeology	27-13
Light	27-15
Landscape and Visual Impact	27-15
Socio-Economics	27-16
Aviation	27-17
Waste	27-18
Health	27-20
27.3.0 SUMMARY OF ADDITIONAL MITIGATION OR MONITORING	27-22

DOCUMENT REFERENCES

TABLES

Table 27-1 : Embedded Mitigation Measures	27-8
Table 27-1: Summary of Additional Mitigation and Monitoring.....	27-22

27.1.0 Introduction

- 27.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) draws together a summary of the mitigation and monitoring measures proposed with regard to the proposed development. This includes consideration of mitigation and monitoring recommended within the Environmental Statement submitted in support of the DCO ('the original ES'), those contained within the DCO itself (Schedule 9 and 11), and any additional or alternative mitigation and monitoring identified as a result of this PEIR when considering the proposed material amendment.
- 27.1.2 Further detailed information pertaining to any additional and alternative mitigation and monitoring measures is provided within the relevant chapters of the PEIR, whilst the residual effects and conclusions are provided within Chapter 28: Conclusion.

27.2.0 Mitigation and Monitoring

Geology, Hydrogeology and Ground Conditions

Original ES & DCO

- 27.2.1 Mitigation and monitoring recommended for Geology, Hydrogeology and Ground Conditions was contained within Chapters 7¹ (Section 7.7) and 31² (Section 31.8) of the original ES.
- 27.2.2 Of relevance to this PEIR, the original ES for the extant DCO details mitigation associated with piling works, the proximity of buildings to the Lindsey Oil refinery and those proposed within the dredging strategy.
- 27.2.3 Schedule 11 paragraph 16 relates to contaminated land, stating:

'(1) No stage of the authorised development is to commence until a written scheme applicable to that stage, to deal with the contamination of any land, including groundwater and ground gas, within the Order limits which is likely to cause significant harm to persons or pollution of controlled waters or the environment has, after consultation with the Environment Agency, been submitted to and approved by the relevant planning authority.

(2) The scheme must include an investigation and assessment report, prepared by a suitably qualified person, to identify the extent of any contamination and the remedial measures to be taken to render the land fit for its intended purpose, together with a management plan which sets out long-term measures with respect to any contaminants remaining on the site.

(3) Remediation must be carried out in accordance with the approved scheme and the management plan.'

Additional Mitigation and Monitoring

- 27.2.4 No alternate or additional mitigation is required following the revised assessment carried out to inform this PEIR. Notwithstanding this, confirmation from the MMO is required that contaminant concentrations in the dredged material are not sufficiently high to prevent disposal of the dredged material in the Humber.

Hydrodynamics and Sediment Quality

- 27.2.5 This chapter defines the predicted changes to the hydrodynamic and sedimentary regime of the Humber Estuary resulting from the AMEP.
- 27.2.6 The implications of the predicted changes to the hydrodynamic and sedimentary regime are assessed in terms of the significance of the potential impacts on various environmental parameters (e.g. aquatic ecology, water quality, commercial fisheries, etc.) in the relevant chapters of this PEIR.

¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000316-07%20-%20Geology%20Hydrogeology%20and%20Ground%20Conditions.pdf>

²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000336-31%20-%20Geology%20Hydrogeology%20and%20Ground%20Conditions.pdf>

Similarly, any measures that may be required in order to mitigate a potential impact on a receptor arising from a predicted effect on the hydrodynamic and sedimentary regime of the estuary are described in the relevant chapters.

27.2.7 On this basis there is no mitigation or monitoring to directly reference with regard to this Chapter of the PEIR.

Water and Sediment Quality

Original ES & DCO

27.2.8 Mitigation and monitoring recommended for Water and Sediment Quality was contained within Chapters 9³ (Section 9.7) and 33⁴ (Section 33.8) of the original ES.

27.2.9 A dredge plume assessment was conducted and presented as part of the DCO application. This addressed the potential for dredging operations to affect the marine environment (see Chapter 8 of original ES⁵). Based on this assessment mitigation measures to control potential adverse effects were agreed by the conditions in Schedule 8.

27.2.10 Additional studies were also carried out to quantify the impact of the scheme on intakes of the (former) Centrica and EON (now Uniper) power plants. These were included as Annex 9.2, Annex 9.3 and Annex 8.3 of the original ES. Based on these studies a commitment was made for ongoing maintenance dredging to be carried out at discrete intervals to prevent sedimentation at the EON and Centrica intakes.

27.2.11 Schedule 11 Requirement 22 requires a Code of Construction Practice to be approved by the Local Planning Authority for each stage of the works. This will set out the measures that will be implemented during construction to minimise pollution of the estuarine environment.

27.2.12 Schedule 8 Requirement Condition 31 requires detailed method statements to be approved by the MMO for all works before the level of MHWS. This provides further controls to be secured to minimise the risk of pollution of the estuarine environment.

27.2.13 Under DCO Schedule 8, Condition 39, an active monitoring scheme to measure marine environmental parameters during the project has been agreed and implemented. Full details of the monitoring arrangements and location are provided in PIER Appendix U9.3 with preliminary baseline results discussed in PIER Appendix U9.4.

27.2.14 Schedule 8 Condition 54 requires the licence holder to employ methods to minimise resuspension of sediment during the construction and dredging operations.

27.2.15 Within the DCO, trigger levels for key water quality parameters were specified or required to be agreed. These trigger levels have been confirmed with the MMO following the baseline monitoring programme and will be used during construction to confirm that adverse impacts are not occurring

³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000313-09%20-%20Water%20and%20Sediment%20Quality.pdf>

⁴ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000338-33%20-%20Water%20and%20Sediment%20Quality.pdf>

⁵ AMEP, Environmental Statement Chapter 8: Hydrodynamic and Sedimentary Regime, 2012 <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000312-08%20-%20Hydrodynamic%20and%20Sedimentary%20Regime.pdf>

and, if ever required (i.e., if exceedances are observed), for working methods to be modified to achieve compliance.

Additional Mitigation and Monitoring

27.2.16 Following this review, it is concluded that no further mitigation is required, over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Water and Sediment Quality relating to the proposed scheme.

Aquatic Ecology

Original ES & DCO

27.2.17 Mitigation and monitoring recommended for Aquatic Ecology was contained within Chapters 10⁶ (Section 10.7) and 34⁷ (Section 34.8) of the original ES.

27.2.18 Mitigation and monitoring requirements contained within the original ES of relevance to the consideration of the proposed material amendment included (but are not limited to):

- provisions for mitigatory and compensatory habitat identified in the CEMMP, including spatial extent values for different habitats (with associated functional attributes) to be created at the Cherry Cobb Sands compensation site in order to address losses in the intertidal and subtidal habitat and function in and around the AMEP quay;
- provisions under the MEMMP to ensure functional aspects of the Humber Estuary SAC are maintained; and
- controls on marine pling including timing restrictions, soft start and the provision of a Marine Mammal Observer (MMO).

27.2.19 Schedule 11, Regulation 19 relates to 'Environmental Management and Monitoring Plans' and Regulation 31 relates to 'European Protected Species'.

Additional Mitigation and Monitoring

27.2.20 No additional mitigation is required for impacts to the Aquatic Ecology as there are no changes in the effects on the aquatic ecological components to those identified in the original ES and provided within the extant DCO.

Ecology and Nature Conservation

Original ES & DCO

27.2.21 Mitigation and monitoring recommended for Ecology and Nature Conservation was contained

⁶<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000314-10%20-%20Aquatic%20Ecology.pdf>

⁷<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000339-34%20-%20Aquatic%20Ecology.pdf>

within Chapters 11⁸ (Section 11.7) and 35⁹ (Section 35.9) of the original ES.

27.2.22 The mitigation and compensation measures identified as part of the DCO remain suitable and fit for purpose without requirement for modification. These include:

- provisions for mitigatory and compensatory habitat, including habitats (with associated functional attributes) to be created at the Cherry Cobb Sands compensation site in order to address losses in the intertidal and subtidal habitat and function in and around the AMEP quay.
- 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 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.

27.2.23 Further detail on the agreed mitigation measures pertaining to the development are provided in the original Terrestrial Ecology and Nature Conservation Chapter of the original ES and the original DCO (Technical Appendix U1-1). Measures will be secured through the approval of various plans and method statements as specified in Schedule 8 and 11 of the extant DCO.

Additional Mitigation and Monitoring

27.2.24 Following this review, it is concluded that no further mitigation is required, over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Terrestrial Ecology and Nature Conservation relating to the proposed scheme.

27.2.25 Notwithstanding, a proposal for a non-material change to the DCO has been submitted to move Mitigation Area A to an alternative location at Halton Marshes, which is currently being considered by the Secretary of State.

Commercial Fisheries

Original ES & DCO

27.2.26 Mitigation and monitoring recommended for Commercial Fisheries was contained within Chapter 12¹⁰ (Section 12.7) of the original ES.

⁸<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000315-11%20-%20Ecology%20and%20Nature%20Conservation.pdf>

⁹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000340-35%20-%20Ecology%20and%20Nature%20Conservation.pdf>

¹⁰<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000317-12%20-%20Commercial%20Fisheries.pdf>

- 27.2.27 Mitigation and monitoring identified within the original ES include (but are not limited to):
- piling restrictions included in the extant DCO (Schedule 8, paragraphs 37 *et seq*)
 - the provision of compensatory habitat at Cherry Cobb Sands as provided for within the extant DCO. These compensatory habitats provide function for fishes, including nursery areas for commercially exploitable species.

Additional Mitigation and Monitoring

- 27.2.28 No additional mitigation is required for impacts to the commercial and recreational fisheries components as there are no significant changes to those identified in the original ES for the DCO.

Drainage and Flood Risk

Original ES & DCO

- 27.2.29 Mitigation and monitoring recommended for Drainage and Flood Risk was contained within Chapters 13¹¹ (Section 13.7) and 36¹² (Section 36.8) of the original ES.
- 27.2.30 Key mitigation proposed for the construction phase as part of the DCO involves adherence to good construction methodology as set out in Environment Agency Pollution Prevention Guidance [now Pollution Prevention for Business]. Much of this is secured under requirements of Schedule 11.
- 27.2.31 This will include:
- minimising pollution risk through the use of good construction practices including use of drip trays on mechanical equipment such as pumps and generators and fail-safe bunded storage of fuel and cement and other materials to prevent spillage to groundwater, watercourses or the sea;
 - over-pumping around works in watercourse channels will be carried out with a suitably-sized pump, in order that excessive flows are not generated and disturbance of the bed material is minimised;
 - watercourse bank reinstatement works will be carried out by vehicles operating from the bank rather than the watercourse channel;
 - for work on, over or adjacent to the watercourses, a maximum of one third of the watercourse will be bunded at any time, and the bunds will have a minimal height above normal water level, and should either wash out or create minimal obstruction during flood conditions.
 - construction materials will be prevented from entering watercourses or the sea and blocking either the channels or culverts and bridges; and

¹¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000318-13%20-%20Drainage%20and%20Flood%20Risk.pdf>

¹²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000341-36%20-%20Drainage%20and%20Flood%20Risk.pdf>

- care will be taken with all works involving concrete and cement. Suitable provision will be made for the washing-out of concrete mixing plant or ready-mix concrete lorries, and such washings will not be allowed to flow into watercourses or the sea.

27.2.32 Key mitigation proposed for the operational phase as part of the DCO, will also include adherence to Environment Agency Pollution Prevention Guidance [now Pollution Prevention for Business]. In addition, the following additional mitigation measures are proposed:

- fail-safe bunded storage of fuel and other substances to prevent spillage to groundwater, watercourses and the sea;
- provision of oil interceptors in paved areas;
- installation of penstocks on outfalls to watercourses and the sea to contain any pollution incidents (where there is an identified risk); and
- the implementation of a robust Flood Warning and Evacuation Plan for the site with its key objective being to evacuate the site before flooding occurs. Any people on the site will make their way off site (if safe to do so) or to the safe refuges on the upper floors of the buildings and await rescue by the emergency services. The Flood Warning and Evacuation Plan will not have any particular environmental impacts.

Additional Mitigation and Monitoring

27.2.33 Following this review, it is concluded that no further mitigation is required, over and above that secured through the DCO including Schedule 1 Requirement 13 (Surface Water Drainage) and 14 (Foul Water Drainage). This will be sufficient to control adverse effects to Flood Risk and Drainage relating to the proposed scheme. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

Commercial and Recreational Navigation

Original ES & DCO

27.2.34 Mitigation and monitoring recommended for Commercial and Recreational Navigation was contained within Chapter 14¹³ (Section 14.8) of the original ES.

27.2.35 A range of existing embedded mitigation measures, those that have an impact upon navigation risk, and are already in place or required by the port authority as part of the DCO. These are outlined within Table 27-1 below.

¹³<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000319-14%20-%20Navigation.pdf>

Table 27-1 : Embedded Mitigation Measures

Embedded Mitigation	Phase	Description
River Works Consent process	Construction	Ensuring SHA and CHA (HES) are fully aware of all stages of project, are included in project updates, and can effectively manage safety of navigation during construction
Promulgation of information to local stakeholders (including Notice to Mariners)	Construction Operation	Hold regular meetings with dredge contractors during dredging operations. Issue Notice To mariners prior to intended works commencing.
Appropriate marking and lighting	Operation	Review navigation aids in vicinity of project berths as directed by ABP / THLS.
Compulsory Pilotage / PEC process	Construction Operation	Ensuring all large vessels in the project area are competently navigated and advised
Adherence to risk control measures listed within the current Port Navigation Risk Assessment.	Construction Operation	Including international, national and local regulations. As listed in the Port Safety Management System.
Vessel Traffic Service (VTS)	Construction Operation	VTS provides 24/7 coverage for the port and provides an Information Service (INS), TOS and Navigational Advice Service (NAS) to all traffic using the port. Important particularly during the construction phase to co-ordinate large dredgers.
Movements associated with barges carrying windfarm cargos treated as project moves.	Operation	In accordance with ABP procedures.
Post dredge surveys and promulgation.	Construction Operation	Charts to be frequently updated to include new berths and berthing pockets and in-channel dredge depths.

Additional Mitigation and Monitoring

27.2.36 The requirement for any additional mitigation beyond that outlined within the original ES in addition to a review of the appropriateness of the DCO mitigations with respect to commercial and recreational navigation will be undertaken as part of the NRA process informed by stakeholder consultation. A final detailed list of recommended existing and additional mitigation (if any) will be provided within the NRA and Shipping and Navigation ES Chapter.

Traffic and Transport

Original ES & DCO

27.2.37 Mitigation and monitoring recommended for Traffic and Transport was contained within Chapter

15¹⁴ (Section 15.8) of the original ES.

27.2.38 The following mitigation measures were included within the original ES.

Construction Phase

TRAFFIC

27.2.39 Since there is no predicted significant traffic impact, the original ES Transport Chapter concluded that no mitigation is required during the construction phase.

RAIL

27.2.40 In terms of mitigating the potential for HGV movements across the railway line during construction, the original ES Transport Chapter stated that level crossings should be constructed as required.

PROW

27.2.41 The DCO requires (Requirement 9 of Schedule 11) that “no stage of the authorised development shall commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority”.

Operational Phase

27.2.42 The following mitigation measures for the operational phase were included within the original ES Transport Chapter:

TRAFFIC

27.2.43 Mitigation measures in the form of junction improvements were proposed at the following junctions:

- Rosper Road / Humber Road;
- Humber Road / A160 / A1173 (Manby Road Roundabout); and
- A1173 / North Moss Lane / Kiln Lane.

27.2.44 The junction improvements include minor road widening, kerb realignments and increased number of junction approach lanes.

27.2.45 In addition to the above, the DCO at Schedule 9 Protective Provisions Part 3 - 31 reinforces the requirements for highway works stating that:

‘For the protection of the Highways Agency, no part of the authorised development is to be occupied until improvements to the following junctions (or alternatives approved in writing by the local planning authority in consultation with the Highways Agency) have been implemented in accordance

¹⁴ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000320-15%20-%20Traffic%20and%20Transport.pdf>

with details approved by the local planning authority in consultation with the Highways Agency:

(a) A160/A1173/Humber Road (Manby Road Roundabout);

(b) A160/Top Road/Habrough Road;

(c) A160/A1077 Ulceby Road;

(d) A160/Eastfield Road (signalised junction), and

(e) A180/A160 Merge/Diverge (Brocklesby Interchange)'.

RAIL

27.2.46 Appropriate safety measures would be in place at the rail crossings to minimise the potential for any collisions between vehicles on the site and trains to as low as reasonably practicable.

DCO Specified Mitigation

27.2.47 In addition to the above, the DCO at Schedule 9 Part 13 provides protective provisions relating to Royal Mail Group Ltd. It states at item 109 that:

'(1) For the protection of Royal Mail Group Ltd ('Royal Mail') the following provisions, unless otherwise agreed in writing between the undertaker and Royal Mail, have effect.

(2) No part of the authorised development is to be occupied until improvements to the A1173 / Pelham Road junction (or alternative mitigation measures to be approved in writing by the relevant planning authority, following consultation with Royal Mail), have been implemented in accordance with details approved by the relevant planning authority in consultation with Royal Mail.

(3) Such improvements must mitigate the effects of the proposed development on the operation of this junction and must be designed in accordance with normal standards.

(4) The undertaker must have due regard to any consultation response received from Royal Mail.'

27.2.48 The Development Consent Order at Schedule 11 also lists the following transport related requirements:

'Highway Access – Item 10

1) No stage of the authorised development is to commence until for that stage, written details of the siting, design and layout of any new permanent or temporary means of access to a public highway to be used by vehicular traffic, or any alteration to an existing means of access to a public highway used by vehicular traffic, has, after consultation with the relevant highway authority, Royal Mail Group Ltd and Centrica plc, been submitted to and approved by the relevant planning authority.

(2) The undertaker must have regard to any consultation responses received.

(3) The public highway accesses must be constructed, or, as the case may be, altered, in accordance with the approved details.

(4) No stage of the authorised development is to commence until for that stage, a written scheme (the "Access Management Scheme") has, after consultation with the relevant highway authority,

been submitted to and approved by the relevant planning authority.

(5) The Access Management Scheme must be carried out in accordance with the approved details.

Public rights of way – Item 11

(1) No stage of the authorised development is to commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority.

(2) The alternative Footpath 50 and Paull Footpath 6 must be implemented in accordance with the relevant approved plan and specification.

Construction traffic – Item 25

(1) No stage of the authorised development is to commence until a written transport statement, including any road condition survey, temporary speed limits, lay-bys and details of the preferred route for that stage to be used by construction traffic on public highways, after consultation with the highway authority, Royal Mail Group Ltd and Centrica plc, has been submitted to and approved by the relevant planning authority.

(2) The undertaker must have regard to any consultation responses received.

(3) Notices must be erected and maintained throughout the period of construction at every construction site exit to a public highway, indicating to drivers the route agreed by the relevant planning authority for traffic entering and leaving the site.'

Additional Mitigation and Monitoring

27.2.49 All the junction works necessary to mitigate for the impact of AMEP have been completed.

27.2.50 As no new significant adverse effects have been identified, there is no requirement for additional mitigation other than those secured through the DCO which includes Schedule 11 Requirements 10 (Highway Access), 11 (Public Rights of Way), 25 (Construction Traffic), 29 (Travel Plan) and 30 (Traffic Management Plan). The change to the agreed diversion route for Footpath 50 would be incorporated into the written implementation plan and specification as required under Requirement 9.

Noise and Vibration

Original ES & DCO

27.2.51 Mitigation and monitoring recommended for noise and vibration was contained within Chapters 16¹⁵ (Section 16.7) and 38 (Section 38.8) of the original ES.

27.2.52 The original ES included suitable mitigation measures to ensure that potential noise and vibration

¹⁵<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000321-16%20-%20Noise%20and%20Vibration.pdf>

effects are managed and controlled to acceptable levels where practicable. This included (but is not limited to) recommendations associated with:

- Use of shrouds and soft starts for piling works;
- Use of Best Practicable Means in undertaking the works;
- Use of best practice methods for both noise and vibration as contained within British Standards; and
- Management of potential traffic noise impacts.

27.2.53 These measures are effectively transcribed into the extant DCO through Schedule 8 paragraphs 37-43 and Schedule 11 Requirement 37 which control piling methods, and by Schedule 11 Requirements 22 (Code of Construction Practice), 26 (Control of Noise During Construction) and 27 (Control of Noise during Operation) which all require plans to be approved by the Local Planning Authority.

Additional Mitigation and Monitoring

27.2.54 Mitigation measures to be implemented and secured through the DCO are appropriate and no alternate or additional mitigation beyond that contained within the original ES is required.

Air Quality

Original ES & DCO

27.2.55 Mitigation and monitoring recommended for Air Quality was contained within Chapters 17¹⁶ (Section 17.7) and 39¹⁷ (Section 39.8) of the original ES.

27.2.56 This mitigation includes the following measures for construction dust, which are taken from the relevant good practice guidance documents available at the time:

- where possible dust generation activities will be undertaken away from the site boundary, particularly those locations adjacent to sensitive receptors;
- stockpiles of debris and overburden will be kept watered or sheeted as required, and for long term stockpiles the use of surface bonding materials or vegetating will be implemented if practicable;
- disturbance of stockpiles will be minimised;
- open surfaces and working areas will be watered as required to minimise dust, and surfaces will be converted to permanent hardstanding as soon as possible, or sealed or vegetated is

¹⁶ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000322-17%20-%20Air%20Quality.pdf>

¹⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000344-39%20-%20Air%20Quality.pdf>

practicable;

- wind breaks and barriers will be erected where possible to minimise wind blow across open areas of the site;
- drop heights will be minimised where possible;
- vehicles will be washed to remove any dusty materials or mud on a regular basis;
- vehicles will be washed to remove any dusty materials from the body and wheels immediately before leaving the construction site;
- the construction access routes will be kept clear of dusty materials with the use of streetcleaners or sprayed with water to maintain the entire road surface wet;
- the speed of vehicles will be limited on unpaved surfaces; and
- containers and trucks will be sheeted to prevent escape of dust during transfer to or from site.

27.2.57 The above measures are still considered relevant and applicable and are effectively secured by Requirements 22 and 28 of Schedule 11 of the extant DCO.

Additional Mitigation and Monitoring

27.2.58 No additional mitigation measures are considered to be required beyond those secured within the extant DCO.

Marine Archaeology

Original ES & DCO

27.2.59 Mitigation and monitoring recommended for Historic Environment was contained within Chapters 18¹⁸ (Section 18.7) and 40¹⁹ (Section 40.7) of the original ES.

27.2.60 Proposed mitigation measures for AMEP were originally set out in the original ES (ES Section 18.7), and the 2012 WSI (Wessex Archaeology 2012a).

27.2.61 The original ES set out mitigation measure relevant to the marine historic environment in works relating to new quay and the berthing pocket, approach channel and turning area. For the new quay it stated: *'Detailed mitigation measures to accompany construction of the new quay are being set out in a Written Scheme of Investigation (WSI) for marine and intertidal archaeology that has been drafted to accompany this Environmental Statement. The WSI provides for a further phase of investigations to enable detailed design of mitigation measures, as well as an outline of the mitigation measures that will be provided. The mitigation measures set out in the WSI will include monitoring by NLC/English Heritage and make provision for post-investigation assessment, material*

¹⁸<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000323-18%20-%20Historic%20Environment.pdf>

¹⁹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000345-40%20-%20Historic%20Environment.pdf>

conservation, archaeological analysis, interpretation and publication of significant results, and preparation and deposition of a publicly-accessible archive. The WSI is subject to the agreement of NLC and English Heritage. It is anticipated that implementation of the WSI will be secured through a condition' (ES para. 18.7.4). For the berthing pocket, approach channel and turning area it stated: 'Detailed mitigation measures to accompany dredging of the berthing pocket, approach channel and turning area are being set out in the Written Scheme of Investigation (WSI) for marine and intertidal archaeology referred to above' (ES para. 18.7.5).

27.2.62 The 2012 WSI set out possible measures that could be carried out during the design phase to supplement archaeological information identified by studies carried out prior to submission of the licence application (Wessex Archaeology 2012a, Section 5.1). These could inform the detailed design of the archaeological mitigation to take place during and after construction of the Marine Energy Park and Compensation Site, to be set out in an updated WSI. The investigations suggested were:

- Review of existing geophysical data;
- Acquisition and interpretation of additional geophysical data;
- Geoarchaeological investigation, including the development of a deposit model taking account of previous work;
- Additional documentary research notably into the brick and tile yards and historic shipping records relating to the anchorage of Whitebooth Roads (off Killinghome);
- Investigation of unidentified foreshore sites;
- Diver-based investigations of geophysical anomalies;
- Development of dredge reporting protocol.

27.2.63 The 2012 WSI also set out measures that will be carried out during the construction phase, as well as further possible measures (Wessex Archaeology 2012a, Section 5.2). The measures that were stated will happen were:

- implementation of Dredge Reporting Protocol; and
- investigations in response to discoveries arising from Dredge Reporting Protocol.

27.2.64 Other possible measures included archaeological excavation and recording and recovery of archaeologically important material pre-construction, and intertidal watching briefs, marine-based watching briefs, and investigations in response to discoveries arising from watching briefs during construction.

Additional Mitigation and Monitoring

27.2.65 No alternate or additional mitigation is required beyond that set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2, Section 7). The only alteration is the change in the location of the archaeological watching brief to match the updated location of the berthing pocket (Figure 18-1, Technical Appendix U18-1).

27.2.66 The protocol for archaeological discoveries would fulfil the duty for the implementation of Dredge

Reporting Protocol contained in the 2012 WSI. The watching brief was suggested as a possible measure in the 2012 WSI. The measures in the 2021 WSI would supersede all the measures suggested in the 2012 WSI.

Light

Original ES & DCO

27.2.67 Mitigation and monitoring recommended for Light was contained within Chapter 19²⁰ (Section 19.7) of the original ES.

27.2.68 The following mitigation measures were proposed as part of the Lighting Assessment for the DCO Application:

- Light towers will be fitted within directional luminaires to limit light spill outside of the working areas;
- Downlights will be fitted outside buildings to provide localised lighting for safe access to buildings;
- For aviation safety, Humberside Airport request that all external lighting shall be flat glass, full cut off design with horizontal mountings to avoid light spill above the horizontal in the interest of aviation safety, which is also in line with best practice with the Institute of Lighting Engineers;
- Final details of the lighting proposals are to take cognisance of the requirements of BS 5489 Part 8 with regard to lighting and railways; and
- Planting of tree belts and woodland areas.

27.2.69 Approval of the detailed design of the lighting both during construction and operation is secured through Schedule 11 Requirement 24 (External Lighting).

Additional Mitigation and Monitoring

27.2.70 No additional mitigation is required to that secured through the DCO.

Landscape and Visual Impact

Original ES & DCO

27.2.71 Mitigation and monitoring recommended for Landscape and Visual was contained within Chapters 20²¹ (Section 20.7) and 41²² (Section 41.8) of the original ES.

²⁰<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000324-19%20-%20Light.pdf>

²¹<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000325-20%20-%20Landscape%20and%20Visual%20Impact.pdf>

²²<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000346-41%20-%20Landscape%20and%20Visual%20Context.pdf>

- 27.2.72 Measures identified within the original ES include (but are not limited to) the following:
- Construction Phase – phasing of works, lighting hours restrictions, maintenance of a tidy and contained site compound, topsoiling and replacement turf/seeding;
 - Operational Phase – Building colour finish, orientation of buildings, adherence to the landscape masterplan, and use of a landscape and ecology mitigation strategy; and
 - Implementation and management of Cherry Cobb Sands.

Additional Mitigation and Monitoring

- 27.2.73 No significant changes have been assessed with regard to the nature, type and level of landscape and visual effects. No new or additional landscape and visual effects have been assessed. No additional mitigation has, therefore, been proposed. Landscape and visual mitigation would remain the same as that permitted under the DCO detailed in Section 20.7 of Chapter 20 of the original ES and within Chapter 41 of the original ES.

Socio-Economics

Original ES & DCO

- 27.2.74 Mitigation and monitoring recommended for Socio-Economics was contained within Chapters 21²³ (Section 21.7) and 42²⁴ (Section 42.8) of the original ES.
- 27.2.75 A range of ‘possible’ mitigation measures were identified within Chapter 21 of the original ES. These include (but are not limited to) the following:
- Informing North Lincolnshire Council and North East Lincolnshire Council of the timeline for implementation of the AMEP scheme;
 - Publicising the project and its scale to ensure local and regional businesses are aware of the increase in operations and employees in this area;
 - Use of a procurement strategy for the construction phase of the project; and
 - Engaging with manufacturers, tenants, MEPs, LEPs, key stakeholders to promote local suppliers, training, research and promotion of the area as a place to live and work.
- 27.2.76 The DCO requires (Requirement 9 of Schedule 11) that *“no stage of the authorised development shall commence that would affect North Lincolnshire Footpath 50 or East Riding of Yorkshire Paull Footpath 6 until a written implementation plan and specification for the making up of an alternative right of way has, after consultation with the relevant highway authority, been submitted to and approved by the relevant planning authority”*.

²³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000326-21%20-%20Socio-Economic.pdf>

²⁴ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000347-42%20-%20Socio-Economics.pdf>

Additional Mitigation and Monitoring

27.2.77 As no significant adverse effects have been identified pursuant to the proposed change, there is no requirement for additional mitigation. The change to the agreed diversion route would be incorporated into the written implementation plan and specification as required under Requirement 9.

Aviation

Original ES & DCO

27.2.78 Mitigation and monitoring recommended for Aviation was contained within Chapter 22 (Section 22.7) of the original ES.

27.2.79 Key mitigation proposed as part of the DCO was as follows:

- The main impacts are potential for increased bird strike hazard and increased hazard to aviation due to tall structures.
- It is judged unlikely there will be an increased bird strike hazard since birds are likely to be displaced further away from the runway extended centreline. Therefore, mitigation measures for bird strike hazard are unlikely to be required.
- The hazard to aviation presented by tall structures will be mitigated by provision of aviation obstacle warning lighting.
- For structures on the AMEP site less than 45 m above ground level, aviation obstacle warning lighting is not specifically required.
- For structures on the AMEP site between 45-150 m above ground level, deemed to present a hazard to aviation, medium intensity red steady obstacle warning lighting should be provided.
- The DCO noted that there is a pylon of height just under 80 m above mean sea level locate close to Humberside Airport's main runway extended centreline which is not lit. On this basis, it was judged unlikely that structures <80 m AMSL would be deemed hazards to aviation. Accordingly, it was concluded that AMEP structures up to 55 m above ground level would not require aviation warning lights.
- For structures 150 m or more above ground level, medium intensity (2000 candelas) steady red obstacle lights should be provided, positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 m.

Additional Mitigation and Monitoring

27.2.80 Following this review, it is concluded that further mitigation will be required, over and above that committed to as part of the DCO application, in relation to the potential for 200 m maximum height quay-side cranes.

27.2.81 Since the time of the DCO application, specific guidance in relation to cranes is available:

- Civil Aviation Authority (CAA) CAP 738 Safeguarding of Aerodromes (Ed.3, October 2020) contains a new Appendix B devoted to cranes that is aligned with the new CAP 1096 guidance note.
- Civil Aviation Authority (CAA) CAP 1096 Guidance to Crane Users (Ed.2.1, September 2020) is the new guidance note specifically addressing potential impacts of cranes on aviation in recognition of their distinctive character. As previously noted, between 1 October 2020 and 31 May 2021, CAP 1096 can be adopted by volunteers in a current formalised trial of the guidance note. After 31 May 2021, the guidance note will be applicable to all parties covered by its scope. The following is of note:

27.2.82 With reference to CAP 738 and CAP 1096, the following mitigation is indicated for the amended proposal quay-side cranes:

- The cranes should be provided with Medium-Intensity Steady-Red Lights (minimum luminous intensity of 2,000 Candelas). The lighting configuration should make the cranes visible at night-time from a full range of angles.
- Night-time is defined as half-hour after sunset and half-hour before sunrise.
- Examples of crane lighting are shown in Figure 22-2. Xenon-based lamps are typically used (thanks to their brightness), although LED lighting is increasingly being adopted because of its associated reduced power consumption and longer operating life.
- For a crane of height 200 m, four levels of lighting are recommended: medium intensity (Type B) at the top, low or medium intensity (Type B) at the first intermediate level, medium intensity (Type B) at the second intermediate level and low or medium (Type B) intensity again at the lowest intermediate level.
- Consultation should be undertaken with relevant stakeholders (namely CAA and Humberside Airport) as to whether the newly proposed cranes should also be supplied with daytime (white) lighting (medium intensity Type A, high intensity Types A/B).
- This should follow the submission of the new CAP 1096 Annex A “Notification Form” to CAA to initiate a formal hazard assessment and stakeholder consultation.

Waste

Original ES & DCO

27.2.83 Mitigation and monitoring recommended for Waste was contained within Chapters 23²⁵ (Section 23.7) and 43²⁶ (Section 43.8) of the original ES.

27.2.84 The mitigation measures proposed in the original ES for the construction phase are:

²⁵<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000328-23%20-%20Waste.pdf>

²⁶<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000348-43%20-%20Waste.pdf>

“23.7.1 The overall goal during the construction phase, consistent with the waste hierarchy, is to reduce the amount of waste produced to a minimum by the appropriate specification of materials brought to site, the utilisation of site won materials wherever possible and the separation of materials to facilitate recycling. This will be set out in detail, along with targets for reuse, recycling and disposal in the SWMP and in accordance with the CL:AIRE Code of Practice. The SWMP will be a working document and will be updated at regular intervals throughout the construction phase. It will identify and prioritise options for minimisation, reuse and recycling of construction wastes where practicable, and allow any unforeseen changes to the construction of the AMEP to be taken into account.

23.7.2 Spoil and hardcore generated on site will be stockpiled for use in the construction works, thereby reducing the need for imported aggregate. As such, these materials will not be classed as wastes, although an exemption from Environmental Permitting may be required if these materials require processing prior to use. Stockpiles may impact the environment through wind-blown dust and rain run-off, and therefore will be managed to avoid consequent nuisance and environmental impact.

23.7.3 Construction wastes and materials unsuitable for on-site use will require disposal as controlled waste in line with the Duty of Care. This includes general construction wastes, waste wood metals, waste electrical and electronic equipment wastes (WEEE), paints and aerosols, oils and oily rags. It is anticipated that these arisings will average 120 tonnes per month. Assuming an average payload of 4-5 tonnes, this implies between one and two additional HGV movements per day. This additional traffic will not add materially to the traffic impacts of the development.

23.7.4 All construction waste will be segregated on site before being removed. Segregation will include skips for at least general construction wastes, wood, metal, plastic, paper/cardboard and glass to facilitate their recycling. Contracts will also be placed for the separate collection using specialist containers of hazardous wastes such as oils, fluorescent tubes, WEEE, aerosols and paint cans, which also may be recycled or sent on for specialist treatment. All skips and containers will be labelled with the range of materials suitable for each and placed on designated hard standings, to be identified in the SWMP, designed to minimise potential impacts of wind, rain and run-off.”

27.2.85 The mitigation measures proposed in the original ES for the operation phase are:

“23.7.5 The operation of the site will be as a manufacturing unit with ancillary support facilities and offices accommodation. Wastes will be managed in accordance with the waste hierarchy through the adoption of best practice to ensure wastes are minimised through the appropriate specification of goods and services, and adherence to segregation regimes at all levels of operation to maximise the recycling potential of wastes arising. Preference will be given to the disposal of residual waste through incineration with energy recovery, with landfill being the disposal option of last resort.

23.7.6 The achievement of best practice will depend to a significant extent on individual behaviour and adherence to the management system(s) in place. These will be designed in accordance with the international standard ISO 14001 (Environmental Management Systems) and supported through the ISO 14001 audit programme, and include as a minimum:

- *identifying waste, highlighting potential for waste minimisation, reuse and recycling at the design stage;*
- *establishing and communicating targets for material consumption;*

- *providing clearly labelled, appropriate containers for segregated collection of materials (including in office accommodation);*
- *providing appropriate collection and storage facilities for segregated materials and wastes;*
- *ensuring the appropriate labelling of wastes to facilitate recycling and appropriate disposal;*
- *audit of chosen contractors to ensure the appropriateness of downstream management facilities;*
- *regular review and updating of the management system; and*
- *staff training in the above.*

23.7.7 Transportation impacts associated with the management of wastes have been shown to be not significant. However, transport requirements will be minimised by ensuring that skips and containers are optimally sized, that only complete loads are transported from the site and that waste is covered to reduce potential for wind blow dust and debris. On-site compaction and pre-treatment of specific wastes will be considered (eg for cardboard and plastic sheeting) where this can further optimise payloads or reduce potential impacts in downstream handling.”

Additional Mitigation and Monitoring

- 27.2.86 There is no alternate or additional mitigation needed as a consequence of the proposed material amendment beyond that contained in the original ES.

Health

Original ES & DCO

- 27.2.87 Mitigation and monitoring recommended for Health was contained within Chapter 24²⁷ (Section 24.7) of the original ES.
- 27.2.88 The DCO is accompanied by a schedule of requirements (Schedule 11) that set out required mitigation measures. The requirements cover a wide range of topics, some which relate to issues that may have an impact on human health. Key requirements relevant to potential health effects addressed in the Original ES include the following:
- Requirement 5 – provision of landscaping
 - Requirement 6 – implementation of landscaping
 - Requirement 18 - Code of Construction Practice
 - Requirement 20 - external lighting

²⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000329-24%20-%20Health.pdf>

- Requirement 21 – construction traffic
- Requirement 22 – control of noise during construction
- Requirement 23 – control of noise during operation
- Requirement 24 – control of emissions
- Requirement 25 – travel plan
- Requirement 26 – traffic management plan.

27.2.89 The above measures are comprehensive and are considered to adequately address the potential adverse health issues.

Additional Mitigation and Monitoring

27.2.90 As no significant adverse effects have been identified pursuant to the proposed change, there is no requirement for additional mitigation.

27.3.0 Summary of Additional Mitigation or Monitoring

27.3.1 Table 27-1 below provides a summary of the additional mitigation or monitoring proposed as a result of the proposed material amendment.

Table 27-2: Summary of Additional Mitigation and Monitoring

PEIR Chapter	Topic	Additional Mitigation or Monitoring
7	Geology, Hydrogeology & Ground Conditions	No alternate or additional mitigation is required following the revised assessment carried out to inform this PEIR. Notwithstanding this, confirmation from the MMO is required that elevated contaminant concentrations in the dredged material are not sufficiently high to prevent disposal of the dredging material in the Humber
8	Hydrodynamic and Sedimentary Regime	Not Applicable.
9	Water and Sediment Quality	It is concluded that no further mitigation is required , over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Water and Sediment Quality relating to the proposed scheme.
10	Aquatic Ecology	No additional mitigation is required for impacts to the Aquatic Ecology as there are no changes in the effects on the ecological components to those identified in the original ES and provided from within the extant DCO.
11	Ecology and Nature Conservation	No further mitigation is required , over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Terrestrial Ecology and Nature Conservation relating to the proposed scheme. Notwithstanding, a proposal for a non-material change to the DCO has been submitted to move Mitigation Area A to an alternative location at Halton Marshes, which is currently being considered by the Secretary of State.
12	Commercial Fisheries	No additional mitigation is required for impacts to the commercial and recreational fisheries components as there are no significant changes to those identified in the original ES for the DCO.
13	Drainage and Flood Risk	It is concluded that no further mitigation is required , over and above that committed to as part of the DCO application. This will be sufficient to control adverse effects to Flood Risk and Drainage relating to the proposed scheme. This conclusion will be reviewed upon completion of the updated wave over topping assessment.
14	Navigation	The requirement for any additional mitigation beyond that outlined within the original DCO in addition to a review of the appropriateness of the DCO mitigations with respect to commercial and recreational navigation will be undertaken as part of the NRA process informed by stakeholder consultation. A final detailed list of recommended existing and additional mitigation (if any) will be provided within the NRA and Shipping and Navigation ES Chapter.
15	Traffic and Transport	As no significant adverse effects have been identified, there is no requirement for additional mitigation. The change to the agreed diversion route for Footpath 50 would be incorporated into the written implementation plan and specification as required under Requirement 9 of the DCO.
16	Noise and Vibration	Mitigation measures to be implemented are appropriate and no alternate or additional mitigation beyond that contained within the original ES is required.
17	Air Quality	No additional mitigation measures are considered to be required beyond those within the extant DCO.
18	Marine Archaeology	Revised mitigation measures are outlined in the updated WSI based on an

PEIR Chapter	Topic	Additional Mitigation or Monitoring
		updated understanding of the design proposal (Wessex Archaeology 2021; Technical Appendix U18-1, Section 7). This includes the use of watching briefs during the backhoe dredging operations and the implementation of a Protocol for Archaeological Discoveries at all times and for all works activities.
19	Light	No additional mitigation is required to that detailed in the DCO Application.
20	Landscape and Visual Impact	No additional mitigation is required to that detailed in the DCO Application. Landscape and visual mitigation would remain the same as that permitted under the DCO detailed in Section 20.7 of Chapter 20 of the original ES and within Chapter 41 of the original ES.
21	Socio-Economic	There is no requirement for additional mitigation. The change to the agreed diversion route would be incorporated into the written implementation plan and specification as required under Requirement 9 of the DCO.
22	Aviation	It is concluded that further mitigation will be required , over and above that committed to as part of the DCO application, in relation to the potential for 200 m maximum height quay-side cranes. This is, however, subject to further design review and consultation with the aviation safeguarding team at Humberside Airport.
23	Waste	There is no alternate or additional mitigation needed as a consequence of the proposed Material Amendments beyond that contained in the original ES.
24	Health	As no significant adverse effects have been identified, there is no requirement for additional mitigation.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 28: CONCLUSION

Able Marine Energy Park, Killingholme, North Lincolnshire



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CONTENTS

28.1.0 INTRODUCTION	28-1
28.2.0 RESIDUAL EFFECTS AND CONCLUSIONS	28-3
Geology, Hydrogeology and Ground Conditions.....	28-3
Hydrodynamics and Sedimentary Regime	28-3
Water and Sediment Quality.....	28-5
Aquatic Ecology	28-6
Ecology and Nature Conservation.....	28-7
Commercial Fisheries	28-9
Drainage and Flood Risk.....	28-11
Commercial and Recreational Navigation.....	28-12
Traffic and Transport.....	28-12
Noise and Vibration.....	28-13
Air Quality.....	28-14
Marine Archaeology	28-15
Light	28-16
Landscape and Visual	28-17
Socio-Economic	28-18
Aviation	28-18
Waste	28-20
Health	28-21
28.3.0 CLOSURE	28-21

28.1.0 Introduction

- 28.1.1 This Preliminary Environmental Information Report (PEIR) has been prepared by SLR Consulting Limited (SLR) on behalf of Able UK Limited ('the client' and 'the Applicant') and sets out the results of various updated technical assessments and a compliance review of the original Environmental Impact Assessment submitted in support of a Development Consent Order (DCO) application for the Able Marine Energy Park (AMEP).
- 28.1.2 The application for the DCO was made in December 2011 and was accompanied by an Environmental Statement (ES). During the examination of the proposals additional environmental information was submitted by the Applicant and was incorporated into the ES for the project. The documents forming the project ES are listed at Schedule 11, paragraph 1 of the AMEP DCO, and this complete set of documents is referred to in this PEIR as 'the original ES'.
- 28.1.3 This PEIR is necessitated by proposals for a material amendment (also referred to as 'material change 2') to change certain details of the consented scheme. Further information regarding the DCO, the application site and its surrounding area is provided within Chapters 1 and 4 of this PEIR.
- 28.1.4 As detailed within Chapter 1 of this PEIR, following the issuing of the DCO, it has become apparent that a number of minor amendments are desirable for the AMEP scheme to be implemented. These minor amendments can be summarised as follows:
- Changes to the proposed quay layout to reclaim the specialist berth at the southern end of the quay, and to set back the quay line at the northern end of the quay to create a barge berth;
 - The addition of options to the form of construction of the quay whereby the piled relieving slab to the rear of the quay could be raised or omitted entirely (subject to detailed design), and the quay wall piles could be restrained with more conventional steel anchor piles and tie bars in lieu of flap anchors;
 - A change to the approved diversion of footpath FP50 in North Lincolnshire to avoid crossing over the existing rail track at the end of the Killingholme Branch Line;
 - Provision of a third cross dam within the reclamation area to enable greater flexibility for staged completion, and early handover of sections of the quay;
 - A change to the consented deposit location for 1.1M tonnes of clay to be dredged from the berthing pocket, to permit its disposal at HU082 or another approved location if required; and
 - An amendment to the sequencing of the quay works (as illustrated on the consented DCO drawings AMEP_P1D_D_101 to 103; Indicative Sequence Plan View[s]) to enable those works to commence at the southern end of the quay and progress northwards.
- 28.1.5 It should be noted that the changes to the proposed quay layout would result in a reduction in footprint area reclaimed from the estuary. The DCO quay reclamation has a footprint of 45 hectares, whilst the proposed reclamation within the material amendment would equate to a footprint of 43.6 hectares; a reduction of 1.4 hectares.
- 28.1.6 In addition to the above, there are no alterations proposed to the operating life or decommissioning of the site. As such, these elements remain as considered and assessed within the original ES.

28.1.7 The purpose of this PEIR is to provide preliminary environmental information to enable consultation on the proposals in advance of submitting an application to the Planning Inspectorate. Following the undertaking of a detailed and objective review of the potential environmental effects associated with the proposed material amendment, the sections below detail the likely residual effects and conclusions of each technical assessment undertaken to complete this PEIR with respect to the proposed material amendment to the DCO.

28.2.0 Residual Effects and Conclusions

Geology, Hydrogeology and Ground Conditions

- 28.2.1 The only additional effect beyond those identified in the original ES for the DCO is related to additional sediment sampling and testing continuing to show elevated trace metal and hydrocarbon concentrations; however, levels remain within normally acceptable limits to allow the previously proposed disposal of dredging material at identified locations within the Humber. Confirmation of this is required from the MMO; however, it is anticipated that no barriers to this approval remain.
- 28.2.2 The effect of additional dredging arisings being deposited in the Humber have also been considered; however, this is required as a contingency if no alternative beneficial use for clay arisings from the berthing pocket can be found.
- 28.2.3 All other effects identified in Chapter 7 of the original ES for the DCO remain relevant to the material amendment.

Residual Effects

- 28.2.4 The changes proposed as part of the material amendment do not result in any additional residual effects, beyond those identified in the original ES for the DCO, during either the construction or operational phases of the development.
- 28.2.5 The assessment contained within Chapter 7 demonstrates that there no changes to the Residual Effects previously identified as part of the DCO.

Technical Conclusion

- 28.2.6 A review of Chapter 7 of the original ES has been carried out. The only change from the baseline, effects and mitigation assessed in the original chapter is related to additional sediment sampling and testing required under the Deemed Marine Licence in Schedule 8 of the DCO.
- 28.2.7 Additional testing has identified trace element and TCH levels in excess of the AL1 level; however, all levels either remain below their respective AL2 level, or consistent with background concentrations typical for the River Humber. Based on this no additional mitigation is considered necessary.
- 28.2.8 An extension of the approval for the disposal of dredged sediments in the Humber is still to be confirmed; however, it is anticipated that this will be provided and no barriers to approval remain.

Hydrodynamics and Sedimentary Regime

- 28.2.9 Disposal of stiff glacial till to site HU082 will result in localised changes to the tidal currents and wave action in proximity to the site although it is expected that the majority of the placed material will erode and enter the water column within a few years of placement.
- 28.2.10 The proposed amended quay layout leads to no significant change in assessed impacts on water levels compared to the current baseline
- 28.2.11 The proposed amended quay leads to no significant change in assessed impacts to flood tide flows

compared to the consented layout. During the ebb tide, a localised region of flow acceleration is predicted off the downstream end of the quay. This initial change may diminish with time but should be noted.

- 28.2.12 Similar patterns of bed shear stress are presented for the proposed quay layout as for the consented layout.
- 28.2.13 The proposed quay layout leads to no significant change in assessed impacts on waves compared to the consented layout.
- 28.2.14 For the proposed quay layout, mud transport modelling using present-day bathymetry predicts a reduction in maintenance dredging requirements (compared with the updated baseline) at adjacent berths except for a potential increase at South Killingholme Oil Jetty (SKOJ), immediately downstream, (+35,000 to 88,000 m³/year) and a potential increase (+3,000 to 7,000m³ per year) at Immingham Gas Terminal (IGT), also downstream. Refer to Table 8-2 of Chapter 8.
- 28.2.15 From the sand transport modelling some potential increases of sand deposition compared with baseline are predicted for Humber International Terminal (+50,000 to 102,000 m³), C.Ro Port (the former Humber Sea Terminal) (+13,000 to 18,000 m³), Immingham Bulk Terminal (+8,000 to 13,000 m³), Immingham Outer Harbour (+2,000 to 3,000 m³) with a reduction of 100,000 to 204,000 m³ predicted at SKOJ, and between 18,000 m³ increase or 29,000m³ reduction likely at IGT. Refer to Table 8-3 of Chapter 8
- 28.2.16 The significance of these potential effects on future maintenance dredging at these nearby berths should be assessed alongside evidence of the composition of the material that is presently dredged from the berths. It is understood that the bulk of the material from the berths is muddy. If the berths are not presently subject to significant sandy infill, which is understood to be the case, then the changes due to AMEP in terms of sandy sedimentation in the berths are not predicted to arise.
- 28.2.17 Using the same methodology for the proposed quay layout as for the consented scheme, there is predicted to be an increase of up to 41,000 m³/year muddy sediments and a decrease of 34,000 m³/year for sandy sediments into the AMEP Berth Pockets. Significant localised sand deposition onto the dredged slopes of the proposed turning area / approach channel is predicted.
- 28.2.18 To the northwest of AMEP, bed level rising is likely to be at a slightly lower rate with the proposed quay layout. To the southeast there is likely to be no significant change from that predicted, other than to note that significant accretion has taken place since the original assessment (as a result of HIT) which leads to a reduced accretionary effect attributable to AMEP.

Residual Effects

- 28.2.19 Given that mitigation is not possible, the residual impacts remain as per the impacts described in the Assessment of Effects section of Chapter 8: Hydrodynamics and Sedimentary Regime (Section 8.4.0).
- 28.2.20 The predicted annual maintenance requirement arising from operations will be in the range 210,000 to 520,000 dry tonnes (previously consented scheme 250,000-630,000 dry tonnes) from the dredging of the AMEP Berthing Pocket and Dock. This is likely to require dredging by TSHD and disposal at the Sunk Deep Channel disposal site HU080 as presently consented.
- 28.2.21 An upper estimate of maintenance dredge arisings based on present-day bathymetry modelling is

357,000 dry tonnes, which is consistent with the value for the consented scheme (429,000 dry tonnes). It is noted however that an additional 21,000 dry tonnes per year is predicted to be deposited into the berth pockets, with 288 m of berth pocket now set 61 m further towards the shore in a slightly shallower location. Additionally, a potential reduction of 16,000 m³ in sand infill is predicted to occur in the quay berthing pockets compared with the consented Quay.

- 28.2.22 The overall potential deposition of sandy sediments into the turning area is significantly increased, likely due to the different turning area polygons considered and not as a result of the amended quay layout, but in practice this will be limited by supply and it is noted that since consent this area has already significantly deepened. The prediction conservatively assumes there is an abundance of mobile sand in proximity to the manoeuvring area.

Technical Conclusion

- 28.2.23 Changes in water levels, bed shear stresses and waves are similar for the material change layout and the consented layout. There are small differences in the peak flow patterns on the ebb tide. Changes to dredging requirements at the AMEP and surrounding facilities are detailed in Table 8-2 and Table 8-3 of Chapter 8: Hydrodynamics and Sedimentary Regime.

Water and Sediment Quality

- 28.2.24 As detailed in the original ES, residual effects relating to Water and Sediment Quality will be minimal provided that proposed control measures and monitoring are fully implemented. The updated technical assessment and additional monitoring indicates that this conclusion will not be changed by the proposed material amendment.

Residual Effects

- 28.2.25 Within the ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Water and Sediment Quality during the construction phase were restricted to minor impacts associated with the dredging operation. Following additional assessment, no further residual impacts have been identified by this review.
- 28.2.26 The updated modelling (PIER Appendix U8.1) predicts that for backhoe dredging of glacial till the increases in suspended sediment concentration at the Uniper Power Station intake will be a maximum of 70mg/l. For the proposed dredging of alluvium by TSHD (without overflowing) the maximum uplift in concentrations were just 45mg/l. TSHD Dredging of sand/gravel would result in greater uplifts of up to 450mg/l for a period of up to one week.
- 28.2.27 The modelling indicates that increases in peak sediment concentration of more than 10mg/l will occur up to 17km from the point of dredging and will extend slightly further upstream for the amended scheme than for the consented scheme. However, when compared to the baseline range of suspended sediment concentrations these potential small uplifts are not considered to be significant.
- 28.2.28 During construction, the removal of sediment through dredging may result in changes to the composition of surface sediments. A number of heavy metal contaminants, including copper, exceed the UK CEFAS Action Level 1 Guidelines. The removal of sediments through dredging will cause sediment bound contaminants to become widely redistributed within the estuary with a minor portion permanently removed from the estuary with the outgoing tides to coastal waters. The overall impact is not considered to be significant, because of the wide dispersion, and tendency

of contaminants to remain bound to or quickly be reabsorbed upon dissociation from the sediment. It is considered unlikely that average sediment quality in any given location will deteriorate.

- 28.2.29 Within the original ES, following consideration of mitigation, the residual effects relating to Water and Sediment Quality during the construction phase were identified to be restricted to thermal impacts and sediment impact associated with maintenance dredging. Following additional assessment, no further residential impacts have been identified by this review.
- 28.2.30 In relation to thermal impacts it was previously identified that changes in circulation associated with the quay could reduce mixing around the Uniper (formerly E.On) intake and result in a slight uplift in peak temperature. The modelled changes were however small (<0.2°C). Updated modelling (PIER Appendix U9-4) has confirmed that the material amendment will result in no discernible change in the level of potential effect. This is not considered significant.
- 28.2.31 With regards to the impact associated with maintenance dredging this will be no greater than already considered in relation to the dredging required for construction. This should therefore not result in significant adverse effects.
- 28.2.32 Following this review, it is concluded that there are no changes to the residual effects previously identified as part of the DCO.

Technical Conclusion

- 28.2.33 The AMEP site is located within and adjacent to the Humber Estuary which is a dynamic and energetic environment with valuable ecological characteristics.
- 28.2.34 The proposed material amendment would involve changes to physical works within and immediately adjacent to the estuary. As a result, there is a potential for a change in the effect of the scheme during construction associated primarily with dredging and deposition of estuarine sediment. Detailed analysis and assessment has however confirmed that these impacts will remain small and are not significant.
- 28.2.35 The proposed material amendment would also involve a variation to the final quay profile. While associated impacts of this on flow patterns and sediment deposition are considered in Chapter 8 of this PIER there is also a potential for changes in mixing and circulation to impact water quality. Detailed analysis and assessment has however confirmed that these impacts will remain small and are not significant.

Aquatic Ecology

- 28.2.36 For aquatic ecology, the potential pathways for environmental effects from the proposed material amendment arise from:
- Construction of the quay entailing: Loss of habitat (intertidal and subtidal) and benthic communities from the reclamation of ground required for the quay; underwater noise and vibration from piling; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and changes to aquatic environment in adjacent water bodies;
 - Dredging of the quay, berth pocket and approaches entailing: Habitat change from substrate removal; habitat and benthic communities disturbance from the sediment plume; indirect

changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance; and

- Dredge Disposal entailing: Loss of subtidal habitat and benthic communities from dredge spoil disposal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

28.2.37 The actual likelihood of any significant effects to occur to the aquatic ecology of the area from the material amendment have been discounted, with it being concluded that the effects as identified in the original ES from the DCO remain valid.

28.2.38 Only very small scale localised alterations to these are expected, these not measurable against the background natural variability of the estuarine system.

Residual Effects

28.2.39 The review of revised baseline data where available and/or appropriate, in the context of the material amendment has not identified any significant new impacts and as such, no additional mitigation is considered necessary.

28.2.40 The residual effects on the Aquatic Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO.

Technical Conclusion

28.2.41 Where appropriate, new baseline conditions have been characterised and assessed against those described in the original ES. No significant changes have been identified outwith those described in the original application and the Examining Authorities Report (2013).

28.2.42 Based on the assessment of potential changes to the aquatic ecology of the area against conditions identified in the original ES baseline, and from the assessment of the material amendment, no significant effects have been identified other than those assessed in the original ES.

28.2.43 Mitigation measures for aquatic ecology proposed in the original ES and secured through the DCO are considered to remain valid, with no significant residual impacts to the aquatic ecology of the Humber Estuary expected following their discharge.

Ecology and Nature Conservation

28.2.44 A Preliminary Ecological Appraisal of the site and its surroundings was carried out in March 2021 and found some minor changes in baseline habitat, but none that would materially affect the original assessment or indicate that the habitat was more favourable to any species now compared to 2012.

28.2.45 Given that effects on the Terrestrial Ecology components have not changed compared to the original ES, and no additional mitigation is required, the residual effects on the Terrestrial Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES (Section 11.8).

- 28.2.46 There will be a direct and indirect loss of the Humber Estuary European Marine Site designated as an SPA, SAC, Ramsar Site and SSSI. These losses cannot be mitigated and therefore residual impacts to the Killingholme Marshes intertidal and sub-tidal habitats will be significant and likely to affect the integrity of the site. As a consequence, it was concluded in the original ES that compensation would be required to offset this impact. A compensation scheme was developed and consented by the Secretary of State.
- 28.2.47 As a result of the proposed material changes (and habitat changes that have occurred since the consent was issued, specifically colonisation of intertidal mudflat by saltmarsh), that loss of habitat would reduce from 58.6 to 58.0 ha. The agreed compensation scheme would, however, be unchanged; compensation ratios for the habitat that will be lost are reviewed in Technical Appendix U11-2 and remain demonstrably suitable.
- 28.2.48 The AMEP development will result in a loss of 100.3 ha of terrestrial semi-natural habitat, including Station Road Fields LWS (which has already been cleared for development pursuant to planning permissions granted by North Lincolnshire Council for enabling works). Mitigation measures have already been implemented to ensure that there will be no significant residual impacts associated with terrestrial habitat loss, though these are still subject to an outstanding application to the Secretary of State for a non-material change to relocate the principal ecological mitigation site.
- 28.2.49 Existing mitigation plans for great crested newt and water voles will reduce impacts on these protected species to a negligible level (and water vole mitigation may in fact enhance habitat in the long term), so there will be no significant residual effects on these species as a consequence of the material amendment.

Residual Effects

- 28.2.50 Given that effects on the Terrestrial Ecology components have not changed compared to the original ES, and no additional mitigation is required, the residual effects on the Terrestrial Ecology receptors from the material amendment and AMEP development as a whole remain as identified in the original ES (Section 11.8).
- 28.2.51 The residual effects of the AMEP development were set out in the original ES section 11.8. There would be a direct and indirect loss of the Humber Estuary European Marine Site designated as an SAC, Ramsar Site and SSSI, agreed then to represent a direct loss of 31.5ha of inter-tidal mudflat, an additional loss of 11.6ha of functional mudflat habitat and a direct loss of 13.5ha of estuarine habitat from Killingholme Marshes foreshore. In addition there would be a permanent loss of 2ha of saltmarsh from Cherry Cobb Sands due to the breach of the sea wall for the compensation site, although this habitat would become intertidal mudflat and would not be lost altogether. The figures are confirmed in the SoCG on the original Habitats Regulations Assessment between the Applicant and Natural England/MMO¹, Table 3.2 and paragraphs 3.5.1 -3.5.2). These losses cannot be mitigated and therefore residual impacts to the Killingholme Marshes intertidal and sub-tidal habitats will be significant and likely to affect the integrity of the site. As a consequence, it was concluded that compensation would be required to offset this impact. A compensation scheme was developed and is consented as associated development through the DCO.

¹<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>

- 28.2.52 As a result of the proposed material change (and habitat changes that have occurred since the consent was issued, specifically colonisation of intertidal mudflat by saltmarsh), that loss of habitat would reduce from 58.6 to 58.0 ha. The agreed compensation scheme would, however, be unchanged.
- 28.2.53 Residual effects on wetland birds during construction, will include (1) the direct loss of feeding, staging and loafing habitat at Killingholme Marshes Foreshore intertidal mudflat and feeding/roosting resource of wetland birds on the Killingholme Fields; and (2) disturbance and displacement of wetland birds utilising the remaining Killingholme Marshes Foreshore intertidal mudflat and the Killingholme Fields. Indirect impacts associated with the loss of the Killingholme Marshes Foreshore intertidal mudflat may also have the potential to affect the usage of North Killingholme Haven Pits as a roost site. A significant residual impact was predicted in the original ES and that remains the case for the proposed material change. However, compensation habitat provided on the northern bank is expected to provide suitable foraging and roost sites for these species. Further information is provided in the draft Habitats Regulations Assessment included in the consultation material.
- 28.2.54 There will be a loss of 100.3 ha of terrestrial semi-natural habitat within the AMEP site. This will include loss of the Station Road Fields LWS is of local value for the AMEP site. However, with the mitigation measures being implemented, there will be no significant residual impacts associated with terrestrial habitat loss.
- 28.2.55 The existing mitigation plans for great crested newt and water voles will reduce impacts on these protected species to a negligible level (and water vole mitigation may in fact enhance habitat in the long term), so there will be no significant residual effects on these species.
- 28.2.56 Overall, there are no changes to the residual effects identified within the Chapter 11 of the original ES.

Technical Conclusion

- 28.2.57 Where appropriate, new baseline conditions have been characterised and assessed against those described in the original ES. No significant changes have been identified outwith those described in the original ES and considered in the Examining Authorities Report (2013).
- 28.2.58 Based on the above assessment of potential changes to the terrestrial ecology and nature conservation of the area against conditions identified in the original ES baseline, and from the assessment of the material amendment, no significant effects have been identified other than those assessed in the original ES from the DCO.
- 28.2.59 Mitigation measures provided in the original ES and secured in the DCO (principally by the requirement to obtain approvals for a series of Environmental Management and Monitoring Plans) are considered to remain valid.
- 28.2.60 Overall, there are no changes to the residual effects identified within the original ES and the approved compensatory habitat will remain suitable to offset effects that cannot be mitigated.

Commercial Fisheries

- 28.2.61 The potential pathways for effects to Commercial and Recreational Fisheries from the proposed material amendment arise from indirect impacts to the fish and shellfish communities present

around the vicinity of the proposed development and/or using the area around the development sites to move through the estuary on migration.

28.2.62 On this basis, the main areas of potential effect arise from the impacts of the material amendment to the fish communities of the estuary around the development:

- Construction of the quay entailing: Loss of habitat (intertidal and subtidal); underwater noise and vibration from piling; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes.
- Dredging of the quay, berth pocket and approaches entailing: Habitat change from substrate removal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.
- Dredge Disposal entailing: Loss of subtidal habitat and benthic communities from dredge spoil disposal; habitat and benthic communities disturbance from the sediment plume; indirect changes to habitats from project-induced changes in hydrodynamic and morphodynamic regimes; and disturbance to fish and fish eggs/larvae from habitat loss and disturbance.

28.2.63 The actual likelihood of any significant effects to occur to the commercial fisheries of the area from the material amendment has been discounted, with it being concluded that the effects as identified in the original ES remain valid in the context of Commercial and Recreational Fisheries, with any alteration in effect arising from the material amendment being either so small as to not be measurable or accommodated within the natural variability of the estuarine system.

Residual Effects

28.2.64 The review of revised baseline data where available and/or appropriate, in the context of the material amendment have not identified any significant new impacts and as such, no additional mitigation is considered necessary.

28.2.65 The residual effects on the Commercial and Recreational Fisheries receptors from the material amendment and AMEP development as a whole remain as identified in the original ES from the DCO.

Technical Conclusion

28.2.66 Where data have been available the baseline conditions have been updated although the importance of the area around the vicinity of the AMEP development is not considered to be high for commercial and recreational fishing activity.

28.2.67 These data, and potential impact pathways from the material amendment, have been assessed against those described in the original ES, these largely relating to indirect effects through potential impacts to the fish and shellfish communities of the area.

28.2.68 No significant changes have been identified outwith those described in the original ES and the Examining Authorities Report (2013).

28.2.69 Based on the above assessment of potential changes to the commercial and recreational fisheries

of the area against conditions described in the original ES baseline, and from the assessment of the material amendment and pathways of potential impact, no significant effects have been identified other than those assessed in the original ES.

28.2.70 Mitigation measures provided in the original ES are considered to remain valid, with no significant residual impacts to the Commercial and recreational Fisheries of the Humber Estuary in the vicinity of the AMEP development expected following their discharge.

Drainage and Flood Risk

28.2.71 As detailed in the original ES residual effects relating to Flood Risk and Drainage will be minimal. This will not impact by the proposed material amendment. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

Residual Effects

28.2.72 Within the original ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Flood Risk and Drainage during the construction phase were identified to be:

- the accidental release of polluting substances into the sea and inland watercourses (control measures will be implemented to mitigate the impacts of pollution incidents).

28.2.73 Within the original ES submitted for the DCO, following consideration of mitigation, the residual effects relating to Flood Risk and Drainage during the operation phase were identified to be:

- Flood risk due to breach of tidal defences (to be mitigated by implementation of a robust Flood Warning and Evacuation Plan);
- Flood risk due to over topping of the existing tidal defences to the north of the quay which, under the terms of legal agreement (Appendix U13-2), will continue to be restricted to no more than 2l/s/m for the 1 in 200 annual probability event in 2033 (to be mitigated by implementation of a robust Flood Warning and Evacuation Plan);
- Flood risk due to failure of the proposed NELDB pumping station (residual impacts are likely to be Minor Adverse and will be mitigated by the use of multiple pumps, alarms, etc); and
- Flood risk due to failure of the proposed foul pumping stations (residual impacts are likely to be Minor Adverse and will be mitigated by the use of standby pumps, alarms and flow storage facilities).

28.2.74 Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO. This conclusion will be reviewed upon completion of the updated wave over topping assessment.

Technical Conclusion

28.2.75 The site is set in a context where flooding is possible; however, this risk is largely controlled through flood defences. The scheme design has been developed to reflect the prevailing risk and will not exacerbate flood risk elsewhere. Residual risk will then be managed through implementation of a robust flood warning and evacuation strategy.

- 28.2.76 With regards to drainage, storm water runoff from the site will be discharged to the Humber Estuary. Particularly during construction however, there is a potential for pollution to occur to the adjacent surface water channels and networks. This will be controlled and managed through the implementation of good construction practices.
- 28.2.77 In both cases the proposed material amendment will make no difference to the potential effects and no additional mitigation will be required.

Commercial and Recreational Navigation

- 28.2.78 This PEIR has considered the possible effects of the Project pertinent to commercial and recreational navigation in light of the material change.
- 28.2.79 All effects assessed as part of the existing DCO application are scoped into the Navigational Risk Assessment (NRA) update. One additional effect 'Impact on mooring / break out risk' has been identified for assessment.
- 28.2.80 A preliminary NRA review of effects anticipates little significant change to the 2011 assessment of commercial and recreational navigation as a result of the material change.
- 28.2.81 Possible additional risk controls may be identified, and the most appropriate mitigation measures will be recommended in light of their assessed effectiveness, ensuring navigational risks are 'As Low As Reasonably Practicable' (ALARP).

Technical Conclusion

- 28.2.82 Early review of the anticipated effect of the material amendment to the consented AMEP project is anticipated to be low given information available to date. Detailed assessment of individual hazards and stakeholder consultation is required and will be undertaken as part of an updated NRA to fully consider the effect of the material change.

Traffic and Transport

- 28.2.83 The proposed material amendment has been reviewed for the potential impacts on traffic and transportation during the construction and operation phases, with consideration of how the proposed material amendment changes the effects identified in the original ES.
- 28.2.84 The proposed amendment to the agreed footpath diversion route around the Quay is required to avoid the potential requirement for a new bridge crossing of the Killingholme Branch line. The proposed new route would, by means of a 440m diversion, relocate the path onto a closed section of the railway line where there is an existing agricultural crossing. The proposed addition to the length of the route is considered to be offset by the benefit to users of removing the proposed footbridge, especially for users such as ambulant disabled users for whom using a bridge would be at best inconvenient or potentially prohibitive. The proposed changes are therefore not assessed to have a significant effect on users.
- 28.2.85 Qualitative consideration indicates that the proposed material amendment will not materially affect the level of traffic generated during the construction or operation phases of the development. Any changes to the construction traffic are likely to be minimal in scale, and therefore the original ES is deemed to suitably assess the effects of traffic and transportation.

28.2.86 The DCO provides mitigation measures (for both the construction and operation phases) which would remain in place for the proposed material amendment. Consultation with North Lincolnshire Council and Highways England during the Scoping exercise has confirmed that all major highways works necessary to mitigate for the development of AMEP are, in fact, complete and they are satisfied the material amendment will not impact on the highway networks.

28.2.87 The residual impacts of traffic and transportation of the development are Neutral/Negligible with no discernible effect.

Residual Effects

28.2.88 The original ES did not identify any effects which remained significant following the application of the mitigation measures.

28.2.89 The original ES determined that no significant impacts are predicted during the construction phase.

28.2.90 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in the original ES Transport Chapter, which were defined as negligible.

Technical Conclusion

28.2.91 On the basis of the above review, SLR considers that the proposed material amendment would result in no material change to traffic levels/patterns generated during the construction and operation phases.

28.2.92 During the original ES scoping discussions with the then HA and NLC, the issue of the proposed HA A160/A180 upgrade scheme was raised, in terms of how this should be taken into account within the EIA. Although there was a possibility that the A160/A180 scheme would not be given funding, or alternative streams of funding might be found, for the purposes of the EIA, scenarios with the scheme in place were not included.

28.2.93 Consultation with North Lincolnshire Council has confirmed that all major highways works are complete and they are satisfied the material amendment will not impact on the highway networks.

28.2.94 The proposed amendment to the agreed footpath diversion route is not assessed to have a significant effect on users of the England Coast Path.

28.2.95 As such, SLR concludes that the original ES remains adequate in its review of the effects of development derived traffic.

Noise and Vibration

28.2.96 Chapter 16 of the original ES has been reviewed in the context of the proposed material amendment, to determine whether the proposals, and subsequent changes in policy, guidance and baseline conditions have the potential to lead to changes in the findings as described within the original ES.

28.2.97 Following this review, no changes have been identified that would alter the assessment of effects as described within the original ES.

Residual Effects

- 28.2.98 Following consideration of mitigation, residual effects relating to noise and vibration during the construction phase are identified within the original ES.
- 28.2.99 Following consideration of mitigation, residual effects relating to noise during the operational phase are identified within the original ES.
- 28.2.100 Following this review, it is considered that there are no changes to the assessment of effects identified within the original ES.

Technical Conclusion

- 28.2.101 This review has identified that the proposed material Amendment, and changes in policy, guidance and baseline conditions that have occurred since the original DCO application, will not alter the findings presented within the original ES.
- 28.2.102 It is therefore concluded that Chapter 16: Noise and Vibration of the original ES remains valid.

Air Quality

- 28.2.103 An air quality assessment was undertaken to assess potential impacts and effects of both the construction and operational phases of the AMEP. Full details of the assessment can be found in the original ES (Chapter 17).
- 28.2.104 A summary of the predicted effects for air quality, consistent with the original ES are presented within Chapter 17 of this PEIR.
- 28.2.105 It is assumed that construction and operational activities would be undertaken in line with recognised industry good practice.

Residual Effects

- 28.2.106 Construction phase effects would be considered as short-term and temporary in nature and with the correct implementation of appropriate dust mitigation measures, residual effects would be rendered 'not significant'.
- 28.2.107 There are not considered to be any significant residual effects associated with the operational phase.
- 28.2.108 There are no changes to the residual effects identified within the original ES of the DCO.
- 28.2.109 The original ES mentioned that the possible AQMA declaration in Killingholme could have altered this conclusion. However, no AQMA was declared and there has been noted improvements in pollutant concentrations in Killingholme. Therefore, the conclusions of the original ES stand and remain precautionary in terms of the assessment of receptor sensitivity and subsequent magnitude of change predicted.

Technical Conclusion

- 28.2.110 The Air Quality Chapter of the original ES which supported the DCO Application, included detailed

qualitative and quantitative air quality assessments to assess the construction and operational phases of the AMEP.

- 28.2.111 The assessment considered several pollutants and several emissions sources, across a range of human and ecological receptors existing within the study area.
- 28.2.112 This PEIR has considered the predicted effects of the original ES, and the current and future baseline, in the context of the material amendment and whether the material amendment and current baseline will materially alter the conclusions of the original Air Quality Chapter to the ES. This includes an assessment of the increased duration of dredging and associated vessel movements and emissions. It has been concluded that the original ES conclusions, which predicted all effects as 'not significant' remain valid.
- 28.2.113 The material amendment is therefore not considered to result in any new/different effects or effects of a greater magnitude than were previously assessed.

Marine Archaeology

- 28.2.114 The construction phase impacts altered by the change in quay design and dredging from the original ES are:
- Additional Dredging of alluvium from intertidal area; and
 - Amended dredging operations in the Berthing Pocket (Section 18.6 of the original ES).
- 28.2.115 The overall footprint of the quay is largely unchanged and provided there is no alteration to the depths of the dredging in the in the Berthing Pocket, Approach Channel and Turning Area these changes do not induce additional effects on the marine Historic Environment to those assessed in the original ES.
- 28.2.116 Operational phase impacts associated with marine Historic Environment will be unchanged from those considered in the DCO application.
- 28.2.117 There will be no additional cumulative effects associated with the marine Historic Environment.
- 28.2.118 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the construction phase or the operational phase. Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO.
- 28.2.119 The proposed material amendment will not alter the effects as identified within the original ES.

Residual Effects

- 28.2.120 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the construction phase (Section 18.8 of original ES).
- 28.2.121 Given the permanence of the effect upon marine Historic Environment receptors, there were no residual effects identified in the original ES with regard to the operational phase (Section 18.8 of original ES).

28.2.122 Following this review, it is concluded that there are no changes to the Residual Effects previously identified as part of the DCO.

Technical Conclusion

28.2.123 The material amendment relating to the footprint of the new quay and the dredging volumes may impact the marine Historic Environment. However, the difference in impact is negligible as compared to those assessed in the original ES. The risks to the marine Historic Environment can be adequately mitigated through the mitigation measures set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2), with the location of the archaeological watching brief altered to correspond with the updated location of the berthing pocket (Figure 18-1, Technical Appendix U18-1).

28.2.124 The proposed material amendment will make no difference to the potential effects and no additional mitigation will be required to those set out in the 2021 WSI (Wessex Archaeology 2021; Technical Appendix U18-2).

Light

28.2.125 There are not considered to be any changes to the lighting impacts predicted as part of the Lighting Assessment submitted with the original ES.

28.2.126 Despite the new development, including lighting, which has taken place within the DCO Application boundary, there would be no change to the Environmental Zone of the area which is still considered to be E4, "High District Brightness". This is the highest Environmental Zone detailed within ILP Guidance (Ref 2).

28.2.127 No changes are proposed to the lighting levels on the site. The precise arrangements for external lighting are reserved matters requiring the submission of written details and their subsequent approval by the local planning authority following consultation with the highway authority and Natural England, in accordance with Schedule 11, paragraph 24 of the DCO.

28.2.128 It is considered that the conclusions associated with the Lighting Assessment undertaken as part of the original ES for the DCO Application remain valid.

Residual Effects

28.2.129 There will be no residual lighting effects arising from the development on sensitive receptors, both amenity and ecological.

28.2.130 With mitigation measures in place, there will be no change to the residual effect on amenity as stated within Chapter 19 of the original ES.

28.2.131 With mitigation measures in place there are no residual effect on ecological receptors.

28.2.132 There are no changes to the residual effects to those stated within the DCO Application.

Technical Conclusion

28.2.133 The lighting assessment for the DCO application looks at impacts associated with both construction and operational phase lighting associated with the proposals.

- 28.2.134 The DCO baseline is still considered representative of the current baseline situation. Despite new development, including the lighting. The area is still classified as Environmental Zone E4, “high district brightness”.
- 28.2.135 Effects of the external lighting associated with the proposed development are still considered to be 'not significant'. As such, it is considered that lighting does not represent a material constraint to the development proposals, which conform to the principles of National Planning Policy Framework and Local Policy. On this basis, this topic will be ‘scoped out’ of the updated ES.

Landscape and Visual

- 28.2.136 The proposed material amendment has been reviewed to assess whether they would result in a significant change to the level and type of effects assessed in Chapter 20 of the original ES on the landscape and visual resource and whether any additional effects would result during the construction and operational phases.
- 28.2.137 The proposed material amendment would result in very limited changes to the composition of available views towards the quay line. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 28.2.138 They would also result in limited changes to the views available to walkers along the footpath diversion with a change in crossing point to avoid the Killingholme Branch railway. There would be no significant change to the level and type of visual effect assessed in Chapter 20 of the original ES on walkers along this footpath. No additional visual effects would result from this change.
- 28.2.139 There would be no change to the level and type of effect assessed in Chapter 20 of the original ES on the landscape resource. No additional landscape effects would result from the proposed material amendment.

Residual Effects

- 28.2.140 The changes proposed as part of this material amendment do not result in any additional residual effects, beyond those identified in the original ES for the DCO.
- 28.2.141 The changes proposed as part of this material amendment do not result in any additional residual construction phase effects, beyond those identified in the original ES for the DCO.
- 28.2.142 The changes proposed as part of this material amendment do not result in any additional residual operational phase effects, beyond those identified in the original ES for the DCO.
- 28.2.143 This assessment demonstrates there no changes to the residual effects previously identified as part of the DCO.

Technical Conclusion

- 28.2.144 On the basis of the above review, SLR considers that the proposed material amendment would result in very limited, and not significant, changes to the landscape and visual resource of the study area and to the effects already assessed in Chapter 20 of the original ES for the DCO.
- 28.2.145 As such SLR concludes that the extant landscape and visual assessment contained within the original

ES remains adequate.

- 28.2.146 On the basis of the assessment contained within this PEIR, and the associated Scoping Opinion issued by PINS, this topic will not be brought forward within the Updated ES.

Socio-Economic

- 28.2.147 The proposed changes to the DCO with regard to socio-economic effects are confined to impacts on recreational routes that form part of the Public Rights of Way network and the proposed route of the England Coast Path, a National Trail. Whilst Public Rights of Way in this area have only local importance, the England Coast Path is of national importance and therefore is considered a receptor of high sensitivity.
- 28.2.148 The presence of the England Coast Path in this location did not form part of the baseline in the original ES. Progress with opening the route around England as a whole, including defining the proposed route in this location, has altered the baseline and this is taken into account in this PEIR.
- 28.2.149 The proposed amendment to the agreed diversion route around the Quay is required to avoid construction of a new bridge crossing of the Killingholme Branch line. The proposed new route would, by means of a 440m diversion, relocate the path onto a closed section of the railway line where there is an existing agricultural crossing. The proposed addition to the length of the route is considered to be offset by the benefit to users of removing the proposed footbridge, especially for users such as ambulant disabled users for whom using a bridge would be at best inconvenient or potentially prohibitive. The proposed changes are therefore not assessed to have a significant effect on users of the England Coast Path.
- 28.2.150 As the proposed changes are negligible in the context of the route of the England Coast Path through North Lincolnshire, they are not assessed to have a significant effect on the tourism economy. It is therefore concluded that the diversion of the England Coast Path is not material to the socio-economic assessment. As other aspects of the socio-economic assessment have already been scoped out, it is concluded that this topic will not be taken forward into the updated ES.

Residual Effects

- 28.2.151 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in Chapter 21 of the original ES.

Technical Conclusion

- 28.2.152 The proposed changes include a change to the proposed route of the England Coast Path, a recreational asset of national importance. This assessment takes account of the fact that, since the original ES was prepared, progress on opening the England Coast Path has resulted in a substantial change to the socio-economic baseline.
- 28.2.153 The assessment has taken into account both the change to baseline as well as the proposed amendment to the scheme, and has concluded that there would be no significant effect and the matter will be scoped out of the updated ES.

Aviation

- 28.2.154 While there have been significant recent updates to the regulations and guidance notes related to

aviation safeguarding and the lighting of structures deemed to be “obstacles” by the regulations, none of these has involved a change to the parameters affecting the potential impacts of such obstacles, eg calculation of the Obstacle Limiting Surface (OLS) at an aerodrome, relevant to the previous DCO application.

- 28.2.155 Similarly, no new developments have taken place at Humberside Airport operations with respect to the airport’s OLS, eg no new runways, etc.
- 28.2.156 The key material change to the amended proposal is the potential for quay-side cranes at the AMEP site to reach a maximum potential height above ground of 200 m.
- 28.2.157 In the original ES, the previously assumed maximum crane height was 165 m.
- 28.2.158 The effect of the increase crane height is that Humberside Airport’s OLS (specifically its Outer Horizontal Surface) may be penetrated by the taller cranes.
- 28.2.159 In this instance, additional mitigation recommendations have been triggered and further consultation with relevant stakeholders (CAA and Humberside Airport) is now warranted.

Residual Effects

- 28.2.160 Following consideration of both the DCO mitigation and additional mitigation, the residual effects relating to aviation safeguarding during the construction phase are identified to be:
- With the provision of the aviation warning light mitigation measures made in this report the hazard to aviation presented by construction of the newly proposed cranes will be mitigated to a level in line with those presented at other airports and aerodromes in the UK. Therefore, the residual impact is judged to be low.
- 28.2.161 Following consideration of both the DCO mitigation and additional mitigation, the residual effects relating to aviation safeguarding during the operational phase are identified to be:
- As per the DCO, since birds will likely be displaced to locations further away from Humberside Airport, it is judged that the bird strike hazard will not be increased.
 - With the provision of the aviation warning light mitigation measures made in this report, the hazard to aviation presented by the newly proposed cranes will be mitigated to a level in line with those presented at other airports and aerodromes in the UK. Therefore, the residual impact is judged to be low.
- 28.2.162 Following this review and the additional mitigation recommendations contained herein, it is concluded that there are no changes to the residual effects previously identified as part of the DCO.

Technical Conclusion

- 28.2.163 A review has been undertaken of aviation safeguarding requirements in relation to the amended AMEP proposal with respect to lighting requirements.
- 28.2.164 This has not changed from that defined within the original ES for the DCO application, including the location of the OLS (Obstacle Limiting Surface) for Humberside Airport.
- 28.2.165 These have not changed from those defined within the original ES for the DCO application.

- 28.2.166 While not defined within the original ES for the DCO application a hierarchy has been employed for mitigation. Where possible this seeks to avoid adverse effects and only where this is not possible are remedial options for reducing, remedying or compensating for any identified effects considered.
- 28.2.167 In the present instance, should the decision to deploy the newly proposed taller cranes be confirmed during detailed design, the recommended notification, consultation and lighting mitigation recommendations should be implemented.
- 28.2.168 With the exception of the newly proposed quay cranes at the site, no significant changes have been proposed in relation to key building heights and other structure elements (including lighting poles) relevant to the assessment of aviation safeguarding and marking/lighting of obstacles.
- 28.2.169 Accordingly, the material amendment and the associated changes to the proposed design will not therefore give rise to any new or different impacts on aviation safeguarding.

Waste

- 28.2.170 The proposed material amendment has been reviewed for their potential impacts on wastes arising during the construction and operation phases, with consideration of how the proposed material amendment compare to the waste effects identified in the original ES.
- 28.2.171 Qualitative consideration indicates that the proposed material amendment would, on balance, likely reduce the quantum of construction wastes arising from the project (associated with the footpath re-routing and quay realignment). No changes to the operational wastes detailed in the original ES are anticipated due to the proposed material amendment.
- 28.2.172 Any changes to the construction waste arisings are likely to be minimal in scale, and therefore the original ES is deemed to suitably assess the effects of waste.
- 28.2.173 The original ES provides mitigation measures (for both the construction and operation phases) which would remain in place for the proposed material amendment. This would ensure the residual impacts of terrestrial waste from the development are of no significance.

Residual Effects

- 28.2.174 The original ES (section 23.8) did not identify any effects which remained significant following the application of the mitigation measures (i.e., strict adherence to the waste hierarchy and the adoption of best practice). The proposed material amendment would not alter the outcome of the original ES with regards to residual effects.
- 28.2.175 As above, no effects considered significant in the original ES or as a result of the proposed material amendment.
- 28.2.176 No changes are identified to the residual effects previously identified within the original ES as part of the DCO.

Technical Conclusion

- 28.2.177 SLR considers that the proposed material amendment would result in minimal change to the waste arisings estimated and the effects considered in the waste chapter of the original ES for the DCO.

28.2.178 As such SLR concludes that the extant waste ES remains adequate in its review of the effects of terrestrial wastes. As such, this topic will not be considered further and will be 'scoped out' of the updated ES.

Health

28.2.179 The original ES included an assessment of health effects which considered the impact of specified topics (socio-economic, landscape and visual, traffic, noise and air quality) on the health and well-being of the local population. The assessment considered both construction phase and operational phase effects.

28.2.180 The potential impacts identified by the Health Assessment were assessed in relation to specified sensitive receptors and took into account both embedded measures and bespoke mitigation. As the proposed material changes would have similar impacts and adopt similar mitigation measures it is considered none of the proposed material changes would affect the findings of the Health Assessment as set out in the Original ES. It is therefore concluded that this topic will not be taken forward into the updated ES.

Residual Effects

28.2.181 As no significant effects have been identified as a result of the proposed changes, there are no residual effects and no changes to the residual effects identified in Chapter 24 of the original ES.

Technical Conclusion

28.2.182 The proposed changes do not affect the findings of the original ES which concluded that there would be no significant adverse health effects arising from the proposed development other than an increased risk of injury from road traffic accidents, which would be mitigated (reduced) through proposed measures that are now embedded in the DCO. There would also be no change to the findings of the original ES with regard to beneficial effects due to the impact on health and wellbeing from employment creation.

28.2.183 The assessment has taken into account both the change to baseline as well as the proposed amendment to the scheme, and has concluded that there would be no significant effect and the matter will be scoped out of the updated ES.

28.3.0 Closure

28.3.1 The proposed material amendment has been assessed for additional environment effects beyond those contained within the original ES for the DCO. This has been undertaken through the preparation of this PEIR and the associated technical assessments contained or referenced herein.

28.3.2 In accordance with the EIA Regulations, consideration has been given to assessing additional potential effects during both the construction and operational phases of the development, whilst effects have been analysed in terms of residual and cumulative; temporary and permanent (short and long term); and beneficial, negligible and adverse.

28.3.3 It is acknowledged that the proposed development, as assessed within the original ES, will result in a number of adverse effects, some of which are considered 'significant' from an impact perspective. However, through the undertaking of this PEIR, it has been assessed that there will be no additional

or alteration of the significant effects identified within the original ES.

- 28.3.4 On this basis, the conclusion is reached that the proposed material amendment is appropriate in the context of the DCO and that there are adequate mitigation measures available to ensure that the proposed development could proceed, as amended, without giving rise to unacceptable environmental effects, even in combination with the other committed developments identified.
- 28.3.5 The mitigation measures identified within the original ES and DCO, along with any alternate or additional mitigation and monitoring identified herein, would ensure to minimise any adverse residual effects on the existing environment or local amenity.
- 28.3.6 On this basis, subject to the completion of an Updated ES, there should be no foreseeable reason why the proposed material amendment would be considered inappropriate or unacceptable from an environmental impact perspective.

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ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2)

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

CHAPTER 29: ACRONYMS AND ABBREVIATIONS

Able Marine Energy Park, Killingholme, North Lincolnshire



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ACRONYM OR ABBREVIATION	DEFINITION
°C	Degree Celsius
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ABP	Associated British Ports
ADMS	Atmospheric Dispersion Modelling Software
AEP	Annual Exceedance Probability
AGL	Above Ground Level
AGLV	Area of Great Landscape Value
AHP	Able Humber Port
AIR	Air Information Resource
AIP	Aeronautical Information Publication – a publication containing details pertinent to flying aircraft, for general (GEN) and specific to en-route (ENR) and aerodrome (AD)
AIP-AD	The part of AIP relevant to the aerodrome
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
ALs	CEFAS Action Levels
ALARP	As Low As Reasonably Practicable
AM	Amplitude Modulation
AMEP	Able Marine Energy Park
AMSL	Above Mean Sea Level – refers to a height above a mean sea level, often locally derived from a nearby coastline, Typically, AMSL and AOD are used interchangeably and are considered broadly equivalent.
AMWB	Artificially Modified Waterbody
ANO	Air Navigation Order
AOD	Above Ordnance Datum
AONB	Areas of Outstanding Natural Beauty
AoR	Area of Responsibility
APA (APZ)	Archaeological Priority Area (Archaeological Priority Zone)
APIS	Air Pollution Information Services
APT	Associated Petroleum Terminals

ACRONYM OR ABBREVIATION	DEFINITION
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standards
As	Arsenic
ASHE	Annual Survey of Hours and Earnings
ASR	Annual Status Report
ATC	Automatic Traffic Counts
AURN	Automatic Urban and Rural Network
AVR	Accurate Visual Representation
B&V	Black & Veatch Ltd
BAP	Biodiversity Action Plan
BAT	Best Available Techniques/Technology
BATEA	Best Available Techniques/Technology Economically Achievable
BBPP	Breeding Bird Protection Plan
BBS	Breeding Bird Surveys
BCT	Bat Conservation Trust
BEB	Building Emissions Benchmark
BF	Beaufort Force
BGS	British Geological Survey
BH	Borehole
BIS	Department for Business, Innovation and Skills
BIM	Building Information Modelling
Birds Directive	Council Directive 2009/147/EC on the Conservation of Wild Birds
BoCC	Birds of Conservation Concern
BP	Before Present
BPM	Best Practical Means
BS	British Standard

ACRONYM OR ABBREVIATION	DEFINITION
BSF	Bluestar Foundations
BSI	British Standards Institution
BTO	British Trust for Ornithology
C4SL	Category 4 Screen Levels
CA	Conservation Area
CAA	Civil Aviation Authority
CBD	Convention on Biological Diversity
CBI	Confederation of British Industries
CBR	California Bearing Ratio
Cd	Cadmium
CD	Chart Datum
CEFAS	Centre for Environment, Fisheries & Aquaculture Science
CFD	Computational Fluid Dynamics
CHA	Competent Harbour Authority
CHaMP	Coastal Habitat Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CL	Critical Load/Critical Level
CL:AIRE	Contaminated Land: Applications in Real Environments
CLP	Construction Logistics Plan
CLVIA	Cumulative Landscape and Visual Assessment
CEMP	Construction and Environmental Management Plan
CLR	Contaminated Land Report
CMP	Conservation Management Plan
CMS	Construction Method Statement
CO	Carbon Monoxide
CO ²	Carbon Dioxide
COCP	Code of Construction Practice

ACRONYM OR ABBREVIATION	DEFINITION
COLREGS	International Regulations for Preventing Collisions at Sea 1972
COMAH	Control of Major Accident Hazards
CP	Civil Parish
Cr	Chromium
CRN	Calculation of Railway Noise Method
CRoW	Countryside and Rights of Way Act 2000
CRTN	Calculation of Road Traffic Noise
CS	Characteristic Situation
CSM	Conceptual Site Model
CZTV	Comparative Zone of Theoretical Visibility
DAS	Design and Access Statement
dB	Decibels
dBa	A-weighted decibel
dBc	C-weighted decibel
dBz	Z-weighted decibel
DBA	Desk Based Assessment
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DCMS	Department for Culture, Media and Sport
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and Regions
DES	Detached Eddy Simulation
DMRB	Design Manual for Roads and Bridges
DfT	Department for Transport
DSM	Digital Surface Model
DSP	Delivery and Servicing Plan
DTI	Department of Trade and Industry
DTM	Digital Terrain Model

ACRONYM OR ABBREVIATION	DEFINITION
DWT	Deadweight Tonnage
EA	Environment Agency
EART	Environmental Assessment of Road Traffic
EC	European Commission
ECoW	Ecological Clerk of Works
EDS	Economic Development Strategy
EEC	European Economic Community
EGPS	Electricity Generation Policy Statement
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EJFC	Eastern Joint Fisheries Committee
ELC	European Landscape Convention
ELR	Employment Land Review
EN-1	Overarching Energy NPS
EN-3	Renewable Energy NPS
EQA	Environmental Quality Standards
EP	English Partnerships
EPA	Environmental Protection Act
EPAQS	Expert Panel on Air Quality Standards
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
ERM	Environmental Resources Management Ltd
ES	Environmental Statement – the report which documents the results of the EIA
EU	European Union
EUBS	EU Biodiversity Strategy
EV	Electric Vehicles
FEPA	Food and Environment Protection Act 1985
FRA	Flood Risk Assessment
FTE	Full Time Equivalent

ACRONYM OR ABBREVIATION	DEFINITION
GAC	Generic Assessment Criteria
GCN	Great crested newt
GHG	Greenhouse Gases
GI	Ground Investigation
GIGL	Greenspace Information for Greater London
GIS	Geographic Information Systems
GLA	Greater London Authority
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, 3 rd Edition
GPG	Good Practice Guide
GPS	Geographical Positioning System
GSV	Gas Screening Value
GT	Gross Tonnes
GVA	Gross Value Added
GW	Gigawatt
GWh	Gigawatt Hour
Habitats Directive	Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna
Habitats Regulations	The Conservation (Natural Habitats &c.) Regulations 1994 (as amended)
Ha	Hectares
HAP	Habitat Action Plan
HAV	Hand Arm Vibration
HCMP	Heavy Component Manufacturing Park
HE	Historic England
HEP	Humber Economic Partnership
HER	Historic Environment Record
HES	Humber Estuary Services
HFRMS	Humber Flood Risk Management Strategy
HIA	Heritage Impact Assessment
HINCA	Humber Industry Nature Conservation Association

ACRONYM OR ABBREVIATION	DEFINITION
HLA	High Level Assessment (a report prepared by Black & Veatch Ltd)
HMA	Hazard Management Actions
HMWB	Heavily Modified Waterbody
HPUK	Hutchison Ports (UK) Ltd
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HPA	Hazardous Property Assessment
HRA	Habitats Regulations Appraisal
HS	Heritage Statement
HST	Humber Sea Terminals
HZTV	Horizontal Angle Zone of Theoretical Visibility
IAQM	Institute of Air Quality Management
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Authority
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
IMO	International Maritime Organisation
IOA	Institute of Acoustics
IOF	Important Ornithological Feature
IOT	Immingham Oil Terminal
IPC	Infrastructure Planning Commission
IPCC	Intergovernmental Panel on Climate Change
IS	Indicative Scenario
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometres
LA	Local Authority
LA90	The percentile sound pressure level exceeded for 90 percent of the measurement period with 'A'

ACRONYM OR ABBREVIATION	DEFINITION
	frequency weighting calculated by statistical analysis
L _{Aeq}	Defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period
LAI	Local Area of Influence
L _{Amax}	The maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L _{Aeq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response
L _{An}	Percentile level - A measure of the fluctuation of the sound pressure level which is exceeded 'n' per cent of the observation time
LAQM	Local Air Quality Management
LAQM.TG (16)	Local Air Quality Management Technical Guidance 2016
LB	Listed Building
LBAP	Local Biodiversity Action Plan
LBRC	Local Biological Records Centre
L _{Max}	The maximum of the sound pressure levels recorded over an interval of 1 second
LCA	Landscape Character Area
LCT	Landscape Character Type
LDF	Local Development Framework
LDP	Local Development Plan
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
LiDAR	Light Imaging Detection and Radar
LI	Landscape Institute
LOA	Length Over-All
LNR	Local Nature Reserve
LWS	Local Wildlife Site
L ₁₀	L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. It is common practice to use the L ₁₀ index to describe traffic noise.
L ₉₀	L ₉₀ is the 'average minimum level' and is often used to describe the background noise.

ACRONYM OR ABBREVIATION	DEFINITION
m	Metre
m/sec	Metres per Second
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi Agency Geographic Information for the Countryside
MTS	Mayor's Transport Strategy
MCA	Marine and Coastal Access Act 2009
MCA	Maritime and Coastguard Agency
MDST	MDS Transmodal Limited
MEP	Marine Energy Park
MFA	Marine Fisheries Agency
MHWS	Mean High Water Spring
MHWN	Mean High Water Neap
MCCs	Manual Classified Counts
MMO	Marine Management Organisation
MMP	Materials Management Plan
MoD	Ministry of Defence
MPS	Marine Policy Statement
MVA	Megavolt ampere
MW	Megawatt
MVHR	Mechanical Ventilation and Heat Recovery
NATS	National Air Traffic Services
NBN	National Biodiversity Network
NE	Natural England
NERC	Natural Environment and Rural Communities Act 2000
NEIFCA	North Eastern Inshore Fisheries Conservation Authority
NESFC	North Eastern Sea Fisheries Committee
NESTA	National Endowment for Science, Technology and the Arts
NCA	National Character Area
NCI	Nature Conservation Importance

ACRONYM OR ABBREVIATION	DEFINITION
NCN	National Cycle Network
NG	National Grid
NGR	National Grid Reference
NHS	National Health Service
NHZ	Natural Heritage Zone
Ni	Nickel
NL	North Lincolnshire
NLC	North Lincolnshire Council
NM	Nautical Miles
NMR	National Monuments Record
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NPS	National Policy Statement
NPPF	National Planning Policy Framework
NRA	National Rivers Authority
NRA	Navigation Risk Assessment
N-RIP	National Renewable Infrastructure Plan
NRMM	Non-Road Mobile Machinery
NRP	Natural Research Projects
NSL	No Sky Line
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptor
NTS	Non-Technical Summary
NVC	National Vegetation Classification
NVQ	National Vocational Qualifications
O&M	Operation and Maintenance
OEM	Original Equipment Manufacturer
OHS	Outer Horizontal Surface - a specified portion of a horizontal plane around an aerodrome above

ACRONYM OR ABBREVIATION	DEFINITION
	which consideration should be given to control of new obstacles in relation to aerodrome safeguarding
ONS	Office of National Statistics
ORED	Office for Renewable Energy Deployment
Original ES	The Environmental Statement prepared in support of the DCO (as made)
OS	Ordnance Survey
OWT	Offshore Wind Turbine
pa	Per Annum
PAN	Planning Advice Notes
PAH	Polycyclic Aromatic Hydrocarbons
PAVIS	Port and Vessel Information System
Pb	Lead
PC	Process Contribution
PCB	Polychlorinated Biphenyls
PCT	Primary Care Trust
PCL	Pedestrian Comfort Level
PEC	Predicted Environmental Concentration
PEIR	Preliminary Environmental Information Report
PI	Plasticity Index
PIA	Personal Injury Accident
PFRA	Preliminary Flood Risk Assessment
PM	Particulate Matter
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PMSC	Port Marine Safety Code
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance
PPG	Pollution Prevention Guidelines

ACRONYM OR ABBREVIATION	DEFINITION
PPL	Potential Pollutant Linkages
Ppm	Parts per million
PPV	Peak Particle Velocity
PSA	Particle Size Analysis
psu	Practical Salinity Unit
PVC	Polyvinyl Chloride
PVS	Peak Vector Sum (mm/s)
R&D	Research and Development
RBMP	River Basin Management Plan
RDS	Rural Development Service
REcS	Regional Economic Strategy
RES	Renewable Energy Strategy
RFRA	Regional Flood Risk Appraisal
RKE	Realisable K-Epsilon
Ro-Ro	Roll-on roll-off facility
RoW	Right of Way
RSPB	Royal Society for the Protection of Birds
RSS	Regional Spatial Strategy
RTA	Road Traffic Accident
S4UL	Suitable for Use Levels
SAC	Special Areas of Conservation
SCI	Site of Community Interest
SCP	Supply Chain Park
SD	The scaled distance (m) for air blast and ground vibration from the charge to the receiver
SDF	Strategic Development Framework
SDP	Strategic Development Plan
Se	Selenium
SEA	Strategic Environmental Assessment
SEEDA	South East England Development Agency

ACRONYM OR ABBREVIATION	DEFINITION
SFRA	Strategic Flood Risk Assessment
SGV	Soil Guidance Values
SHA	Statutory Harbour Authority
SHOG	Sun Hours on Ground
SHBSES	South Humber Bank Strategic Employment Site
SINC	Site of Importance for Nature Conservation
SLA	Special Landscape Area
SM	Scheduled Monument
SMS	Safety Management System
SNCI	Site of Nature Conservation Importance
SNCO	Statutory Nature Conservation Organisation
SoP	Standard of Protection
SOP	Standard Operation Procedures
SO ₂	Sulphur Dioxide
SPA	Special Protection Area
SPG	Supplementary Planning Guidance
SPD	Supplementary Planning Document
SPMT	Self-Propelled Mobile Transporter
SPL	Sound Pressure Level
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage Systems
SWL	Sound Power Level
SWMP	Site Waste Management Plan
t/T	Tonne (1,000 kg)
TA	Transport Assessment
The EIA Regulations	Town and Country Planning (Environmental Impact Assessment) England Regulations 2017
TA	Transport Assessment

ACRONYM OR ABBREVIATION	DEFINITION
TBT	Tributyltin
TCA	Townscape Character Area
TCT	Townscape Character Type
TEB	Transport Emissions Benchmark
TEL	Threshold Effect Level
TOC	Total Organic Carbon
TOS	Transient Overshadowing
TP	Travel Plan
Tpa	Tonnes per annum
TPH	Total Petroleum Hydrocarbons
TSHD	Trailing suction hopper dredger
TTE	Total Transport Emissions
TVA	Townscape and Visual Assessment
TWh	Terrawatt-hours
UKC	Under Keel Clearance
UK AQ5	United Kingdom Air Quality Strategy
UK BAP	UK Biodiversity Action Plan
UKTAG	United Kingdom Technical Advisory Group
UKRES	UK Renewable Energy Strategy
UN	United Nations
Update ES	The Updated Environmental Statement to be submitted in support of the Material Amendment Application
UWWT	Urban Wastewater Treatment
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VAM	Views About Management
VAT	Value Added Tax
VHF	Very High Frequency
VMS	Vessel Monitoring System

ACRONYM OR ABBREVIATION	DEFINITION
VP	Vantage Point
VTS	Vessel Traffic Services
VSC	Vertical Sky Component
W&CA	Wildlife and Countryside Act 1981
WCA	The Wildlife and Countryside Act 1981 (as amended)
WC	Worst Credible
WeBS	Wetland Bird Survey
WFD	Water Framework Directive
WML	Waste Management Licensing
WWTW	Wastewater Treatment Works
WHS	World Heritage Site
WRAP	Waste & Resources Action Programme
WSA	Wider Study Area
YSI	Yellow Springs Instrument Company
Zn	Zinc
ZTV	Zone of Theoretical Visibility
ZVI	Zone of Visual Influence
µg	Microgram
µg/m ³	Micrograms per cubic metre

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