



Department for
Business, Energy
& Industrial Strategy

SOUTH HUMBER BANK ENERGY CENTRE HABITATS REGULATIONS ASSESSMENT

Regulation 63 of the Conservation of Habitats and Species
Regulations 2017



October 2021

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1. Introduction

1.1. Background

This is a record of the Habitats Regulations Assessment (“HRA”) that the Secretary of State for Business, Energy and Industrial Strategy has undertaken under the Conservation of Habitats and Species Regulations 2017 (“the Habitats Regulations”) in respect of the Development Consent Order (“DCO”) for the South Humber Bank Energy Centre and its associated development (the “Project”). For the purposes of these Regulations the Secretary of State is the competent authority (under the Habitats Regulations).

The planning application (“the Application”) proposes the construction and operation of an energy from waste (“EfW”) power station with a gross electrical output of up to 95 megawatts (“MW”) including an electrical connection, a new site access, and other associated development on land at South Humber Bank Power Station, South Marsh Road, Stallingborough, DN41 8BZ. The Applicant is EP Waste Management Limited.

The Application was submitted under section 37 of the Planning Act 2008 (“PA2008”) and was received in full by the Planning Inspectorate (“PINS”) on 9 April 2020.

The Application was accepted by PINS under section 55 of the PA2008 for Examination on 4 May 2020 and a single appointed person was appointed as the Examining Authority (“ExA”) for the application. The Examination of the Application began on 10 November 2020 and completed on 10 May 2021. The ExA submitted its report of the Examination, including its recommendation (“the ExA’s Report”), to the Secretary of State on 10 August 2021.

1.2. Habitats Regulations Assessment (HRA)

The Habitats Regulations aim to ensure the long-term conservation of certain species and habitats by protecting them from possible adverse effects of plans and projects. The Habitats Regulations cover England and Wales including their inshore waters up to 12 nautical miles (“nm”).

The Habitats Regulations provide for the designation of sites for the protection of habitats and species of international importance. These sites are called Special Areas of Conservation (“SACs”). The Regulations also provide for the classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory species within the UK and internationally. These sites are called Special Protection Areas (“SPAs”). SACs and SPAs together, referred to as European sites in legislation, form part of the UK’s national site network.

The Convention on Wetlands of International Importance 1972 (“the Ramsar Convention”) provides for the listing of wetlands of international importance. These sites are called Ramsar sites. Government policy is to afford Ramsar sites in the United Kingdom the same protection as sites within the national site network (collectively referred to in this HRA as “protected sites”).

Regulation 63 of the Habitats Regulations provides that:

....before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in-combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, [the competent authority] must make an appropriate assessment of the implications of the plan or project for that site in view of that site’s conservation objectives.

And that: *In the light of the conclusions of the assessment, and subject to regulation 64 [IROP¹], the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).*

This Application is not directly connected with, or necessary to, the management of a protected site. The Habitats Regulations require the Secretary of State to consider whether the project is likely to have a significant effect (“LSE”) on any such site, alone or in-combination with other plans and projects. Where the potential for LSE cannot be excluded, an appropriate assessment (“AA”) of the implications of the project for that site in view of its conservation objectives must be completed. Therefore, the Secretary of State must determine whether the project will have an adverse effect on the integrity of the site(s). In this document, the first stage assessment of LSEs and, where required, the second stage assessment (“the AA”) to determine whether there is an adverse effect on the integrity of a site, are collectively referred to as the Habitats Regulations Assessment (“HRA”). The HRA refers only to sites within UK jurisdiction.

1.3. Report on the Implications for European Sites (RIES) and Statutory Consultation

Under the Habitats Regulations the competent authority must, for the purposes of an AA, consult the appropriate nature conservation body and have regard to any representation made by that body within such reasonable time as the authority specifies. Natural England (“NE”) is the Statutory Nature Conservation Body (“SNCB”) for England and for English waters within the 12 nm limit.

The ExA prepared a RIES [PD-012], with support from the Planning Inspectorate’s Environmental Services Team. The RIES was based on matrices provided by the Applicant and relevant information provided by Interested Parties (“IPs”). The RIES documented the information received during the Examination (up until 19 March 2021) and presented the ExA’s understanding of the main facts regarding the HRA to be carried out by the Secretary of State.

The RIES was published on PINS planning portal website and the ExA notified IPs that it had been published. Consultation on the RIES was undertaken between 31 March 2021 and 23 April 2021. The RIES was issued to ensure that IPs, including the SNCBs, were consulted formally on habitat regulations matters, as required under regulation 63(3) of the Habitats Regulations.

The Secretary of State is content to accept the ExA’s recommendation that the RIES, and consultation on it, represents an appropriate body of information to enable the Secretary of State to fulfil his duties in respect of the UK’s national site network.

In addition, this HRA has been compiled using evidence from the application documents and consultation responses, which are available on the Planning Inspectorate’s Nationally Significant Infrastructure Project web pages². In particular:

- The ExA’s Report
- The Applicant’s Environmental Statement (“ES”)
- The Applicant’s Habitats Regulations Assessment Report (“HRAR”) entitled ‘Habitats Regulations Assessment Signposting’

Key information from these documents is summarised in this HRA.

¹ Imperative reasons of overriding public interest,

² <https://infrastructure.planninginspectorate.gov.uk/projects/south-east/aquind-interconnector/?ipcsection=docs>

2. Project Description

The Project is comprised of the construction and operation of an EfW power station with a gross electrical generation capacity of up to 95 MW at International Organization for Standardization (“ISO”) conditions, at South Humber Bank Power Station (“SHBPS”). The ES indicates that the Project would run continuously 24 hours a day, 7 days a week, excluding Christmas Day, Boxing Day and New Year’s Day, supplying its own power in normal operating conditions with the balance exported to the grid. Operation would be driven by demand and up to the maximum allowed under its Environmental Permit (“EP”). The Project site is around 23 hectares (“ha”) in area and comprises the following main parts:

- An electricity generating station located on the Main Development Area (“MDA”), which is land sited east of the existing SHBPS, to be fuelled by Refuse Derived Fuel with a gross electrical output of up to 95 MW at ISO conditions;
- Two emissions stacks and associated emissions monitoring systems;
- Administration block, including control room, workshops, stores and welfare facilities;
- Electrical, gas, water, telecommunication, steam and other utility connections;
- Landscaping and biodiversity works;
- A new site access on to South Marsh Road and works to an existing access on to South Marsh Road; and
- Temporary construction and laydown areas.

The MDA will measure approximately 7 ha and currently comprises an area of grassland, with underground cooling pipes, other buried services and an associated private access road. The MDA and land within the SHBPS is generally flat, and typically stands at around 2.0 m Above Ordnance Datum.

The site lies within the boundary of the administrative area of North East Lincolnshire Council (“NELC”) and benefits from a Planning Permission granted by the NELC (reference DM/1070/18/FUL) for a 49.9 MW EfW power station and associated development (“NELC Planning Permission”). The Project would increase the gross electrical capacity from that of the NELC Planning Permission from 49.9 MW to 95 MW by improving the efficiency of the EfW power station. This would be without increasing the maximum fuel throughput of 753,500 tonnes per annum (“tpa”), nor by increasing the maximum sizes of the building dimensions granted in the NELC Planning Permission.

The key differences between the Project and the NELC Planning Permission are summarised as follows:

- A larger air-cooled condenser, with an additional row of fans and heat exchangers;
- A greater installed cooling capacity for the generator;
- An increased transformer capacity; and
- Ancillary works.

The Project is located to the east of SHBPS, which is situated on the South Humber Bank between the towns of Immingham and Grimsby; both over 3 km from the Project site. The site location is shown in Figure 1. The area is comprised of a mix of industrial and agricultural uses. To the south, west and north-west the site is adjoined by land in agricultural use. To the east and north-east, the site is adjacent to industrial development, which includes a large polymer manufacturing site, Synthomer, and a waste management facility, NEWLINCS, both of which are accessed from the South Marsh Road. The estuary of the River Humber lies around 175 m to the east of the site. The environmental receptors which are situated within 5 km of the Project are shown in Figure 2.

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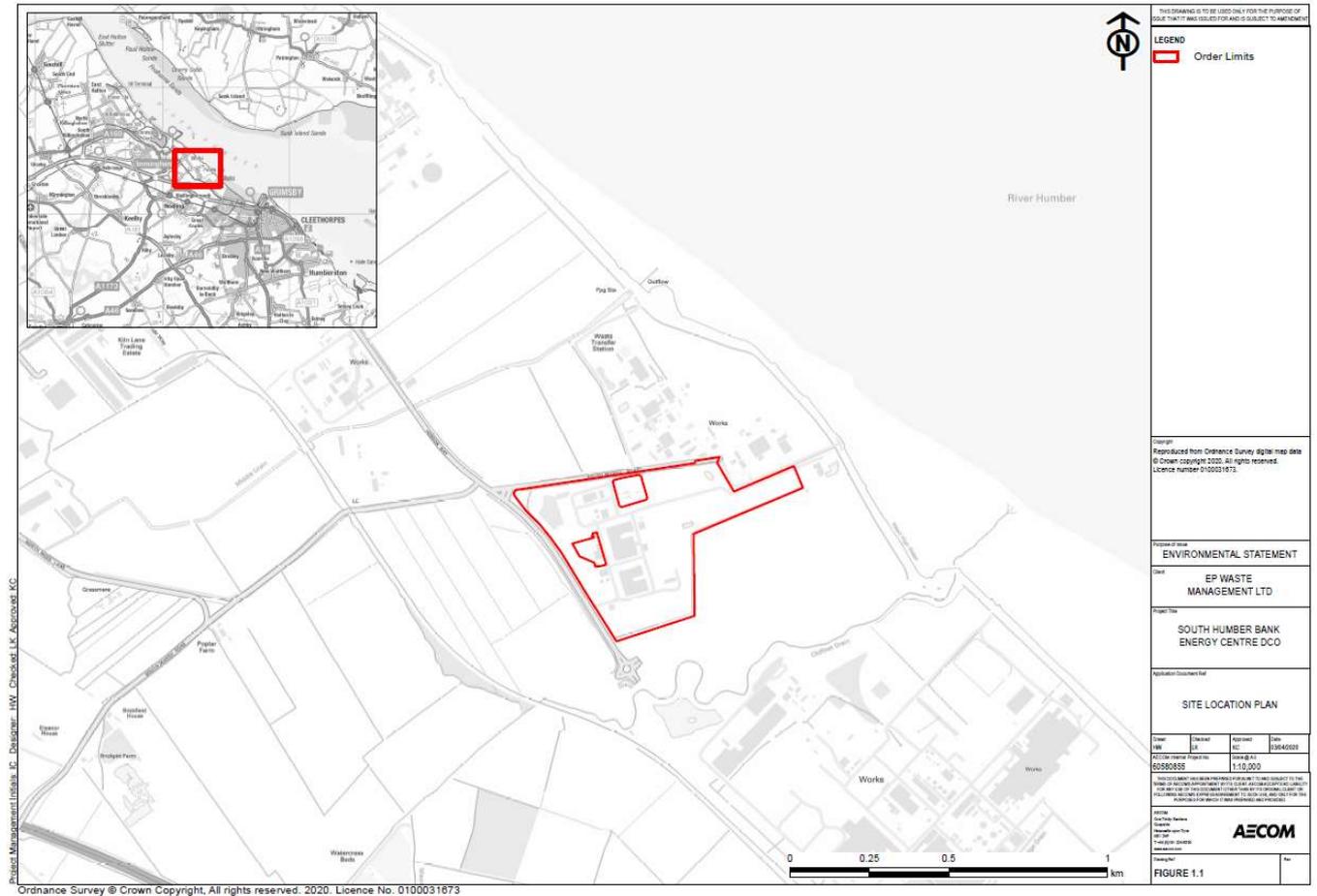


Figure 1: Proposed location of the Project

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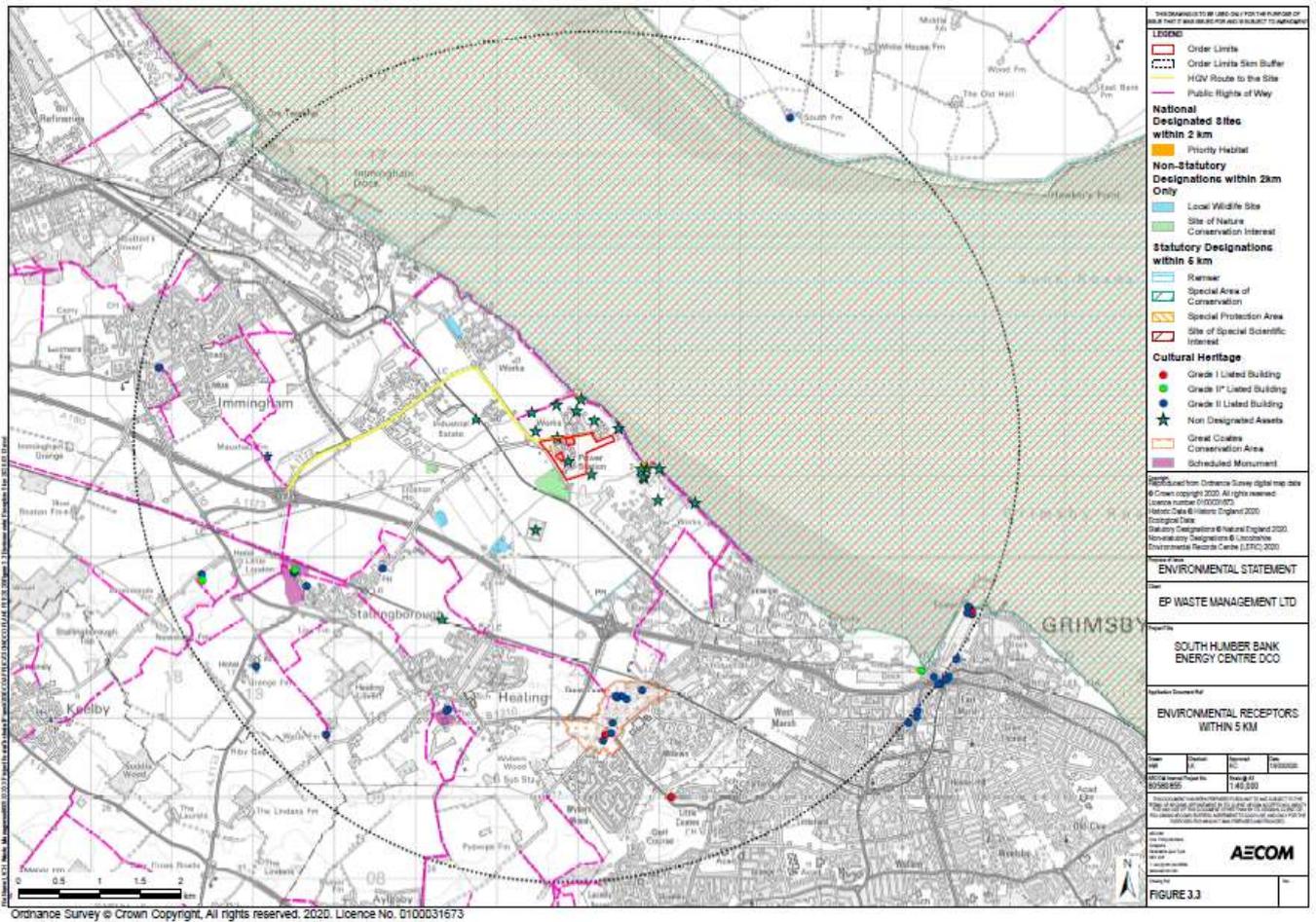


Figure 2: Environmental receptors within 5 km of the Project

The Order Limits of the Project do not overlap with any protected sites. The nearest protected sites are located approximately 175 m to the east of the Project site at their closest point.

3. Likely Significant Effects Test

Under regulation 63 of the Habitats Regulations the Secretary of State must consider whether a project will have an LSE on a European site, either alone or in-combination with other plans or projects.

The purpose of this section is to identify any LSEs on protected sites and to record the Secretary of State’s conclusions on the need for an AA and his reasons for including activities, sites or plans and projects for further consideration in the AA.

Of all the protected sites identified during Examination, the ExA concluded that LSEs could not be excluded for the following three sites and their qualifying features, either alone or in-combination with other plans or projects, based on the final version of the Applicant’s HRA Report [REP2-001].

- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar site

No additional sites which could be affected by the Project were identified by any of the IPs. Table 1: Protected sites for which LSE cannot be excluded, when the Project is considered alone or in combination with other plans or projects, on the listed qualifying features (summarised from ExA Report [ExA: 5.4.7] and the final HRAR [REP2-001: Tables 5.1, 5.2, 6.1 and 6.2]). summarises the features for which LSEs, either alone or in-combination, cannot be excluded for each site.

The HRAR used a search radius of 10 km to identify all potential pathways. The Applicant confirmed that the scope of the ecological assessment had been agreed with NELC, and that it had received no objection from NE to the baseline data-gathering approach which was applied.

NE highlighted that Table 1A.2 (Screening Matrix for Humber Estuary SAC) of the HRAR indicated that Atlantic salt meadows were either not susceptible to potential effects or were outside the zone of influence for potential impacts from deterioration in air quality during operation both alone and in-combination with other plans or projects. This appeared to be contradictory to the information within Table 5.2 (Likely Significant Effects during Operation) of the HRAR. NE noted that it had advised in its Relevant Representation (“RR”) [RR-008] that a LSE could not be ruled out either alone or in-combination for this habitat type, but confirmed that overall NE remained satisfied that there would be no adverse effect on integrity (“AEoI”). In response, the Applicant amended the HRA Screening Matrix for Humber Estuary SAC, as well as the Integrity Matrix contained in HRAR Appendix 2, to include this feature and address NE’s comment.

The Applicant updated its HRAR during the Examination to include consideration of in-combination visual effects as well as to incorporate additional information from updates to the integrity matrices.

Table 1: Protected sites for which LSE cannot be excluded, when the Project is considered alone or in combination with other plans or projects, on the listed qualifying features (summarised from ExA Report [ExA: 5.4.7] and the final HRAR [REP2-001: Tables 5.1, 5.2, 6.1 and 6.2]).

Name of protected site	Qualifying features	Potential Impact(s)
Humber Estuary SAC	Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (<i>Ammophila arenaria</i>) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes)	Changes in air quality during operational phase (alone and in-combination)

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Name of protected site	Qualifying features	Potential Impact(s)
	Dunes with common sea buckthorn (<i>Hippophae rhamnoides</i>) <i>Salicornia</i> and other annuals colonizing mud and sand	
Humber Estuary SPA	<p>Avocet <i>Recurvirostra avosetta</i> Bittern <i>Botaurus stellaris</i> Hen harrier <i>Circus cyaneus</i> Golden plover <i>Pluvialis apricaria</i> Bar-tailed godwit <i>Limosa lapponica</i> Ruff <i>Philomachus pugnax</i> Marsh harrier <i>Circus aeruginosus</i> Little tern <i>Sterna albifrons</i> Shelduck <i>Tadorna tadorna</i> Knot <i>Calidris canutus</i> Dunlin <i>Calidris alpina</i> Black-tailed godwit <i>Limosa limosa</i> Redshank <i>Tringa totanus</i> Waterbird assemblage</p>	<p>Loss of functionally linked habitat within Project boundary during construction phase (alone and in-combination)</p> <p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using Pyewipe mudflats</p> <p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using arable field to the south (field 37)</p> <p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using arable field to the north (fields 30 and 31)</p> <p>Visual impacts during construction (alone and in-combination) and decommissioning (alone) phases to birds using the arable field to the south (field 37)</p> <p>Changes in air quality during operational phase (in-combination)</p>
Humber Estuary Ramsar site	<p>Saltmarshes Dune systems Humid dune slacks</p>	<p>Changes in air quality during operational phase (alone and in-combination)</p>
	<p>Shelduck Golden plover Knot Dunlin Black-tailed godwit Redshank</p>	<p>Loss of functionally linked habitat within Project boundary during construction phase (alone and in-combination)</p> <p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using Pyewipe mudflats</p> <p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using arable field to the south (field 37)</p>

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Name of protected site	Qualifying features	Potential Impact(s)
		<p>Noise/vibration impacts during construction (alone and in-combination), operation (in-combination), and decommissioning (alone) phases to birds using arable field to the north (fields 30 and 31)</p> <p>Visual impacts during construction (alone and in-combination) and decommissioning (alone) phases to birds using the arable field to the south (field 37)</p>

The ExA was satisfied that the Applicant's final HRA Report identified all the LSEs that could result from the Project alone or in-combination with other plans or projects.

The Secretary of State has considered the LSEs of the Application on all relevant qualifying features of the three protected sites listed above, with consideration of their conservation objectives, to determine whether there will be LSEs in the context of the Habitats Regulations. The Applicant considered that impacts associated with the decommissioning phase of the Project are likely to be similar in nature to those associated with the construction phase, as decommissioning methodology will be similar in its level of impact to that of construction in terms of noise, vibration and air quality. The potential effects on qualifying features are not anticipated to differ significantly from those predicted during construction and will be subject to any necessary mitigation measures. This is with the exception of the loss of functionally linked land as this impact will have already occurred at the construction phase. The Secretary of State recognises that powers are in place for decommissioning effects to be addressed fully by the relevant authorities prior to decommissioning and with consideration of more detailed information on decommissioning processes and environmental conditions at that time. The Secretary of State therefore considers that it is reasonable not to include a detailed discussion on decommissioning effects in this report and notes that decommissioning is not a barrier to the Application being granted.

3.1. Likely Significant Effects Alone Assessment

The Secretary of State agrees with the recommendations of the ExA and concludes that LSEs cannot be excluded at the three protected sites listed in Table 1: Protected sites for which LSE cannot be excluded, when the Project is considered alone or in combination with other plans or projects, on the listed qualifying features (summarised from ExA Report [ExA: 5.4.7] and the final HRAR [REP2-001: Tables 5.1, 5.2, 6.1 and 6.2]), when the Project is considered alone.

These sites are taken forward to the AA to consider whether the Project will result in an adverse effect upon the integrity of these sites.

3.2. Likely Significant Effects In-Combination Assessment

Under the Habitats Regulations the Secretary of State is obliged to consider whether other plans or projects in-combination with the Project might affect protected sites. In this case, a total of 13 projects were identified which could potentially affect some of the same protected sites.

The approach used by the Applicant to assess in-combination effects was to select plans or projects which may affect the designated site feature under consideration. The plans or projects included in the in-combination assessment are listed in Table 6.1 (construction) and Table 6.2 (operation) in the HRAR and reflect a shortlist of plans and projects considered in the ES cumulative assessment.

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The Secretary of State agrees with the recommendations of the ExA and concludes that LSEs cannot be excluded at the same three protected sites identified in the LSE alone assessment, listed in Table 1, when the impacts of the Project are considered in-combination with the other identified plans or projects.

The three sites listed in Table 1 are taken forward to the AA to consider whether the Project in-combination with other plans or projects will result in an adverse effect upon the integrity of these sites.

4. Appropriate Assessment Methodology

The requirement to undertake an AA is triggered when a competent authority, in this case the Secretary of State, determines that a plan or project is likely to have a significant effect on a protected site either alone or in-combination with other plans or projects. Guidance issued by Defra states that the purpose of an AA is to assess the implications of the plan or project in respect of the site's conservation objectives, either individually or in-combination with other plans and projects, and that the conclusions should enable the competent authority to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus is therefore specifically on the species and/or habitats for which the protected site is designated³.

The purpose of this AA is to determine whether the adverse effects on the integrity of the features of the three sites identified can be ruled out as a result of the Application alone or in-combination with other plans and projects in view of the site's conservation objectives and using the best scientific evidence available.

If the competent authority cannot ascertain the absence of an adverse effect on integrity within reasonable scientific doubt, then under the Habitats Regulations, alternative solutions should be sought. In the absence of an acceptable alternative, the project can proceed only if there are imperative reasons of overriding public interest ("IROPI") and suitable compensation measures are identified.

4.1. Conservation Objectives

Defra Guidance indicates that disturbance to a species or deterioration of a protected site must be considered in relation to the integrity of that site and its conservation objectives⁴. It states that "*the integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was designated*".

Conservation objectives have been established by Natural England and outline the desired state for a protected site, in terms of the interest features for which it has been designated. If these interest features are being managed in a way which maintains their nature conservation value, they are assessed as being in a 'favourable condition'. An adverse effect on integrity ("AEoI") is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation. There are no set thresholds at which impacts on site integrity are considered adverse. This is a matter for interpretation on a site-by-site basis, depending on the designated feature and nature, scale, and significance of the impact.

Natural England has issued generic conservation objectives, which should be applied to each interest feature of the site. Supplementary advice for each site underpins these generic objectives to provide site-specific information and give greater clarity to what might constitute an adverse effect on a site interest feature. Supplementary advice on conservation objectives is subject to availability and is currently being updated on a rolling basis.

Where supplementary advice is not yet available for a site, Natural England advises that HRAs should use the generic objectives and apply them to the site-specific situation. For SPAs, the overarching objective is to avoid the deterioration of the habitats of qualifying features, and the significant disturbance of the qualifying features and ensuring the integrity of the site is maintained and the site makes a full

³ <https://www.gov.uk/guidance/appropriate-assessment#what-must-an-appropriate-assessment-contain>

⁴ <https://www.gov.uk/guidance/appropriate-assessment#what-must-an-appropriate-assessment-contain>

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contribution to achieving the aims of the Wild Birds Directive. This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features; and
- The distribution of the qualifying features within the site.

For SACs, the overarching objective is to avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving favourable conservation status of each of the qualifying features. This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

The conservation objectives and, where available, supplementary advice on conservation objectives have been used by the Secretary of State to consider whether the Project has the potential to have an adverse effect on the integrity of sites, either alone or in-combination with other plans or projects. The potential for the Project to have an adverse effect on site integrity is considered for each site in turn.

5. Appropriate Assessment

5.1. Appropriate Assessment: Humber Estuary SAC

The Humber Estuary SAC covers an area of 36657.15 ha. The site contains the second largest coastal plain estuary in the UK and the largest coastal plain estuary on the east coast of Britain. The site is located approximately 175 m east of the Project. The estuary supports a full range of saline conditions, with the range of salinity, substrate and exposure to wave action influencing the estuarine habitats and range of species that utilise them. Suspended sediment concentrations are high and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. The extensive mud and sand flats support a range of benthic communities which in turn are an important feeding resource for birds and fish. Wave exposed sandy shores are found in the outer/open coast areas of the estuary⁵.

The site is designated as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons
- Dunes with *Hippophae rhamnoides*
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Fixed dunes with herbaceous vegetation ('grey dunes')
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')

The site is also designated as it hosts the following species in Annex II:

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

In addition to the generic conservation objectives for SACs presented in Section 4.1, specific targets at the Humber Estuary SAC, relating to the features for which LSE could not be excluded, include but are not limited to⁶:

- Maintain the total extent of the Dunes with *Hippophae rhamnoides* feature, subject to natural changes;
- Restore the total extent of the Shifting dunes along the shoreline with *Ammophila arenaria*, Fixed dunes with herbaceous vegetation, *Salicornia* and other annuals colonising mid and sand, and Embryonic shifting dunes features;
- Restore the distribution and continuity of the Embryonic shifting dunes, Shifting dunes along the shorelines with *Ammophila arenaria*, and Fixed dunes with herbaceous vegetation features,

⁵ <http://publications.naturalengland.org.uk/publication/5009545743040512>

⁶

<https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030170&SiteName=humber+estuary&SiteNameDisplay=Humber+Estuary+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAAarea=&NumMarineSeasonality=8>

including where applicable component vegetation types and associated transitional vegetation types, across the site; and

- Maintain concentrations and deposition of air pollutants at below the site-relevant critical load or level values given for all features for where LSE could not be excluded on the Air Pollution Information System.

5.1.1. Changes in air quality

5.1.1.1. Nitrogen oxides (NO_x) emissions: alone

The LSE assessment determined that there was a risk of air quality impacts on sensitive habitats within the SAC due to increased NO_x emissions during operation of the Project. The air quality impact assessment modelled a number of receptors sensitive to NO_x emissions within the Humber Estuary SAC. The nearest sensitive habitat to the Project is an area of saltmarsh approximately 400 m to the south-east, the modelled outputs of three receptors represented this habitat in the assessment. The process contribution ("PC") for NO_x at these three receptors was measured to be 2.4%, 2.4% and 2.5% of the critical level for the SAC⁷. This exceeds the 1% screening threshold and was therefore assessed in further detail.

UK Air Pollution Information System ("APIS") data at this location indicates that the background annual mean NO_x concentration at the receptors is 25.9 µg/m³. The PC from the Project would be greater than 1% but results in a total NO_x predicted environmental concentration ("PEC") of 26.7 µg/m³ which does not exceed the critical level of 30 µg/m³. Further assessment carried out using project-specific data concluded that the annual mean NO_x PC would be 2.5% of the critical level resulting in a total annual mean NO_x concentration of 18.6 µg/m³. The Applicant therefore concluded that there would be no AEol on the SAC as a result of annual NO_x contributions from the Project alone.

5.1.1.2. Nutrient nitrogen deposition: alone

The LSE assessment identified a risk of air quality impacts on sensitive habitats within the Humber Estuary SAC due increased nutrient nitrogen deposition during operation of the Project. The air quality impact assessment concluded that the annual nitrogen deposition rate PC at the nearest saltmarsh habitat would be 2.1% of the critical load⁸ (20 kg N/ha/yr) at the identified receptors. As this is above the 1% screening threshold further assessment was carried out by the Applicant.

The total annual nitrogen deposition rate at the receptors was predicted to be 0.4 kg N/ha/yr from deposition of NO_x and ammonia (NH₃), compared to the background deposition of 15.5 kg N/ha/yr. When the additional nitrogen attributable to the Project was added to the background deposition total, nitrogen deposition rates were found not to exceed the critical load for this habitat type, which is 20 – 30 kg N/ha/yr. The Applicant therefore concluded that there would be no AEol on the SAC as a result of increased nitrogen deposition from the Project alone.

5.1.1.3. NO_x emissions: in-combination

The following developments were identified as potentially affecting air quality in-combination with the Project: Waste Tyre Pyrolysis, VPI Immingham Energy Park A, Great Coates Renewable Energy Centre, North Beck Energy Centre, Sustainable Transport Fuels Facility and VPI Immingham Open Cycle Gas Turbine DCO. The LSE assessment identified a risk of in-combination air quality impacts to sensitive

⁷ Critical levels are concentrations of pollutants in the atmosphere above which direct adverse effects on receptors may occur.

⁸ Critical loads are quantitative estimates of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur. Critical load relates to the quantity of pollutant deposited from air to the ground.

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habitats within the Humber Estuary SAC as a result of increased NO_x emissions and nutrient nitrogen deposition during the simultaneous operation of these facilities.

The air quality impact assessment determined that the cumulative PC/critical level of NO_x at the nearest saltmarsh habitat within the SAC, with all considered cumulative developments and the Project, would be between 7.3 – 8.0%. This exceeds the 1% threshold for insignificance and indicated that further assessment was required. The total NO_x contribution from all identified developments was combined with the background concentration provided by APIS to give the PEC. The cumulative PEC results show a total annual mean NO_x concentration of 28.1 – 28.3 µg/m³ at the identified receptor locations. This is slightly below the critical level for all vegetation types from the effects of NO_x (30 µg/m³). The assessment also used a more precise background NO_x concentration derived from NO₂ project-specific measurement data recorded at saltmarsh within the SAC. The total PEC for this measurement was between 19.9 µg/m³ – 20.1 µg/m³, which is below the critical level.

An additional identified saltmarsh receptor within the SAC slightly exceeded the 1% PC threshold at 1.3% and the total PEC resulted in a cumulative contribution of 45.1 µg/m³. As the baseline levels of NO_x at this receptor exceed the critical level (the baseline level is 44.7 µg/m³), the Applicant considered that the small contribution would not result in any in-combination AEol with the other identified developments.

In its RR, NE noted that background NO_x concentrations exceeded critical levels and the Applicant's air quality impact assessment reported that the annual mean NO_x environmental thresholds would be exceeded for the additional identified saltmarsh receptor in-combination with other plans or projects. NE requested further justification from the Applicant that the Project would not result in an adverse effect on the site.

In response, the Applicant stated that the air quality modelling had identified several locations within the Humber Estuary SAC where the PC for mean NO_x was between 1.2% and 1.3% of the critical load. It referred to the reference within NE's air quality impact assessment guidance to the Institute of Air Quality Management (IAQM) guidance. This advises that the 1% and 10% screening criteria should not be used rigidly. The Applicant was therefore of the view that it was correct for the assessment to round the first decimal place and take the values as whole percentages. This resulted in the outputs being rounded down to 1% which meant the PC threshold for screening out in-combination effects was not exceeded.

The Applicant also referenced a statement on the APIS database that "*There is substantial evidence to suggest that the effects of nitrogen oxide (NO₂) are much more likely to be negative in the presence of equivalent SO₂*". As the SO₂ levels are generally low (well below 10 µg/m³ and below the CL) locally to the Project site, no synergistic effect with NO_x was expected. In addition, the Applicant also referred to NE's air quality assessment guidance that "*...1% of critical load/level are considered by NE's air quality specialists (and by industry, regulators and other statutory nature conservation bodies) to be suitably precautionary, as any emissions below this level are widely considered to be imperceptible*". The Applicant therefore considered a conclusion of no in-combination AEol resulting from changes in NO_x emissions to be valid.

NE, in its response [REP2-020], referred to the APIS description of NO_x, which highlights that "*it is likely that the strongest effect of emissions of nitrogen oxides across the UK is through their contribution to total nitrogen deposition*". NE noted that additional ecological reasoning was provided for nutrient nitrogen deposition at paragraph 17.8.12 of ES Chapter 17 [APP-051]. This reasoning asserted that for coastal saltmarshes, such as those for which the Humber Estuary is partly designated, nitrogen inputs from air were less important than nitrogen effects from other sources because the effect of any deposition of nitrogen from the atmosphere was likely to be dominated by much greater flushes of nitrogen from marine, fluvial or agricultural sources. This view is reflected on the APIS website. It also highlights that flushing of the intertidal saltmarsh in the area by tidal incursion occurs twice per day and this is considered to likely further reduce the role of nitrogen from the atmosphere in controlling botanical position. Based on this information, NE concurred with the assessment conclusions of no AEol.

5.1.1.4. Nutrient nitrogen deposition: in-combination

For the annual nitrogen deposition rate (kg N/ha/year), the air quality impact assessment concluded that the PC at the nearest saltmarsh habitat within the SAC would be between 3.9% and 4.2% of the critical load at the identified receptors. This is above the 1% screening threshold, so further analysis was carried out to establish whether this increase in nitrogen deposition would result in any significant effects on the saltmarsh habitat.

The total cumulative annual nitrogen deposition predicted at the identified receptors was determined to be 0.8 kg N/ha/yr as a result of NO_x and ammonia (NH₃). When this is combined with the background deposition of 15.5 kg N/ha/yr, the cumulative PEC for nitrogen deposition would remain below the critical load for saltmarsh. This would be maximum of 16.3 kg N/ha/yr compared to a critical load range of 20 – 30 kg N/ha/yr. The Applicant therefore concluded there would be no AEoI on the SAC from in-combination annual nitrogen deposition.

The HRAR highlighted that some studies noted that the selection of 20 kg N/ha/yr as the minimum critical load for saltmarsh habitat did not use very realistic nitrogen doses nor input methods. For coastal saltmarshes, such as those for which the Humber SAC is partially designated, nitrogen inputs from air are not as important as nitrogen effects from other sources. This is due to the effect of atmospheric deposition being dominated by much greater flushes of more readily utilised nitrogen from marine, fluvial or agricultural sources. The nature of the intertidal saltmarsh in the SAC means there is flushing via tidal incursion twice per day. This will likely further reduce the role of nitrogen from the atmosphere in controlling botanical composition.

5.1.1.5. Acid deposition: in-combination

The air quality impact assessment determined that there would be no exceedance of the screening threshold from the Project alone, however, cumulative acid deposition (keq/ha/yr) PC would slightly exceed the 1% insignificance screening threshold at the identified receptors (predicted to be between 1.1 and 1.2%). The Applicant determined that given the very small PC, that there would be no AEoI on the SAC as a result of acid deposition in-combination with other plans or projects.

In its RR, NE highlighted that acid deposition thresholds would be exceeded in-combination for fixed dune habitat receptors. NE noted this had not been discussed in the HRAR and requested more information and justification as to why a conclusion of no AEoI had been reached in-combination with other plans or projects.

The Applicant highlighted in Appendix 8 of the Applicant's Comments on the RRs [REP1-008] that the detailed air quality assessment was contained in ES Chapter 17 and was signposted to in the HRAR. The Applicant stated that the cumulative PC would be between 1.1 and 1.2% of the critical load at six locations within the Humber Estuary SAC (sand dune habitats) and that, as for NO_x, the application of the IAQM guidance resulted in no exceedance of the 1% screening thresholds for acid deposition at the receptors modelled for the in-combination assessment. The Applicant considered that the conclusion of no AEoI as a result of changes in acid deposition was therefore valid.

NE noted that as the sand dunes within the Humber Estuary SAC are likely to be calcareous based on the soil type and the plant communities in the area, the APIS description of acid deposition was relevant. The APIS description highlights that "*soil acidification as a result of acid deposition has relatively little impact in UK dunes because the sand dune soils are generally well-buffered, with the exception of the few acidic dune systems (UKREATE, 2000)*". NE stated that on the basis of this information, it concurred with the assessment's conclusions that the Project would not result in an AEoI for the Humber Estuary SAC due to predicted changes in acid deposition contributions in-combination with other plans or projects.

5.1.1.6. Sulphur dioxide (SO₂) emissions: in-combination

For SO₂, the air quality impact assessment determined that there would be no exceedance of the screening threshold from the Project alone, however, there would be an in-combination exceedance of the 1% critical level insignificance screening threshold at some of the identified receptors within the SAC

(2.4 – 2.7%). However, as the PEC for SO₂ will not be exceeded as SO₂ levels are generally low locally to the Project site (well below 10 µg/m³ and below the CL), the Applicant concluded that there would be no AEol on the SAC due to SO₂ in-combination with other plans or projects.

5.1.1.7. Conclusions

During Examination, the Applicant submitted a signed and updated SoCG with NE [REP2-003]. This showed that all matters were agreed. It also confirmed that air quality impacts had been adequately addressed in the ES and that predicted effects on all ecological receptors were not significant. NE confirmed that the Applicant had provided the further information it had requested in its response to NE's RR and as set out in the SoCG, it had no outstanding queries.

The ExA noted that, as outlined in the ES, for background NO_x concentrations derived from project-specific NO₂ data recorded at the saltmarsh habitat [APP-108], the total PEC was between 19.9 µg/m³ – 20.1 µg/m³ which is well below the critical load. The ExA also highlighted the cumulative PEC for nitrogen deposition predicted at three saltmarsh receptors, where PC critical load was exceeded, would be a maximum of 16.3 kg N/ha/yr, which is below the critical load of 20 – 30 kg N/ha/yr.

The ExA stated : *"I consider the Applicant's approach to the assessment of in combination effects from NO_x and acid deposition, as set out in the HRAR, ES Chapter 17 and further justified in the Applicant's comments on the RRs [REP1-008], is justified, and agree that the Project would not result in adverse effects on the integrity of the European sites due to the predicted NO_x and acid deposition contributions in combination with other plans or projects"*.

The Secretary of State acknowledges that both NE and the ExA are content that the Project would not have any AEol on the Humber Estuary SAC alone and in-combination with other plans or projects. He agrees with this conclusion.

5.2. Appropriate Assessment: Humber Estuary SPA and Ramsar site

The Humber Estuary SPA covers an area of 37,630.24 ha and comprises extensive wetland and coastal habitats on the east coast of England. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. The saltmarsh is backed by low sand dunes with marshy slacks and brackish pools on the north Lincolnshire coast. Parts of the estuary are owned and managed by conservation organisations and the site encompasses all or parts of the following Sites of Special Scientific Interest ("SSSI"): Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby-Theddlethorpe Dunes SSSI, and The Lagoons SSSI⁹.

The site qualifies as an SPA as it is used regularly by 1% or more of populations of the following species listed in Annex I in any season:

- Avocet
- Bittern
- Hen harrier
- Golden plover
- Bar-tailed godwit
- Ruff
- Marsh harrier
- Little tern

⁹ <http://publications.naturalengland.org.uk/publication/5382184353398784>

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The site also qualifies as an SPA as it is used regularly by 1% or more of the populations of the following regularly occurring migratory species in any season:

- Shelduck
- Knot
- Dunlin
- Black-tailed godwit
- Redshank

The Humber Estuary Ramsar site covers 37,988 ha and an area largely coincident with the Humber Estuary SPA. The site qualifies under Ramsar criterion 1 for its near-natural estuary with component habitats including dune systems with humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes and coastal brackish/saline lagoons.

The site qualifies under Ramsar criterion 3 as it supports a breeding colony of grey seals at Donna Nook. This is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleet-by-Theddlethorpe on the southern extremity of the site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.

As the site supports waterfowl assemblages of international importance (20,000 or more) in the non-breeding season, it qualifies under Ramsar criterion 5. The site also qualifies under Ramsar criterion 6 for supporting 1% or more the following species/populations, so the wetland is considered to be of international importance: common shelduck, golden plover and knot¹⁰.

Both the Humber Estuary SPA and Ramsar site are located approximately 175 m east of the Project.

In addition to the generic conservation objectives for SPAs presented in Section 4.1, specific targets at the Humber Estuary SPA, include but are not limited to:

- Maintain safe passage of birds moving between nesting (where applicable for breeding features), roosting and feeding areas for all features except the waterbird assemblage feature;
- Restrict or reduce the frequency, duration and/or intensity of disturbance affecting roosting, nesting (where applicable for breeding features), foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed for all features; and
- Maintain concentrations and deposition of air pollutants at below the site-relevant critical load or level values given for this feature of the site on the Air Pollution Information System for all features.

5.2.1. Loss of functionally linked habitat

5.2.1.1. Alone

Habitat within the Project site boundary has been demonstrated to support low numbers of SPA/Ramsar site birds and is therefore assumed to be functionally linked to the Humber Estuary SPA and Ramsar site. The HRAR report noted that there have been no recorded aggregations within the Project site boundary above 1% of the Humber Estuary threshold. As such, a precautionary approach was applied to the Project as it lies within the Mitigation Zone to which Policy 9 of the North East Lincolnshire Local Plan (“NELLP”) is applicable. Policy 9 states that “...proposals which adversely affect the Humber Estuary SPA/Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations”.

The LSE assessment identified that the loss of functionally linked habitat within the Project’s MDA has the potential to displace SPA/Ramsar site waterfowl in the absence of mitigation. This could result in decreased resting and feeding times, and increased energy expenditure as birds may seek new areas to roost and feed which are further from the mudflats. Within the Mitigation Zone identified on the NELC

¹⁰ <https://rsis.ramsar.org/ris/663>

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policies map, development proposals on greenfield land that adversely affect the Humber Estuary SPA and Ramsar site due to the loss of functionally linked land are required to make contributions towards the provision and management of the mitigation sites identified.

A financial contribution was secured in relation to the NELC Planning Permission, pursuant to section 106 of the Town and Country Planning Act 1990 ("the 1990 Act"), which was amended by a Deed of Variation. The ExA had concerns about the status of the section 106 agreement and so does the Secretary of State. Therefore, requirement 38 of Schedule 2 to the DCO has been amended to provide that construction of the main works (Work No 1) must not start until a new development consent obligation pursuant to section 106 of the 1990 Act, has been secured between the relevant parties. The development consent obligation must reflect the obligations as secured by the section 106 agreement, and it is expected that this will provide for a financial contribution to be paid to NELC (or other relevant planning authority) which NELC will then use towards wetland habitat at Cress Marsh (the SHG mitigation site) suitable for birds that use the Humber Estuary SAC and Ramsar site.

The SHG Mitigation Strategy is a long-term strategy which has been agreed between NELC, North Lincolnshire Council ("NLC"), NE, the Environment Agency, Lincolnshire Wildlife Trust, and the Royal Society for the Protection of Birds ("RSPB") to address the impacts of new development on overwintering birds on the South Humber. The strategy enables promotion of economic development on the South Humber Bank whilst maintaining the area's functional relationship with the estuary through the creation of a network of smaller sites of wetland/grass habitat to mitigate the impact on overwintering estuary birds. Construction of a 48 ha site at Cress Marsh wetland habitat was completed by NELC in winter 2018/19. NELC stated that survey data had demonstrated that the habitat attracts large numbers of birds and is successfully providing functional habitat. NELC considers that the Cress Marsh site provides more than sufficient mitigation land than is required through current consents/submissions to adequately mitigate the impact on overwintering birds.

It is expected that a financial contribution to the SHG Mitigation Strategy will be used to pay (retrospectively) towards the costs of constructing the Cress Marsh site. The calculation of the financial contribution required for the application of Policy 9 was undertaken as part of the NELC Planning Permission. The same amount applies to the Project as the area of land to be lost is the same. NELC confirmed that the contribution required totalled £105,378.

5.2.1.2. In-combination

The LSE assessment considered that there may be potential for cumulative effects on birds using functionally linked land in the absence of mitigation, should multiple developments proceed that result in such loss of habitat.

Chapter 17 of the ES [APP-051] identified two developments which could potentially combine with the Project to result in in-combination adverse effects through loss of habitat functionally linked to the Humber Estuary SPA and Ramsar site. These were the Stallingborough Link Road and the Sustainable Transport Fuels Facility which are both located in NELC's administrative boundary. Policy 9 of the NELC Local Plan is applicable to both developments and stipulates that full mitigation must be provided by any developments affecting such habitats through a financial sum secured via legal agreement to draw down from a dedicated strategic mitigation scheme (SHG) and delivered directly by NELC prior to construction.

The applicants for both developments have committed to financial payments to the SHG Mitigation Strategy. The HRAR concluded that with this payment there is no potential for adverse in-combination effects on the integrity of the Humber Estuary SPA and Ramsar site as a result of the loss of functionally linked habitat.

5.2.1.3. Conclusions

The finalised SoCG with NELC [REP4-006] showed that both parties agreed that there would be no AEol on birds associated with the Humber Estuary SPA and Ramsar site as appropriate mitigation had been

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secured in the DCO. This included the proposed financial contribution to the SHG Mitigation Strategy. All other matters were shown as agreed.

The final SoCG with NLC [REP1-012] showed that all matters were agreed. NLC confirmed its support for the proposed contribution towards strategic mitigation and agreed that it would be adequately secured according to the Applicant's draft wording which would be secured in the DCO.

In the final SoCG between the Applicant and NE, NE welcomed the commitment of a financial contribution towards the SHG Mitigation Strategy. It agreed that this approach was acceptable in mitigating for the loss of supporting habitat within the Humber Estuary SPA and Ramsar site.

A financial contribution is mutually necessary to the conclusion of no AEoI on the Humber Estuary SPA and Ramsar site alone or in-combination with other plans or projects from the loss of functionally linked land; a conclusion which was reached between the Applicant and IPs during Examination. As such, the Secretary of State has decided to impose a Requirement which provides that construction of the main works (Work No 1) must not start until a development consent obligation pursuant to Section 106 of the 1990 Act has been secured between the relevant planning authority, EP Waste Management Limited (or a person who has the benefit of the development consent order), EP SHB Limited, and Lloyds Bank plc (the mortgagee) (or any successor in title to the charge). With this secured in the DCO under Requirement 38, the Secretary of State expects that the section 106 agreement will require payment of a financial contribution and on that basis agrees with the ExA and IPs that there will be no AEoI on the SPA and Ramsar site alone or in-combination with other plans or projects due to loss of functionally linked land.

5.2.2. Noise/vibration impacts

5.2.2.1. Pyewipe mudflats: alone

The Applicant carried out a noise impact assessment including baseline monitoring and noise modelling as part of the ES (Chapter 8: Noise and Vibration [APP-042]) to determine whether the Project would result in noise impacts on ornithological features during construction in the nearest part of the Humber Estuary SPA and Ramsar site to the Project, the Pyewipe mudflats. Birds are considered to be more susceptible to disturbance from short peaks of noise, for example during piling activities, than continuous noise levels. As such, for piling activities, the L_{Amax}^{11} values were predicted at the nearest sensitive receptors to provide an indication of likely peak noise events for comparison with ambient conditions.

Ambient noise levels on the seawall at the edge of the Humber Estuary SPA and Ramsar site boundary were recorded at 47 – 53 dB $L_{Aeq,T}^{12}$. The main sources of noise at this location were found to be waves breaking along the shoreline and birdsong. Occasional vehicle usage along the top of the seawall increased ambient noise, with a peak noise range of 51.3 – 77.7 dB $L_{AFMax15min}^{13}$.

Noise levels for the majority of construction activities were predicted to be within the range of 47 – 52 dB $L_{Aeq,1hr}$ and would therefore be within the ambient range. Drop hammer piling could potentially be used which the modelling predicted would result in noise levels of 62 dB at the seawall which represents an exceedance in the ambient noise level. The regular impulsive high noise levels emitted by drop hammer piling has the potential to disturb birds. Unmitigated, the peak noise from drop hammer piling activity was estimated to be 75 dB L_{Amax} at the nearest part of the Estuary. The HRAR considered it reasonable to assume that there would be some attenuation of noise due to the topography of the seawall and as the mudflats are below the level of the measured receptor location.

¹¹ L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period.

¹² $L_{Aeq,T}$ is the A-weighted, equivalent continuous sound level. T denotes the period of time over which the fluctuating sound levels averaged.

¹³ L_{AFmax} is the A-weighted maximum sound level measured with a fast time constant.

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A noise monitoring study on bird behaviour undertaken by Xodus Group¹⁴ during construction for the Grimsby River Terminal used the following significance criteria for disturbance:

- ≤ 65 dB L_{AmaxF} – negligible
- >65 to ≤ 75 dB L_{AmaxF} – minor adverse
- >75 to ≤ 85 dB L_{AmaxF} – moderate adverse
- >85 dB L_{AmaxF} – major adverse

The significance levels in the study were based on visible behavioural responses of birds to noise stimuli. The criteria were based specifically on the responses of birds within the Humber Estuary. Using the criteria from the Xodus study, the assessment concluded that there would be a minor adverse effect on birds.

Piling activity during construction would be temporary and occurring over a relatively short period of time (i.e. weeks rather than months). The elevated noise levels would be expected to only reach a portion of the Pyewipe mudflats closest to the MDA. As such, localised short-term displacement may occur, but this was not considered likely to adversely affect the survival of birds or result in their permanent displacement from the mudflats or wider Estuary. The HRAR highlighted that large areas of mudflat would be unaffected by elevated noise levels from piling and could accommodate displaced birds.

The HRAR noted that if Continuous Flight Auger (“CFA”) piling was undertaken in place of drop hammer piling, noise levels would be reduced to 50 dB $L_{Aeq,1hr}$ at the seawall. Peak noise levels would also be reduced significantly through avoidance of regular, impulsive high peak noise. The Applicant concluded there would be no AEoI from the Project alone on the Humber Estuary SPA and Ramsar site as a result of construction piling noise.

In its RR, NE considered that the increase in noise levels could disturb birds using the Pyewipe mudflats and requested further information to demonstrate that an LSE could be ruled out. It stated that no evidence had been provided as to how large an area of the mudflats would be affected by elevated noise levels. NE highlighted that although the piling works would take place over a relatively short period of time, passage species, such as the black-tailed godwit, are only present for very limited periods of time before moving to their wintering/breeding grounds. Disturbance impacts on foraging efficiency and energy expenditure could therefore be significant. NE also noted that if CFA piling were to be used, then LSE for bird species using the foreshore could be ruled out [APP-044].

The Applicant confirmed that it would implement CFA piling or seasonal constraints on drop hammer piling, or a combination of both, and that no other piling options would be proposed [REP2-010]. It revised the wording of DCO Requirement 17 to describe only these two mitigation options. Piling was also removed from the definition of ‘permitted preliminary works’ contained in Requirement 1, by the Applicant.

Appendix 9 [REP2-010], submitted during Examination, provided a detailed response to NE’s concern regarding noise and its request for evidence on the availability of undisturbed habitat to support the Applicant’s argument that alternative foraging/roosting areas were available should birds be disturbed. Figures A to L of the Appendix contained LA_{eq} and LA_{max} noise contour maps for drop hammer and CFA piling. The Appendix explained that CFA piling would be much less likely to disturb birds as it does not include the regular bangs associated with drop hammer piling. It was predicted that CFA piling would result in a decrease of around 10 dB LA_{max} compared to drop hammer piling and a decrease in peak noise modelled across the Pyewipe mudflats.

The Appendix explained that $<1\%$ of the mudflats would be affected by construction noise levels in excess of 65 dB LA_{max} and reiterated that it is reasonable to assume disturbed birds would move further south rather than abandon their favoured foraging/loafing grounds. It also highlighted that as the mudflats are fronted by industrial areas and currently subject to industrial noise and activity, it is reasonable to assume

¹⁴ Postlethwaite, B. and Stephenson, S. (2012). *Grimsby River Terminal Construction – Pile Noise Monitoring and Bird Behaviour Observations.* L-30062-S02-REPT-001. Xodus Group.

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that the birds are habituated to noise as they are present in large numbers at this location over winter. Given the small area of the mudflats which may be subject to higher noise levels during drop hammer activity, the Applicant concluded that sufficient undisturbed area is available on the south-east mudflats to accommodate any displaced birds. The Appendix confirms that the proposed mitigation will apply seasonal and timing restrictions on drop hammer piling (two hours either side of high tide during September to March, when birds are most likely to be present in the fields) and/or to use CFA piling.

NE clarified with the Applicant that in line with the mitigation hierarchy, noisy works should be avoided during sensitive time periods for overwintering associated with the SPA and Ramsar site but acknowledged that the Applicant wished to provide its contractors with flexibility. NE were of the view that the use of CFA piling is a more effective mitigation measure but agreed that the alternative option of avoiding impact piling two hours either side of high tide during the overwintering period would not result in any AEol of either the Humber Estuary SPA or Ramsar site. This was provided that the piling works would not take longer than one month to complete, and the mitigation measures were appropriately secured. The Applicant confirmed that drop hammer piling would not be required for more than four weeks as reflected in the Biodiversity Strategy [REP6-004] and secured by DCO Requirement 17(2).

5.2.2.2. Field 37: alone

The Applicant's noise impact assessment considered the potential for impacts during construction on the field to the south of the Project (field 37). The field is outside the boundary of the Humber Estuary SPA and Ramsar site but is considered to be functionally linked due to the aggregations of wintering birds it supports. Baseline noise assessment levels were monitored along the southern edge of the Project, representing the nearest part of field 37 to the Project. Noise from the SHBPS was found to dominate at this location along with noise generated from the associated cooling water pumping station and the adjacent chemical plant (Synthomer). Ambient noise levels were in the range 47 – 53 $L_{Aeq,T}$ and 49 – 65 dB L_{AFmax} . Predicted noise levels arising from construction at this location were in the range 42 – 73 dB $L_{Aeq,T}$ with the noisiest activity assessed being drop hammer piling. This represents a significant increase of up to 20 dB from ambient noise levels. This was considered to be the worse-case scenario for the assessment of effects as in reality most birds would be located closer to the Estuary, towards the central and eastern portions of the field, and therefore further from the noise source. The estimated noise levels at various points across the field were assessed to determine the proportion of field 37 which would be subject to construction noise levels in excess of ambient levels.

In the centre of field 37, noise from drop hammer piling activities were predicted to be 62 dB $L_{eq,T}$ which is in excess of the ambient noise level. Peak noise from drop hammer piling was predicted to be 76 dB L_{Amax} which falls within the 'moderate adverse' disturbance range used by the Xodus study (Section 5.2.2.1). Estimated peak noise levels were in the range 69 – 70 dB L_{Amax} at the furthest receptors, which the Applicant determined would result in 'minor adverse' disturbance. For all other construction activities, noise was expected to attenuate to within the ambient range at this distance from the Project. Disturbance was therefore ruled out for construction activities other than piling.

The HRAR concluded that without noise mitigation, noise and vibration impacts associated with construction would likely cause disturbance to birds if construction takes place during winter months when aggregations in field 37 are highest. The proposed mitigation by the Applicant is not yet fixed to allow contractors to determine the best available technique for noise abatement during piling. These measures will be agreed with NELC and will comprise:

- Seasonal piling restrictions – piling will be restricted for two hours either side of high tide in the period September to March inclusive; and/or
- CFA piling – This technique is less disturbing to birds as there is no impulsive noise. The use of alternative piling methods is expected to reduce noise to 50 dB L_{Aeq} , which is up to 8 dB below the ambient noise level measured at the site boundary.

With consideration of the mitigation proposed secured in Requirement 17(2) of the DCO, the Applicant concluded that there would be no AEol on field 37 from the Project alone.

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NE highlighted the higher predicted noise level in the centre of the field compared to ambient noise level and that LSEs had been ruled out as according to the applied significance criteria, the predicted peak noise levels would be minor adverse in their impact. It was also acknowledged that predicted noise levels would attenuate to the centre of the field as demonstrated in Figure 8.2 (Predicted Noise Levels at Ecological Receptors) [APP-069]. However, NE considered that further information was required to demonstrate that an adequate area of the field would remain undisturbed, and justification could be provided to demonstrate that this would provide functional supporting habitat for SPA and Ramsar species.

The Applicant responded to NE confirming implementation of CFA piling or seasonal constraints on drop hammer piling, and Appendix 9 which provided associated L_{Aeq} and L_{Amax} noise contour maps, as outlined in Section 5.2.2.1.

The modelled L_{Amax} levels during construction for drop hammer piling were measured at five locations within the Application site. These predicted that a large proportion of the field would be subject to noise levels up to 75 dB L_{Amax} during drop hammer piling. The Appendix confirms the proposed mitigation to apply seasonal and timing constraints on drop hammer piling (two hours either side of high tide during September to March) and/or to use CFA piling, as secured in the DCO.

For L_{Aeq} levels, the modelled drop hammer piling scenario indicated that a small portion of field 37 (0.6%) would be subject to construction noise in excess of 65 dB L_{Aeq} at its closest point to the Project, along the field boundaries. The Applicant concluded that it is reasonable to assume that aggregations of birds would not be present in close proximity to the boundaries as they are known to prefer open vistas.

NE clarified with the Applicant that noisy works should be avoided during sensitive time periods for overwintering birds associated with the SPA and Ramsar site, and considered use of CFA piling or avoiding impact piling two hours either side of high tide during the overwintering period to be sufficient mitigation. NE's response is outlined in further detail in Section 5.2.2.1. NE concluded that noise and vibration impacts would not result in an AEoI on field 37 from the Project alone.

5.2.2.3. Fields 30 and 31: alone

Fields to the north of the Project (fields 30 and 31) were included in the noise impact assessment as they are considered functionally linked to the Humber Estuary SPA and Ramsar site due to the aggregations of wintering birds they support. Fields 30 and 31 are expected to experience higher ambient noise levels than field 37 due to HGV and other vehicle movements along South Marsh Road and Hobson Way, which run along the western boundary of field 30. The HRAR identified the potential for piling activity to result in displacement of birds associated with the SPA and Ramsar site from the fields.

The central point of the two fields is approximately 400 m north-west to the nearest part of the Project. For all construction activities other than piling, noise levels are expected attenuate to within the ambient range at this distance from the works. They would therefore not be expected to displace birds in fields 30 and 31. Vibration from drop hammer piling also decreases with distance from the piling location.

The predicted noise level at the centre of the fields for drop hammer piling is 59 dB $L_{Aeq,1hr}$. This is slightly higher than the ambient noise level. Peak noise levels at this location are estimated to be 72 dB L_{Amax} which is within the threshold for 'minor adverse' disturbance effects based on the Xodus study (Section 5.2.2.1). The HRAR acknowledged that this may result in localised displacement of birds but considered that the noise levels are not sufficiently high to result in their complete displacement from the fields, particularly since the southern and western extents are subject to relatively high ambient noise levels due to traffic along South Marsh Road and Hobson Way.

The Applicant highlighted that if CFA piling is used instead of drop hammer piling, noise levels would be significantly reduced (42 – 62 dB $L_{Aeq,1hr}$). Peak noise levels would also be significantly reduced as CFA piling will not produce regular, impulsive high peak noise levels. Therefore, there would be a slight increase above ambient noise levels in this location during the majority of construction with CFA piling. However, based on the Xodus study, this is within the threshold for negligible disturbance effects. As

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such, the Applicant concluded that there would be no AEoI from the Project alone on fields 30 and 31 due to noise and vibration impacts.

NE considered that the use of CFA piling would adequately mitigate noise and vibratory disturbance to fields 30 and 31. However, NE was not clear as to whether the figures set out in paragraph 10.6.23 of the ES Chapter 10 [APP-044] related to the location of the noise receptor or a central location in the fields. NE also considered seasonal restrictions on drop hammer piling to be sufficient mitigation but requested further information to demonstrate that alternative undisturbed habitat was available, as the assessment indicated that there could also be an increase in noise levels on the nearby mudflats.

The Applicant responded to NE confirming implementation of CFA piling or seasonal constraints on drop hammer piling, and Appendix 9 which provided associated L_{Aeq} and L_{Amax} noise contour maps which included the location of receptors, as outlined in Section 5.2.2.1.

For L_{Aeq} levels, the modelled drop hammer piling scenario indicated that a small portion of field 30 and 31 (0.2%) would be subject to construction noise in excess of 65 dB L_{Aeq} at its closest point to the Project, along the field boundaries. The Applicant concluded that it is reasonable to assume aggregations of birds would not be present in close proximity to the boundaries as they are known to prefer open vistas.

In relation to operational effects, the modelling for fields 30 and 31 indicated that 2.5% of the total combined area would be subject to noise levels above 65 dB L_{Amax} . This would be along the field boundaries where birds are considered to generally avoid. It was also highlighted that if operational noise did reach a level to elicit a response from the birds, about 97.5% of the field would remain undisturbed. The Applicant considered it reasonable to conclude that the majority of fields 30 and 31 would not be expected to experience operational noise levels above which disturbance could be expected, and would continue to provide functional supporting habitat.

NE clarified with the Applicant that noisy works should be avoided during sensitive time periods for overwintering birds associated with the SPA and Ramsar site, and considered that through use of CFA piling or avoiding impact piling two hours either side of high tide during the wintering period, there would not be an AEoI on the sites from the Project alone. NE's response is outlined in further detail in Section 5.2.2.1.

5.2.2.4. Pyewipe mudflats, field 37, fields 30 and 31: in-combination

Two developments were identified for inclusion in the in-combination noise and vibration assessment. These were the Stallingborough Link Road and Sustainable Transport Fuels Facility.

For the Stallingborough Link Road in-combination noise assessment, the receptors included residential dwellings at Woad Lane and identified greenfield areas 2 km from the high tide of the Humber Estuary SPA and Ramsar site. The assessment predicted that the noise impact from the construction of the Link Road on the Humber Estuary SPA and Ramsar site would be negligible and the impact on all receptors would not be significant.

The in-combination noise assessment undertaken for the Sustainable Transport Fuels Facility included two receptors in common with the noise assessment carried out as part of the ES (Chapter 8: Noise and Vibration): Poplar Farm and Cress Cottage. The highest noise level predicted at Poplar Farm from construction of the Sustainable Transport Fuels Facility was 53 dB. This was determined not to be significant. The highest predicted noise level from the construction of the Project at Poplar Farm would be 48 dB if drop hammer piling is carried out, resulting in a cumulative noise level of 54 dB L_{Amax} . This is equivalent to the measured ambient noise level and as such, a conclusion of no significant in-combination impacts was reached if construction of the Sustainable Transport Fuels Facility and the Project coincide.

The highest noise level predicted at Cress Cottage from construction of the Sustainable Transport Fuels Facility was 53 dB, which was determined not to be significant. The highest predicted noise level resulting from the construction of the Project at Cress Cottage would be 48 dB if drop hammer piling is carried out. This would result in a cumulative construction noise level of 54 dB L_{Aeq} which is below the measured ambient noise level of 65 dB L_{Aeq} . As such, the assessment concluded there would be no significant in-

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combination impact should construction of the Sustainable Transport Fuels Facility and the Project coincide. An assessment of ecological sites was not provided in the Sustainable Transport Fuel Facilities ES. However, considering the predicted noise levels at residential receptors it was concluded that the Project would not significantly add to noise levels at the protected sites.

The HRAR outlined that other developers will also commit to financial contributions towards the creation of mitigation habitat which will provide alternative bird habitat. With this considered, as well as the Applicant's proposed contributions to the SHG Mitigation Strategy, it was concluded that there would be no AEol in-combination with other plans or projects on the Humber Estuary SPA and Ramsar site.

5.2.2.5. Conclusions

The final SoCG between the Applicant and NE agreed that with use of standard measures for piling as outlined in the ES and secured by draft DCO Requirement 17 (Piling) as well as the preparation of a Construction Environmental Management Plan ("CEMP") secured by Requirement 15, there will be no significant noise and vibration disturbance effects on qualifying features of the Humber Estuary SPA and Ramsar site and a conclusion of no AEol alone or in-combination can be reached.

The ExA considered the information provided in the HRAR, RIES, ES and responses to written questions. On the basis of the information provided, and the control measures secured by DCO Requirement 17, the ExA concluded that the Project would not result in an AEol on the Humber Estuary SPA and Ramsar site alone or in-combination with other plans or projects as a result of noise and vibration disturbance. The Secretary of State agrees with this conclusion.

5.2.3. Visual disturbance

5.2.3.1. Field 37: alone

The nature and scale of the Project would not represent a significant change in the type of structures already present around field 37. As the birds are present in a dynamic and highly commercial environment associated with the Humber Estuary, it can be assumed that they are resilient to changes which do not directly affect habitats. This includes the presence of tall structures such as power stations, bulk handling facilities, jetties and cranes, as well as the movement of large commercial vessels in and out of the nearby ports of Grimsby and Immingham.

The HRAR concluded that there could be a minor localised displacement of birds on field 37 due to its proximity to construction works. Mitigation was proposed in the form of a ~2.5 m high close-boarded fence to be installed along part of the southern boundary of the site. This provides visual screening from vehicle and personnel movements during construction to birds using field 37. Temporary lighting during construction will be arranged as to minimise glare outside the construction site. These measures to minimise the impact of lighting are further outlined in the ES Volume III Appendix 5A Outline CEMP [APP-107] and Indicative Lighting Strategy [APP-031]. With the implementation of the proposed mitigation, the Applicant concluded that there would be no AEol resulting from visual disturbance on the Humber Estuary SPA and Ramsar site from the Project alone.

5.2.3.2. Field 37: in-combination

As outlined in Section 5.2.2.4, the HRAR highlighted that the developers identified in the in-combination assessment will also commit financial sums which will draw down mitigation habitat. The creation of alternative habitat and the proposed contributions to the SHG Mitigation Strategy led the Applicant to conclude that there would be no AEol on the Humber Estuary SPA and Ramsar site due to construction related disturbance in-combination with other plans or projects.

5.2.3.3. Conclusions

It its final SoCG with the Applicant, NE agreed that the potential visual disturbance effects on qualifying species of the Humber SPA and Ramsar site had been adequately addressed in the Applicant's ES. It agreed that a permanent visual screen installed during preliminary works would effectively mitigate visual

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disturbance on birds using field 37 and that this is adequately secured by the wording of Requirement 8 in the DCO.

The ExA considered the Applicant's proposed mitigation measures to be appropriate and concluded that the Project would not result in an AEol alone or in-combination with other plans or projects. The Secretary of State agrees with this conclusion.

5.2.4. Changes in air quality

5.2.4.1. Alone and in-combination

Potential LSEs due changes in air quality were identified for the Humber Estuary SPA (in-combination) and the Humber Estuary Ramsar site (alone and in-combination).

As the boundaries of both the Humber Estuary SAC, SPA and Ramsar site are largely coincident, the air quality impact assessment incorporated all three protected sites and therefore used the same receptors to measure impacts. As such, the outcomes of the assessment and comments provided on this from the Applicant, ExA and relevant IPs provided throughout Section 5.1.1 for the Humber Estuary SAC, reflect the conclusions for air quality impacts in-combination for the Humber Estuary SPA and alone and in-combination for the Humber Estuary Ramsar site.

5.2.4.2. Conclusions

The air quality impact assessment incorporated all three protected sites. Therefore, the comments provided by NE and the ExA throughout Section 5.1.1 also apply to the conclusions reached for changes in air quality to the Humber Estuary SPA and Ramsar site. In summary, both NE and the ExA are content that there would be no AEol alone or in-combination with other plans or projects on the Humber SPA and Ramsar site due to changes in air quality. The Secretary of State agrees with this conclusion.

6. Habitats Regulations Assessment Overall Conclusions

The Secretary of State has carefully considered the information presented before and during the Examination, including the RIES, the ES, representations made by Interested Parties, and the ExA's report itself. He considers that the Project has the potential to have a LSE on three protected sites when considered alone and in-combination with other plans or projects. These sites are listed below:

- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar site

The Secretary of State has now undertaken an AA in respect of the conservation objectives of the sites to determine whether the Project, either alone or in-combination with other plans or projects, will result in an adverse effect on the integrity of the above sites.

The recommendation of the ExA is that [ExA: 5.7.2]: *“On the basis of the information before me I consider that the Proposed Development would have no adverse effects, subject to the controls set out in the rDCO attached at Appendix D of this report, either alone or in-combination with other plans or projects, on the integrity of any European site and its features.”*

Having considered all the information available to him and the mitigation measures secured through the DCO, the Secretary of State has concluded, in line with the recommendation of the ExA, that the Project will not have an adverse effect on the integrity of the relevant qualifying features of any of the three protected sites listed above.

7. Transboundary Assessment

During the pre-application stage in December 2019, the Planning Inspectorate undertook a transboundary screening on behalf of the Secretary of State [OD-001] to satisfy processes under EIA Regulation 32. This found that the Project was unlikely to have a significant effect either alone or cumulatively on the environment in an European Economic Area State.

This conclusion was reviewed on the 15 January 2021 and the same conclusion of no significant effect was reached. No correspondence was received in relation to transboundary issues.

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