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Northern Endurance Partnership | Humber Carbon Capture Pipeline

Humber Carbon Capture Pipeline

Preliminary Habitats Regulations Assessment Screening Report

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1 Introduction

1.1 Background

1.1.1 This report presents the preliminary Stage 1 Habitats Regulations Assessment (HRA) Screening of the Humber Carbon Capture Pipeline (HCCP) Project (hereafter referred to as 'the Project', the boundary for which is defined at the 'draft Order Limits'). A detailed description of the Project and the draft Order Limits is provided in Volume 2 - Chapter 2: Project Description of the Preliminary Environmental Information Report (PEIR) (Ref 1).

1.1.2 The purpose of this document is to identify whether the Project has the potential to result in Likely Significant Effects (LSE) on National Site Network (NSN) sites (hereafter referred to as 'European sites' for ease of reference), either alone or in-combination with other plans or projects, in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended).

1.1.3 The Project is a Nationally Significant Infrastructure Project (NSIP) that will involve the development of a new onshore pipeline network to transport captured carbon dioxide (CO_2) from industrial facilities within the Humber region to a landfall point on the Holderness Coast. From there, the CO_2 will be transferred offshore for permanent storage as part of the wider East Coast Cluster, a carbon capture and storage cluster for the UK to meet its net zero targets (Ref 2). Further information on the East Coast Cluster is included in Chapter 2: Project Description of the PEIR (Ref 1).

1.1.4 Given the proximity of the Project to the Humber Estuary and other internationally and nationally designated sites, there is potential for interaction with habitats and species of conservation importance. The HRA process provides the framework for identifying these sites, understanding potential impact pathways, and determining whether further Appropriate Assessment (AA) will be required.

1.2 Purpose of this Report

1.2.1 Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) (Ref 3), a person applying for any consent, permission or other authorisation for a plan or project is responsible for assembling and describing all the relevant information required to enable the competent authorities to carry out their HRA responsibilities.

1.2.2 In line with the Planning Inspectorate's Advice Note 10 (Ref 4), the relevant Secretary of State is the competent authority for the purposes of the Habitats Regulations in relation to applications for NSIPs. The Habitats Regulations require competent authorities, before granting consent for a plan or project, to carry out an AA in circumstances where the plan or project is likely to have a significant effect on a European site (either alone or in combination with other plans or projects).

1.2.3 This preliminary HRA Screening Report has been prepared to support early engagement with Natural England and other stakeholders. It is provided alongside the PEIR to enable consultees to review and comment on the initial screening conclusions in advance of the full HRA that will accompany the Environmental Statement submitted with the Development Consent Order (DCO) application.

1.2.4 The assessment is based on currently available baseline information, ongoing ecological surveys, and consultation with stakeholders, including Natural England. It is recognised that the conclusions reached in this preliminary report will be subject to further refinement as more detailed survey data and design information become available.

1.3 Consultation

1.3.1 Consultation on HRA matters has been undertaken with Natural England, as the statutory nature conservation body for England, and other stakeholders throughout the pre-application process. Engagement has focused on the scope of the assessment, the identification of designated sites and qualifying features, the need for baseline data on functionally linked land (FLL), and the consideration of potential impact pathways. This section summarises HRA-specific consultation to date, highlighting key issues raised and how they have been addressed within this preliminary Screening Report. The consultation responses are presented in alphabetical order by consultee.

Associated British Ports

1.3.2 Associated British Ports highlighted the importance of recognising existing mitigation areas, in particular Newton Garth at the Humber Enterprise Park, which provides compensatory habitat for bird species listed within the nearby Special Protection Area (SPA). They advised that the HRA should take these areas into account when considering potential effects on FLL and when assessing cumulative and in-combination impacts.

1.3.3 This advice will be addressed at the AA stage, when FLL mapping is produced, and Newton Garth will be considered within the cumulative and in-combination assessment.

East Riding of Yorkshire Council

1.3.4 Consultation with East Riding of Yorkshire Council has focused on the consideration of potential in-combination effects. East Riding of Yorkshire Council advised that an initial long-list of committed developments should be provided to inform the HRA assessment of cumulative impacts. This feedback has been noted, and while the screening stage identifies potential for in-combination impacts, the detailed assessment will be undertaken at the AA stage and submitted as part of the DCO application.

Environment Agency

1.3.5 The Environment Agency advised that the HRA should assess potential impacts on migratory fish species, including river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*), which migrate through the Humber Estuary and River Derwent systems and are qualifying features of the Humber Estuary Special Area of Conservation (SAC) and Ramsar site and the River Derwent SAC. They emphasised that potential pollution risks (including bentonite breakout from HDD) and changes to water quality should be explicitly considered.

1.3.6 These matters have been addressed by including migratory fish and assessing potential pathways through the HRA screening (see Section 4). Pollution pathways, including bentonite breakout, have been included in the screening, and where LSE cannot be excluded these issues will be taken forward to AA (see Section 6).

Marine Management Organisation

1.3.7 The Marine Management Organisation (MMO) advised that marine aspects of the Project must be fully addressed within the HRA, including potential impacts on intertidal and subtidal habitats, suspended sediment release, and water quality changes associated with HDD works. They also highlighted the need to consider marine species, including fish and marine mammals, and confirmed that the Holderness Inshore Marine Conservation Zone (MCZ) must be scoped into the assessment.

1.3.8 This advice has been addressed by scoping the Holderness Inshore MCZ into the HRA (see Section 4), with a shadow HRA to be provided at the DCO stage to ensure compliance with the Habitats Regulations and marine licensing requirements.

Potential marine impact pathways have been identified at screening, and where LSE cannot be excluded these will be assessed further at AA (see Section 6).

Natural England

1.3.9 Natural England has been the primary consultee on HRA matters. Engagement has focused on the scope of designated sites, identification of relevant qualifying features, potential impact pathways, and survey requirements. Table 1-1 provides a summary of the matters raised by Natural England and how these have been addressed within this preliminary Screening Report.

Table 1-1: Summary of HRA Consultation with Natural England

Summary of Matters Raised	How Comments Have Been Addressed in this Report
Scope of HRA Natural England advised that the following sites should be considered within the HRA: Humber Estuary SAC, SPA and Ramsar; Lower Derwent Valley SPA, SAC and Ramsar; River Derwent SAC; Greater Wash SPA; Thorne & Hatfield Moors SPA; and the Holderness Inshore MCZ.	Section 5 outlines the criteria and pathway considerations used to determine which European sites require further assessment. Sub-section 5.2 lists all sites considered, including those identified by Natural England.
Survey Requirements: Birds Natural England advised that wintering, passage and breeding bird surveys should be undertaken for the Humber Estuary and Lower Derwent Valley SPAs, covering both designated site features and FLL. They advised that survey effort should be concentrated within the 4 km Impact Risk Zone (IRZ) around the SPA's, and in line with their published guidance (Ref 5, Ref 6 and Ref 7), with appropriate coverage of tidal / flood states, vantage point surveys as the preferred method, and nocturnal surveys where relevant. Up to two years of survey may be required in sensitive areas.	Survey methodologies for wintering, passage and breeding birds have been developed in consultation with Natural England and follow Natural England's guidance, including Annex C (Ref 7). Surveys cover both designated site features and potential FLL, with vantage point methods used where appropriate. Coverage has included different tidal and flood states to reflect the dynamics of the Humber Estuary and Lower Derwent Valley.
Impact Pathways: Birds Natural England advised that the potential for disturbance and displacement of SPA and Ramsar bird species must be assessed, including noise, visual disturbance (particularly to birds using intertidal and mudflat habitats),	Noise, visual disturbance, and temporary habitat loss have been considered at screening for SPA and Ramsar bird features, both within designated sites and on surrounding FLL. Where LSE cannot be excluded, these are carried forward to AA. The assessment of noise

Summary of Matters Raised	How Comments Have Been Addressed in this Report
and habitat loss / disturbance within designated sites and on surrounding FLL. They also advised that FLL at Drax and surrounding areas should be reassessed with up-to-date data, that assemblage species should be based on the most recent WeBS lists, and that Greater Wash SPA features must be included. Natural England also highlighted the importance of assessing seasonal effects and, where practicable, timing works to avoid peak bird periods.	will include species-specific behavioural responses, consideration of the temporal pattern and frequency characteristics of the noise (including whether it is impulsive or continuous), and comparison with background levels. FLL across the draft Order Limits will be assessed using the latest habitat and survey data. Potential effects on Greater Wash SPA features, including little tern *Sternula albifrons* and red-throated diver *Gavia stellata*, will be addressed in the cumulative assessment at AA stage. Seasonal and timing restrictions to avoid peak bird periods will also be considered as potential mitigation at this stage.
Impact Pathways: Aquatic Species Natural England advised that potential direct and indirect impacts to lamprey must be considered, including noise and vibration and pollution risks (e.g. bentonite breakout during drilling). They also requested that potential disturbance and displacement of marine mammals (particularly grey seal *Halichoerus grypus*) be assessed, including both above-water and underwater noise. In addition, potential minor effects on otter (*Lutra lutra*) associated with the River Derwent SAC were highlighted.	These effects have been noted. Where risks cannot be fully excluded at this stage, potential effects are acknowledged and will be revisited at AA to ensure robust conclusions.
Intertidal and Subtidal Habitats Natural England advised that the HRA should assess the potential for direct and indirect habitat loss, including SAC habitats (Estuaries, Mudflats and sandflats not covered by seawater at low tide).	These effects have been noted. Where risks cannot be fully excluded at this stage, potential effects are acknowledged and will be revisited at AA to ensure robust conclusions.

Planning Inspectorate

1.3.10 The Planning Inspectorate (PINS) advised that the HRA should follow the approach set out in Advice Note 10 for NSIPs, including the application of the precautionary principle at screening, clear definition of the zone of influence, and the use of

assessment matrices. They also emphasised the importance of early consultation with Natural England and the need to clearly document outstanding matters such as cumulative and in-combination effects.

1.3.11 These points have been addressed by adopting a precautionary approach in the screening, defining the zone of influence for each European site (see Section 5), and presenting the outcomes in screening matrices (Section 6). Engagement with Natural England has been ongoing (see Table 1-1), and any issues that cannot be fully resolved at this stage, such as cumulative and in-combination effects, are identified for further assessment at AA (see Section 7).

North Lincolnshire Council

1.3.12 North Lincolnshire Council advised that the HRA should consider potential impacts on European sites in their administrative area, including the Humber Estuary SAC, SPA and Ramsar site, and the Lower Derwent Valley SPA, SAC and Ramsar site. They highlighted the need for robust survey data FLL within the draft Order Limits and surrounding areas, and emphasised that in-combination effects with other major infrastructure projects in the region must be assessed.

1.3.13 These points have been addressed by including the Humber Estuary and Lower Derwent Valley designations within the Stage 1 screening (see Section 5), by assessing FLL using habitat and survey data (see Section 6), and by identifying in-combination impacts for consideration at AA (see Section 7).

North Yorkshire Council

1.3.14 North Yorkshire Council advised that the HRA should assess potential pathways of effect to the Lower Derwent Valley SPA, SAC and Ramsar site, given the proximity of the Project to the River Derwent catchment. They highlighted the importance of understanding how SPA bird features may use FLL within the draft Order Limits and surrounding agricultural fields, and noted that up-to-date WeBS data should be used to identify relevant assemblage species.

1.3.15 These matters have been addressed by including the Lower Derwent Valley designations in the Stage 1 screening (see Section 5) and by undertaking surveys to identify FLL in line with Natural England's guidance (see Section 5). Assemblage species have been through consultation with Natural England (see Table 1-1), and potential impacts on off-site supporting habitats are identified for consideration at AA (see Section 6).

2 The Habitats Regulations Assessment Process

2.1 Background

2.1.1 The requirements of Council Directive 92/43/EEC (as amended) on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') and Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') have been transposed into UK legislation through, most recently, the Habitats Regulations.

2.1.2 The Conservation of Habitats and Species Regulations 2017 (as amended) provide for the protection of internationally important nature conservation sites, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). These sites form part of the National Site Network (i.e. European site), which replaced the European Union's Natura 2000 network following the UK's withdrawal from the EU.

2.1.3 In England, in accordance with Paragraph 181 of the National Planning Policy Framework (NPPF) and associated guidance, the same level of protection also applies to:

- Ramsar sites (designated under the 1971 Ramsar Convention).
- Proposed SACs (pSACs).
- Potential SPAs (pSPAs).
- Proposed Ramsar sites, and
- Any sites identified or required as compensatory measures for adverse effects on any of the above.

2.1.4 In addition, as requested by Natural England and the MMO, MCZs are also considered within this report.

2.1.5 For the purposes of this HRA, these sites are hereafter collectively referred to as European sites, unless a specific distinction is required.

2.1.6 The HRA process is a legal requirement for any plan or project that may have a likely significant effect on a European site, either alone or in combination with other plans or projects. The assessment process consists of up to three sequential stages:

- **Stage 1 – Screening**: This initial stage determines whether the proposal is likely to have a significant effect (LSE) on the conservation objectives of a European site and does not consider any proposed mitigation. If no likely significant effects are identified, either alone or in combination with other plans or projects, no further assessment is required.

- **Stage 2 – Appropriate Assessment**: This assesses the impacts on site integrity in light of the site's conservation objectives and must consider any proposed mitigation measures. The competent authority must conclude whether an adverse effect on site integrity can be ruled out.
- **Stage 3 – Derogation**: If an adverse effect on site integrity remains, the project can only proceed if:
    - There are no less damaging alternative solutions.
    - There are imperative reasons of overriding public interest (IROPI) justifying the proposal, and
    - Compensatory measures are secured to ensure the overall coherence of the European site is maintained.

2.1.7 The assessment process follows the precautionary principle throughout and the word 'likely' is regarded as a description of a risk (or possibility) rather than in a legal sense an expression of probability.

2.1.8 Stages 1 and 2 are covered by Regulation 63 and Stages 3 and 4 are covered by Regulation 64 and 68 of the Habitats Regulations.

2.1.9 Screening can be used to screen-out European sites and elements of works from further assessment, if it is possible to determine to a high degree of confidence, that significant effects are unlikely (e.g., if sites or interest features are clearly not vulnerable (exposed and / or sensitive) to the outcomes of the Project due to the absence of any reasonable impact pathways). The screening process has two potential conclusions, namely that the Project, alone or in combination with other developments, could result in:

- No LSE on any of the qualifying features of the European site, or
- LSE identified, or cannot be ruled out, on one or more of the qualifying features of the European site.

2.1.10 Only the second of these outcomes will trigger Stage 2, an AA. If one or more LSE are identified, or cannot be ruled out, it is then necessary to proceed to Stage 2 and produce an AA.

2.1.11 This HRA screening report reflects the *People over Wind judgment* (Ref 13) and applies a precautionary approach throughout. The judgment clarified that when making screening decisions for the purposes of deciding whether an appropriate assessment is required, competent authorities cannot take into account any mitigation measures. Where any potential impact pathway exists between the Project and a feature of a European site, that feature is taken forward to AA, ensuring all potential effects, including *de minimis* ones, are considered. As the Project is not

connected with the management of any European site, this report serves as the Applicant's preliminary record of HRA Stage 1 – Screening, to support the Secretary of State in determining the need for AA.

2.2 HRA Screening Steps

2.2.1 This report is intended to cover HRA 'Stage 1 – Screening' only.

2.2.2 Screening is intended to be a coarse filter for identifying effects (positive and negative) that may occur, to allow the assessment stage to focus on the most important aspects.

2.2.3 This report follows the procedures for screening described by the European Commission in the guidance document 'Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. These steps are:

- Step 1: Determine whether the plan or project is directly connected with or necessary for the management of the site.
- Step 2: Describe the plan or project in detail.
- Step 3: Identify potential impact pathways to European sites.
- Step 4: Assess whether the effects are likely to be significant, either alone or in-combination with other plans or projects.

2.2.4 Steps 1 – 4 of the screening process are set in the proceeding sections. Section 7 contains a summary of the outcome of the screening process. Where LSE cannot be excluded, these will be carried forward to the AA, which will be provided at the DCO application stage.

3 Step 1: Is the Project directly connected with or necessary for the management of a European site?

3.1.1 The Project is a ‘plan or project’, for the purpose of the Habitat Regulations, but is not directly connected with or necessary for the management of any European sites. An Appropriate Assessment may, therefore, still be required and so it is necessary to proceed to Step 2 of the Screening Process.

4 Step 2: Description of the Project

4.1 Introduction

4.1.1 For Step 2, a further understanding of the Project is required, such as the location and description of elements that could result in effects on European sites. This includes elements of the Project that may directly (e.g. land-take), or indirectly (e.g. emissions to air) affect European sites or that may act in-combination with other plans or projects.

4.1.2 A detailed description of the Project is provided in Volume 2 - Chapter 2: Project Description of the PEIR (Ref 1), and this section summarises the key elements relevant to the HRA.

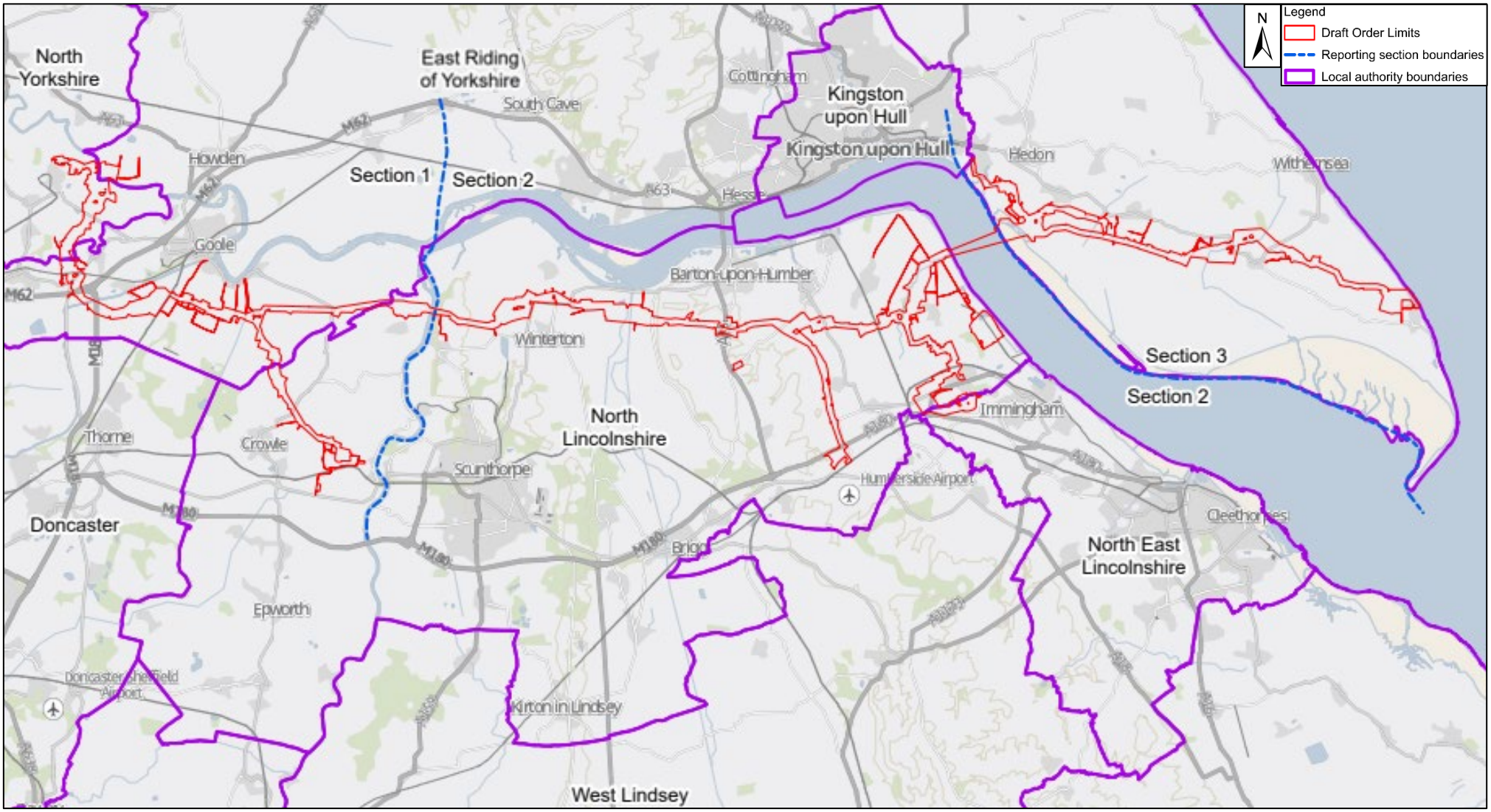
4.2 The draft Order Limits

4.2.1 The draft Order Limits are illustrated in Insert 4-1 and extend from Drax in North Yorkshire to the Holderness Coast north of Easington in the East Riding of Yorkshire. They represent the maximum geographic extent of the Project's temporary and permanent works as currently defined at this stage of design. The draft Order Limits include the proposed pipeline route, associated above-ground installations (AGIs), the Pump Facility, construction compounds, access routes, and working areas. At the landfall, the draft Order Limits extend seaward to Mean Low Water Springs (MLWS) to enable the connection with the offshore carbon dioxide transportation pipeline and infrastructure, which are to be progressed as a separate application.

4.2.2 For reporting purposes, the Project has been divided into three geographic sections numbered 1 to 3, also illustrated on Insert 4-1:

- Section 1 – which extends from the Drax area in the west to the River Trent.
- Section 2 – which extends from the River Trent to the Humber Estuary.
- Section 3 – which extends from the Humber Estuary to the Holderness coast north of Easington.

Insert 4-1: Project Location Plan



4.2.3 At this design stage, the draft Order Limits are typically a minimum of 300m wide. However, some areas, such as near Drax, are wider to allow for design development and accommodate design optionality. The draft Order Limits reflect the current stage of design and will be refined as the design matures, taking into account responses to the Statutory Consultation, stakeholder feedback and the findings of environmental surveys and assessments. The Environmental Statement will consider the draft Order Limits that form the DCO application, and these will be reflected within the final HRA Report that supports this application.

4.3 The Carbon Dioxide Pipeline

4.3.1 The pipeline would be approximately 66 cm in diameter and built out of carbon steel. The pipeline required for the spur lines to carbon capture projects would be up to approximately 30 cm in diameter. The pipeline would be underground throughout the extent of the Project, at approximately 1.2 m below the surface. Only small sections of the pipeline within the boundary of some AGIs and the Pump Facility would be above ground, to allow for operational maintenance access and monitoring.

4.4 Above Ground Installations

4.4.1 The AGIs are facilities required to operate and maintain the pipeline. They would be located at strategic locations along the pipeline, relating to proximity to carbon capture projects and intervals along the pipeline length. Details of each proposed AGI, including location, type, footprint and access arrangements, are provided in Volume 2 - Chapter 2: Project Description of the PEIR (with figures in Volume 3).

4.4.2 Three types of AGIs are proposed: Inlet; Junction; and Block Valve Stations. All AGIs would be operated remotely. Inspection and maintenance visits would be required during operation.

4.4.3 The size and arrangement of each AGI would be dependent upon its location and the function it serves; however, all have the following features and characteristics in common:

- Security fencing (approximately 2.4 m high) with access points and a minimum of two emergency exits.
- Permanent access track (up to 4 m wide), using existing routes where possible; new or upgraded tracks surfaced with stone aggregate or concrete.
- Vehicle parking and turning space within or adjacent to the facility.
- Pedestrian access for maintenance and security staff, including emergency exits.

- Electrical and instrumentation unit raised above flood level, up to approximately 4.5 m high. Small HVAC unit will also be required to maintain conditions at this unit.
- Security and emergency lighting, operating only during visits, breaches, or incidents.
- Associated infrastructure including pipework, valves, instrumentation, sensors, and transformers.
- Telecommunications link via the dedicated fibre optic cable along the pipeline.
- Power supply connection from nearby electricity distribution infrastructure (via buried or overhead cable).
- Ground surfacing: concrete pads for equipment and access, remainder with permeable aggregate.
- Landscape planting to integrate the AGI into the surrounding environment.
- Surface water drainage designed in line with SuDS principles.

4.4.4 In broad terms, AGIs are proposed across North Yorkshire, North Lincolnshire, North East Lincolnshire and the East Riding of Yorkshire. They are generally located in agricultural land or within existing industrial sites, with access from existing or new tracks. None of the proposed AGI locations fall within a European site; however, at Salt End both options for the proposed AGI are situated within approximately 15 m of the Humber Estuary SPA, SAC and Ramsar site. In addition, some AGI locations may occupy land that is functionally linked to European sites.

4.4.5 Given the ongoing refinement of options, the HRA has assumed a worst-case scenario for potential pathways of effect. At this stage, the assessment is presented as a preliminary screening report to inform consultation and identify key issues early. A shadow HRA will be prepared to accompany the Environmental Statement, which will include an updated screening and Appropriate Assessment (where required) based on the finalised design information and construction methodologies.

4.5 The Pump Facility

4.5.1 A Pump Facility is proposed north of Easington, close to the landfall where the onshore and offshore pipelines connect. Its purpose is to increase carbon dioxide pressure for onward transport to the offshore storage site. The Greater Wash SPA and Holderness Inshore MCZ lie approximately 330 m east.

4.5.2 Two siting options remain under consideration (see Volume 2 - Chapter 2: Project Description of the PEIR). The facility would be permanently staffed by a small team, with additional personnel present periodically for maintenance. Electricity would be supplied from Salt End via a buried cable corridor running parallel to the pipeline within the draft Order Limits.

4.5.3 Key features include secure fencing and access, buildings for administration, welfare, control and workshops, pump units with associated cooling and venting systems, a backup generator and UPS, lighting, HVAC, and electrical and instrumentation units. The design also provides for parking, internal access roads, drainage following SuDS principles, landscaping, and integration of the Project's dedicated fibre optic cable.

4.5.4 The DCO application would include minor diversions of a short overhead electricity line and a field drain if required to accommodate the facility.

4.6 Other Assets

4.6.1 Other assets include:

- A fibre optic cable would be installed throughout the length of the pipeline and connect the AGIs and the Pump Facility.
- A cathodic protection system (CP System) would be installed, associated with the buried pipeline. The design of the CP System is still in progress; however, it is anticipated that this would primarily consist of a cabinet located within each AGI and the Pump Facility, and test posts located at typically accessible locations at intervals along the pipeline (such as at field boundaries, where access is convenient).
- Pipeline marker posts installed at regular intervals along the pipeline to provide a visual indication of its presence once reinstatement is completed and the pipeline is buried and operating. These would typically be installed at field boundaries and / or adjacent to roads, watercourses or other crossings to ensure they are clearly visible and minimise disruption to land uses.

4.7 Construction of the Project

Pre-construction Activities

4.7.1 Ahead of construction, the pipeline route and working width would be surveyed, pegged out, and agreed with landowners, with routeing designed to use existing gaps in hedgerows and trees where practicable. Pre-commencement ecological and land drainage surveys would be carried out, and new drains installed or existing drains protected to maintain land drainage and soil condition. Records of drainage layouts would be agreed with landowners. Where necessary, utilities (e.g. overhead electricity lines) diversions would be included within the DCO application and diverted in advance.

Temporary Construction Compounds

4.7.2 Temporary construction compounds would be required to support the construction works. Compounds would be used for the storage of construction materials (including pipe), equipment, as well as site office facilities. The compounds would be established prior to commencing pipeline construction works.

4.7.3 A total of 11 locations for temporary construction compounds are proposed. This includes a construction compound at the port of Killingholme currently referred to as a 'search area', whereby discussions are ongoing with landowners and operators in this area to identify and agree upon whether an area of existing hardstanding can be used as a temporary construction compound.

4.7.4 The size and arrangement of each temporary construction compound would vary depending on the extent and type of construction work it would serve. However, each temporary construction compound would typically include the following features / characteristics:

- Perimeter security fencing (i.e. Heras-style or equivalent).
- A temporary access point and / or track from the existing road network. This is anticipated to involve a combination of using existing suitable tracks (and potentially upgrading) or constructing new tracks which would typically be of crushed aggregate.
- Areas of temporary surface within the temporary construction compound. This may include compacted gravel, wooden bog-mats, reinforced rubber or aluminium track panels or asphalt. The material chosen would be dependent upon ground conditions, ecological constraints and other variables and would be determined via engagement with landowner/s.
- Security and safety features such as temporary lighting. Lighting would be designed, positioned, and directed to reduce the intrusion into adjacent habitats, used in shifts and at the lowest luminosity necessary for safe delivery of each task.
- Installation of temporary drainage solutions, where necessary.
- Vehicle access and parking area.
- Office and welfare facilities.
- Materials and waste storage and handling areas.

4.7.5 The proposed temporary construction compounds can be categorised into the following typical types:

- Type 1 - a major operating yard intended to support pipeline construction activities primarily through the provision of office and welfare facilities, with additional land allocated for temporary storage / laydown of construction plant, bulk materials and pipeline.

- Type 2 - a major operating yard intended to act as a general construction yard to support pipeline construction, with additional land allocated for temporary storage / laydown of construction plant, bulk materials and sections of pipeline.
- Type 3 - a general office, welfare and parking facility to provide local support to pipeline construction activities. It is envisaged that these comparatively smaller construction compound types would be required at regular intervals and locations of prolonged construction access, such as major trenchless crossings, within the draft Order Limits and typically at the access point from public highways.
- Type 4 - a pipe storage facility, providing a space to allow for the bulk storage of sections of pipeline and components associated with large lengths of pipeline construction. As a minimum, it is anticipated that a single Type 4 compound will be required for each construction section, with the potential for additional pipe stores of similar or smaller size to allow for localised storage of sections of pipeline where construction access to the pipeline corridor is limited.

4.7.6 The proposed locations of the temporary construction compounds are shown in the PEIR (Volume 4 - Figure 2.1: Key Features of the Project), and described below:

Section 1

- Drax Temporary Construction Compound (TCC) – Type 4, approximately 2.8 ha in size.
- Keadby TCC 1 – Type 1, approximately 2 ha in size.
- Keadby TCC 2 – Type 4, approximately 2.8 ha in size.
- Eastoft TCC – Type 4, approximately 2.8 ha in size.

Section 2

- Winterton TCC – Type 4, approximately 3 ha in size.
- Beaumontcote TCC – Type 4, approximately 8.5 ha in size.
- Humberside Airport TCC – Type 1, approximately 1.8 ha in size.
- Immingham Docks TCC – Type 4, approximately 5.9 ha in size.
- South Killingholme TCC – Type 4, approximately 4.7 ha in size.

Section 3

- Salt End TCC – Type 4, approximately 2.1 ha in size.
- Winestead TCC – Type 3, approximately 2.6 ha in size.

4.7.7 Where temporary construction compounds interact and / or temporary access tracks interact with existing landowner accesses or Public Rights of Way, temporary measures would be put in place, such as diversions, to accommodate the continued use of these routes.

4.7.8 The temporary construction compounds are anticipated to be required for the duration of the construction phase (discussed further later in this section). In addition to the temporary construction compounds, further temporary working areas would likely be required to serve specific works, such as the construction of AGIs or where major pipeline crossings are proposed. These temporary construction compounds would typically be smaller and required for a shorter duration than those currently identified and would be located within the draft Order Limits. The Humber Estuary crossing may require temporary construction compounds for a longer duration due to the complexity of the works.

4.7.9 Depending on the ground conditions and levels of each temporary compound area, some topsoil stripping and profiling of the ground may be required to establish a safe and effective temporary working area. Following the completion of the construction works, all temporary construction compounds would be disassembled, and the ground conditions restored to their former use or as designed and consented.

4.8 Construction Vehicle Movements

4.8.1 Construction traffic is described in detail within Volume 2- Chapter 2: Project Description of the PEIR. Construction vehicle movements will arise from the delivery of materials, plant and equipment to work sites, as well as workforce travel and the removal of excavated material. It will involve movements both within the draft Order Limits (e.g. along the pipeline working width, access tracks, and construction compounds) and outside the draft Order Limits.

4.8.2 A total of 165 access points have been identified at the current stage of design development, of which 13 access points are assumed to be maintained permanently for operational access

4.8.3 Traffic data screening to define the Affected Road Network (ARN) for potential air quality impacts has not yet been undertaken. For this preliminary Stage 1 HRA, a precautionary 200 m buffer has been applied to the entire construction road network. The final HRA will instead apply a 200 m buffer to the defined ARN, but this is not expected to identify any additional European sites beyond those already considered at this stage.

4.9 Methods for constructing the pipeline

Open-cut Pipeline Installation Method

4.9.1 Due to the majority of the land within the draft Order Limits being situated in a predominantly flat, open agricultural setting, the majority of the pipeline would be

constructed using ‘open-cut trench’ method. This method would be used for agricultural land, buried service crossings, minor roads / tracks, minor and / or non-sensitive watercourses.

4.9.2 The open-cut pipeline installation method would typically work in ‘stretches’ i.e. sections of open-cut works at a time. The extent and duration of the works associated with each stretch would be heavily influenced by aspects such as topography, ground conditions and any environmental or lands constraints.

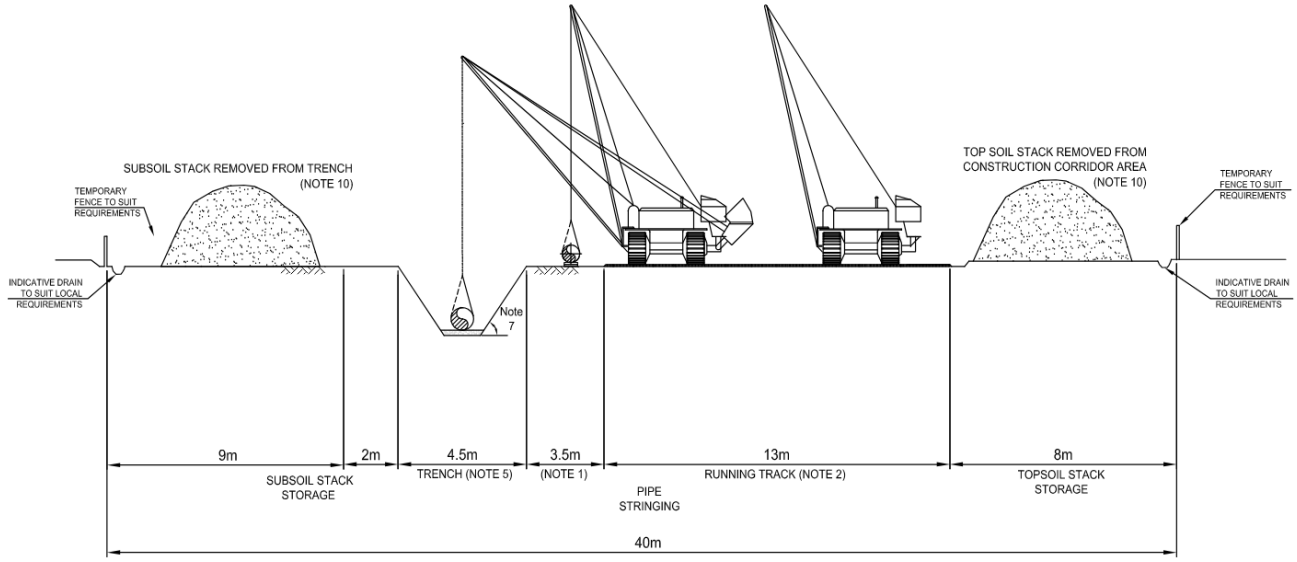
4.9.3 In typical circumstances, open-cut sections would be worked on in stretches of 40 – 50m, but potentially up to 1km, at a time. The duration of the works for each open-cut stretch would be up to approximately 2 months at a time.

4.9.4 All pipeline construction activity would be undertaken within a demarcated strip of land, known as the construction working width. This area would allow the construction contractor to undertake the pipeline construction activities and transport equipment and materials along the pipeline route to facilitate the installation of the pipeline.

4.9.5 To establish the construction working width, the area would be cleared of items which may obstruct construction works, such as fences, vegetation and topsoil. Where possible, established trees and hedgerows would be avoided. The width of topsoil to be stripped would generally correspond to the areas that will be most affected by construction activity (e.g., pipe trench, pipe string fabrication area, the temporary running track and subsoil storage stacking area). Topsoil would be stripped and stored carefully to one side of the working width in such a way that it is not mixed with subsoil or trafficked over by vehicles or construction plant in accordance with a Soil Management Plan (to be agreed).

4.9.6 The construction working width would be a maximum of 40 m. This would be the typical width for areas where construction works are unconstrained. An illustration of the typical arrangements for a 40 m construction working width is provided in Insert 4-2.

Insert 4-2: Illustrative diagram of a 40 m construction working width



4.9.7 In certain sensitive or constrained locations, reduced construction working widths would be applied to minimise environmental and land-use impacts, as summarised below:

- A 20 m working width would typically be used where sensitive habitats, watercourses, or other constraints cannot be avoided. Where a reduced width is used, additional construction area is typically required on either side for the storage of soil removed from the narrowed construction area.
- In exceptional cases, a further reduction to a 5 m working width may be applied for very short sections.

Trenchless Crossing Installation Method

4.9.8 Where the pipeline is required to cross complex and / or sensitive existing features, such as major roads, railways, main rivers and environmentally sensitive areas, a ‘trenchless’ construction method would be used.

4.9.9 There are multiple types of trenchless construction techniques (see Volume 2 - Chapter 2: Project Description of the PEIR). However, all technique types would involve installing the pipeline below an existing feature, without excavating or disturbing the ground surface, as with the open-cut method.

4.9.10 The depths of the trenchless crossings would vary and be dependent on the characteristics of the feature to be crossed (i.e. the channel depth of a main river), ground conditions, trenchless crossing method and any spatial restrictions, amongst other reasons. The final depth of cover would be confirmed during detailed design

and would ensure overall safety and integrity of the pipeline as well as the feature to be crossed.

4.9.11 A preliminary schedule of where trenchless crossings are proposed is provided in Volume 2 - Chapter 2: Project Description of the PEIR (Table 2-10; with locations indicated in Volume 3 - Figure 2.1: Key Features of the Project) and includes the locations where the pipeline route intersects European sites. The proposed list of trenchless crossings will be presented in the ES and reflected within the final HRA submitted in support of the DCO application.

Humber Estuary Crossing and Easington Landfall

4.9.12 A trenchless installation technique is proposed to cross the Humber Estuary and to establish the landfall north of Easington. Several design options for these elements remain under consideration within the PEIR. At this preliminary stage, the HRA acknowledges the potential for effects on European sites but cannot determine the final scope until a preferred design has been confirmed. The detailed construction method, alignment and depth will be defined at the detailed design stage and assessed in full within the shadow HRA, which will include updated screening and, where required, Appropriate Assessment.

Pre-commissioning and Hydrostatic Testing

4.9.13 Once constructed, the pipeline would be cleaned, gauged, flooded and hydrostatically tested in sections to prove integrity. Around 16,200 m^3 of water is anticipated to be required, with reuse between test sections wherever practicable. Potable or filtered freshwater is currently being considered as sources. Additives, potentially including biocides or corrosion inhibitors, among others, may be required depending on water quality and retention time. Hydrotest water would be discharged safely to approved locations (e.g. sewer, watercourse, ground or treatment facility) and tested to ensure compliance with regulatory standards. Following de-watering, the pipeline would be dried using nitrogen, air, or vacuum systems, with drying equipment sited at AGIs or designated locations.

Pipeline Reinstatement

4.9.14 After construction, all temporary working areas would be cleared of materials and reinstated. Excavated soils would be replaced and treated to avoid compaction, with topsoil carefully spread. Restoration would include reseeding of pastureland, reinstatement of hedgerows and fencing, and restoration of watercourse banks and ditches. Open-cut road crossings would also be reinstated in line with standards and in consultation with the relevant highway authority.

4.10 Construction Programme and Working Hours

4.10.1 Subject to the DCO being granted, construction is anticipated to run for four years, with the detailed programme to be confirmed at the design stage. Works will be sequenced efficiently, with not all locations along the route subject to construction at the same time. Twenty-four-hour working may be required for certain critical activities, particularly trenchless crossings and offshore interfaces, with continuous working at any one location expected to last for limited periods (e.g. up to four weeks). The final construction phasing, including any restrictions to working hours required to mitigate significant effects, will be set out in the shadow HRA.

4.11 Operation of the Project

4.11.1 The operational phase is expected to last for approximately 25 years, during which the pipeline will transport carbon dioxide from capture projects to the offshore storage site. A Permanent Rights Corridor (typically 12–18 m wide for the pipeline and up to 10 m for the power cable) will be established to protect the integrity and safety of the system and provide access for inspection and maintenance. Restrictions within this corridor will prevent activities such as excavation or planting of deep-rooting trees.

4.11.2 AGIs will be operated remotely with occasional site visits for inspection and maintenance. Routine operations include periodic pipeline inspection approximately every five years, which may involve controlled venting of small volumes of CO_2 and nitrogen. Emergency venting facilities are also provided but would only operate in unforeseen circumstances.

4.11.3 The Pump Facility at Easington will be permanently staffed (up to four people) with additional staff visiting for maintenance when required. Localised lighting will be used for safety and security during low-light conditions. The Pump Facility houses the main CO_2 pump units, normally operating four units with one on standby, and includes venting systems to manage routine maintenance and emergency scenarios.

4.11.4 Noise and vibration emissions during operation are expected to be very limited, with only small HVAC systems operating continuously at AGIs and pumps at the facility designed with attenuation.

4.12 Decommissioning Phase of the Project

4.12.1 The pipeline, AGIs and Pump Facility are expected to remain in operation for at least 25 years. At the end of their design life, they would be decommissioned in line with

applicable legislation, licences and best practice, using methods intended to minimise environmental impacts.

4.12.2 It is currently anticipated that the buried pipeline would be left in situ to avoid further soil disturbance, with sections cut and grouted where necessary. The AGIs and Pump Facility would be dismantled and removed using similar equipment, machinery and traffic routes as for construction, after which the land would be restored to its former use.

5 Step 3: Identification of potential effects on European sites

5.1 Introduction

5.1.1 In line with PINS Advice Note 10 (Planning Inspectorate, 2022), this stage identifies whether there are realistic potential impact pathways from the Project that could result in LSE on any European sites, either alone or in combination with other plans or projects.

5.1.2 Table 5-1 summarises the criteria and pathway considerations used to determine which European sites require further consideration at this stage. The criteria draw from guidance within the Design Manual for Roads and Bridges (DMRB) LA 115 (Highways England, 2020) and Natural England (2021).

Table 5-1: Criteria for the Identification of Potential Effects on European sites

Criteria	Outcome
Is the Project within 2 km of a European site or functionally linked land (FLL)[1].	The Project passes beneath the Humber Estuary SPA / SAC / Ramsar site. The Project also extends into Greater Wash SPA and Holderness Inshore MCZ. The following additional European sites are situated within this distance threshold (approximate distance from the draft Order Limits is also provided): • River Derwent SAC (480 m north). • Thorne Moor SAC (800 m south). • Thorne and Hatfield Moors SPA (800 m south). The following European sites are designated for species that may use FLL within 2 km of the draft Order Limits: • Lower Derwent Valley SPA (3.8 km north). • Lower Derwent Valley Ramsar site (3.8 km north).
Is the Project within 30 km of a SAC, where	Not applicable. No SACs designated for bats are located within 30 km.

[1] FLL is a term often used to describe areas of land or sea occurring outside a designated site which is considered to be critical to, or necessary for, the ecological or behavioural functions in a relevant season of a qualifying feature for which a SAC, SPA or Ramsar site has been designated. These habitats are frequently used by SPA species and support the functionality and integrity of the designated sites for these features.

Criteria	Outcome
bats are noted as one of the qualifying interests.	
Does the Project cross or lie adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a European site.	Yes. The Project alignment crosses below the Humber Estuary, a tidally influenced water body designated as SAC, SPA and Ramsar site. The following additional European sites have been identified following this criterion (approximate distance from the draft Order Limits is also provided): • Lower Derwent Valley SAC (3.8 km north) • Lower Derwent Valley SPA (3.8 km north) • Lower Derwent Valley Ramsar site (3.8 km north)
Does the Project have a potential hydrological or hydrogeological linkage to a European site containing a groundwater dependent terrestrial ecosystem (GWDTE) which triggers the assessment of a European site following DMRB LA 113 (Highways England *et al.*, 2020).	Yes. The Humber Estuary supports wetland habitats that can be groundwater dependent, as identified in UKTAG guidance (2004). However, the Annex I habitats of the Humber Estuary SAC are almost entirely tidally maintained (e.g. estuaries, saltmarsh, mudflats, dune habitats) and are not classified as GWDTEs. In contrast, the Humber Estuary Ramsar site includes wetland types such as humid dune slacks (high groundwater dependence) and reedbed / wet grassland communities, including rush-pasture within grazing marsh (low to moderate groundwater dependence). For the purposes of assessment under LA 113[2], the Ramsar site is therefore relevant in respect of these features, whereas the SAC has only marginal relevance under this criterion. Due to their upstream location and separation distance from the draft Order Limits, no perceivable hydrological or hydrogeological impact pathways have been identified for the European sites associated with the River Derwent and Thorne and Hatfield Moors. No other European sites have been identified with potential connections of this kind.
Does the Project have an affected road network (ARN) which triggers the criteria for assessment of European sites following DMRB LA105	Traffic data screening to define the ARN for potential air quality impacts has not yet been undertaken. For the final HRA Report, a 200 m buffer will be applied to the ARN to identify any additional European sites. At this preliminary Stage 1 HRA, a precautionary 200 m buffer has instead been applied to the entire construction road network (see Section 4.8.3). Consequently, the final HRA is not expected to identify any additional European sites beyond those already considered at this stage.

[2] DMRB LA 113 provides established methods for assessing GWDTEs. Although designed for road schemes, it is commonly used as a benchmark for other linear infrastructure, such as pipelines, where no sector-specific guidance exists.

Criteria	Outcome
(Highways England, 2019).	The construction road network passes through and adjacent to the Humber Estuary SPA, SAC and Ramsar site and lies within 130 m of the Greater Wash SPA. No other European sites are located within 200 m of the construction road network.
Additional European sites should be subject to screening where the existence of ecological connectivity between projects and European sites is identified beyond the screening criteria.	No additional European sites have been identified with ecological connectivity to the draft Order Limits.
Those European sites with IRZs[3] within the Project boundary should be subject to HRA screening.	No additional European sites have been identified with IRZs within the draft Order Limits.

5.2 European Sites Identified for Screening

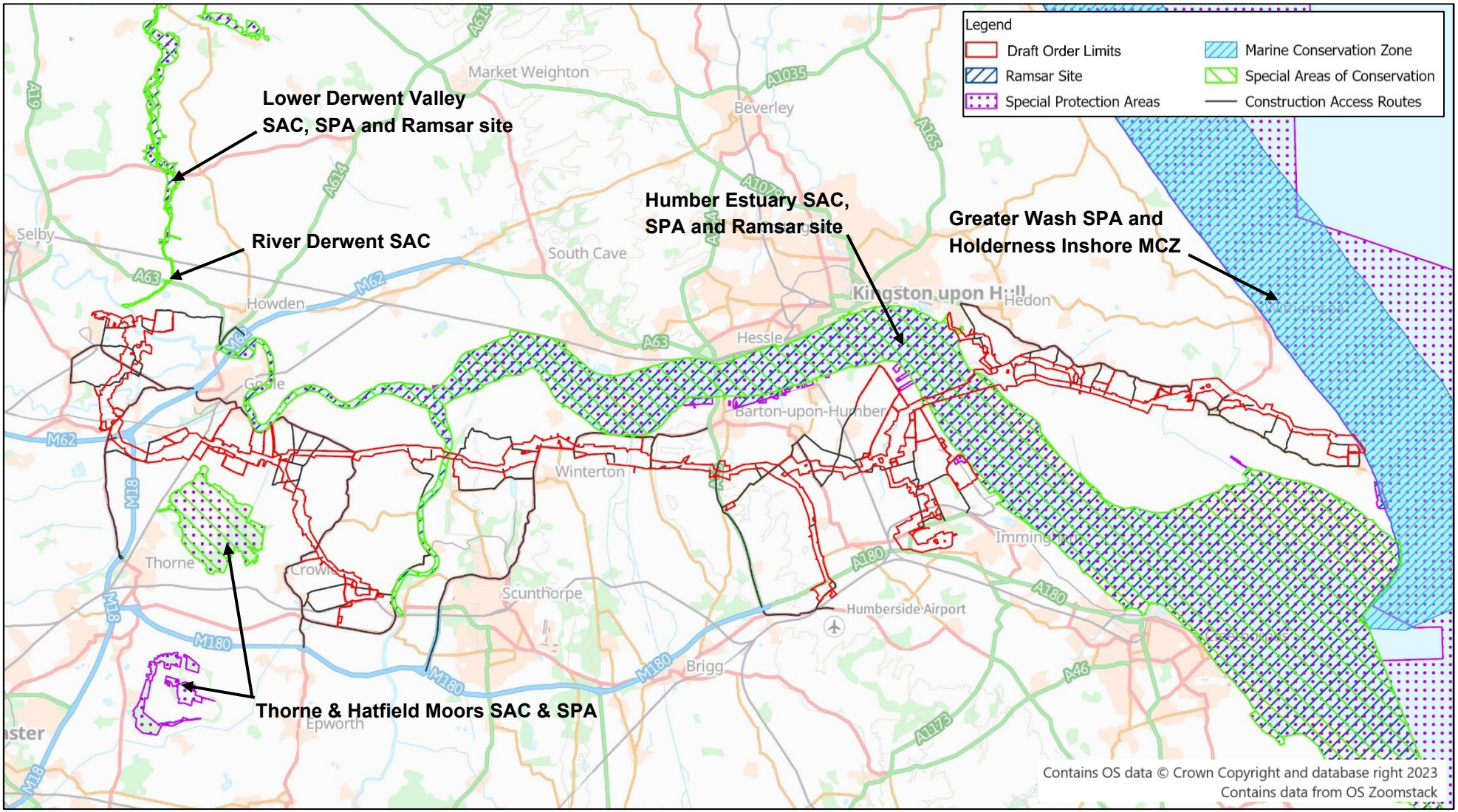
5.2.1 The European sites listed below have been identified as relevant to the HRA screening, based on their proximity to the draft Order Limits and potential ecological connectivity. All sites are shown on Insert 5-1, which also illustrates the draft Order Limits and the entire construction road network (used on a precautionary bases for air quality screening purposes):

- Humber Estuary SAC (partially with the draft Order Limits).
- Humber Estuary SPA (partially with the draft Order Limits).
- Humber Estuary Ramsar site (partially with the draft Order Limits).
- Holderness Inshore MCZ (partially with the draft Order Limits).
- Greater Wash SPA (partially with the draft Order Limits).
- River Derwent SAC (480 m north).
- Thorne Moor SAC (800 m south).

[3] Impact Risk Zones (IRZs) are GIS-based buffers developed by Natural England to identify the types of activities that could affect designated sites. They map the potential “zone of influence” of each European site, showing where particular risks (e.g. from air quality, water abstraction, or infrastructure development) may apply. In the HRA process, IRZs are used as an initial screening tool to highlight whether a project lies within an area where activities could have a likely significant effect on a European site.

- Thorne and Hatfield Moors SPA (800 m south).
- Lower Derwent Valley SAC (3.8 km north).
- Lower Derwent Valley SPA (3.8 km north).
- Lower Derwent Valley Ramsar site (3.8 km north).

Insert 5-1: European Sites in Relation to the draft Order Limits and the Construction Road Network



5.3 Potential Impact Pathways

5.3.1 This step identifies whether the proposed works described in Step 2 and (Section 4) have the potential to cause effects on the qualifying features of these European designated sites.

Potential Effects and Zones of Influence

5.3.2 The spatial scope of this HRA is defined by the likely environmental outcomes of the Project, the sensitivity of the qualifying features, and their potential vulnerabilities. Many features (particularly mobile species) may rely on habitats outside of designated site boundaries, meaning effects can occur some distance from the European site if FLL is affected.

5.3.3 The construction and operation phases of the Project may give rise to a number of potential effect pathways which could result in LSEs on the European sites identified in Section 5.2. To ensure a precautionary approach at this preliminary stage, a broad Zone of Influence (ZoI) has been applied for each type of potential environmental change as shown in Table 5-2.

5.3.4 All of these effect pathways have been considered on a precautionary basis at this preliminary screening stage. Where no credible pathway exists within the ZoI, features have been screened out. Where pathways fall within the ZoI or potential for LSE cannot be excluded, the feature has been carried forward for further consideration at the AA stage. The outcomes are set out in Section 6, which presents the screening matrices and conclusions.

Table 5-2: Potential effects and ZoI

Potential effect	Pathway	ZoI
Permanent or temporary land take / land use change	Direct or indirect loss of habitats within the draft Order Limits, or temporary degradation during construction works, with potential effects on habitats and sedentary species.	Within the draft Order Limits for habitats and sedentary species; for mobile species, effects may extend beyond this where ranges overlap.
Physical harm to species and habitats	Site establishment, use of plant, compounds and access track construction could cause direct injury or mortality to species, or temporary habitat loss / damage to supporting habitat, including areas functioning as FLL for SPA / Ramsar birds.	Within the draft Order Limits.
Habitat fragmentation	Reduction in habitat connectivity for species, particularly birds using FLL associated with the Humber Estuary and Lower Derwent Valley.	Within the draft Order Limits for habitats and sedentary species; for mobile species, effects may extend beyond this where ranges overlap.
Noise, vibration, light and visual / movement disturbance	Construction activities, including HDD drilling compounds and haul roads, may cause disturbance or displacement of qualifying bird features of the Humber Estuary and Lower Derwent Valley. During operation, no credible disturbance pathway is anticipated: the pipeline is buried and compounds removed; AGIs are remotely operated with occasional daytime checks; operational noise is minimal and lighting is local, task-only.	Up to 500 m from construction works for sensitive species, with distances adjusted for species-specific foraging behaviour with distances adjusted for species-specific foraging behaviour, based on current research, published best practice guidance, and professional ecological judgement.

Potential effect	Pathway	ZoI
Hydrological and hydrogeological change	Works crossing beneath the Humber Estuary could alter water movement, increase siltation, or affect sediment transport processes, with potential implications for estuarine habitats and species.	Potential effects are expected to be limited upstream, with a precautionary ZoI of up to 500 m from the draft Order Limits. Downstream, a broader ZoI of up to 15 km has been applied to reflect the potential for dispersion of suspended sediments and changes to estuarine processes
Air quality	Emissions from construction traffic and plant and dust generation during earthworks could degrade sensitive habitats.	A ZoI of up to 200 m has been applied for vehicle emissions. For construction dust, a precautionary ZoI of up to 250 m has been applied around construction works and haul routes to capture potential effects on sensitive habitats.
Pollution event	Risk of accidental release of contaminants (e.g. from drilling fluids, surface water runoff or spills), with potential to affect habitats and species upstream and downstream of the works.	ZoI is up to 500 m upstream of the draft Order Limits and up to 15 km downstream, reflecting the potential for contaminants (e.g. from HDD drilling fluids, surface water runoff, or accidental spills) to disperse via the tidal river system.
Barrier effect	Temporary obstruction of watercourses during crossing works could impede upstream or downstream movement of migratory fish or otter, with indirect consequences for designated sites.	ZoI extends along the length of connected watercourses upstream and downstream of the works, as obstruction could prevent migratory species from accessing required habitats beyond the immediate works area.
Biosecurity / invasive non-native species (INNS) risk	Potential for machinery and materials to introduce or transfer INNS, resulting in indirect degradation of habitats or competition with qualifying species.	ZoI applies to all works areas where movement of machinery or materials could facilitate the spread of invasive species.

In-Combination Effects

5.3.5 As part of the HRA screening process, information on other projects and plans that have been subject to HRA in relation to the same European sites is considered to identify potential 'in-combination' effects. At this preliminary stage, however, a detailed in-combination assessment is not undertaken. Instead, the screening applies a strong precautionary principle: if a potential pathway of effect is identified between the Project and any European site, that site is carried forward to AA. This ensures that all potential effects, including very small ('*de minimis'*) effects, are captured and will be assessed in detail, both alone and in-combination with other projects, at the AA stage.

6 Step 4: Assessment of likely significant effects

6.1 Introduction

6.1.1 This step identifies whether the proposed works described in Step 2 (Section 4) and potential effects described in Step 3 (Section 5) have the potential to cause LSE on the qualifying features of those European sites identified in Step 3.

6.1.2 Each European site is presented in the following screening matrices, which set out the qualifying interest features, potential pathways of effect, and the justification for either excluding LSE or carrying features forward to AA.

6.2 Humber Estuary SAC Screening Matrix

Table 6-1: Humber Estuary SAC (UK0030170) qualifying features relevant to the screening assessment and potential for LSE

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
H1110 Sandbanks which are slightly covered by sea water all the time	✓	These features are present within the draft Order Limits at the Humber Estuary and River Trent crossing locations. Direct impacts are not anticipated as trenchless crossings will be used at both locations. However, indirect impacts as a result of hydrological / hydrogeological change and pollution events are possible.
H1130 Estuaries	✓	
H1140 Mudflats and sandflats not covered by seawater at low tide	✓	
H1150 Coastal lagoons	**X**	Two qualifying coastal lagoons areas are present within the Humber Estuary SAC boundary both of which are located at least 20 km downstream from the draft Order Limits. These sites are outside the ZoI for any indirect impacts as a result of the Project.
H1310 Salicornia and other annuals colonising mud and sand	✓	These features are mapped to 10 km resolution only (Ref 9) and are present within the 10km grid squares that include the River Trent and Humber Estuary crossings. These features may be present within the draft Order Limits and / or ZoI. Direct impacts are not anticipated as trenchless crossings will be used at both locations. Depending on the exact location/s of these features, indirect impacts as a result of hydrological / hydrogeological change, changes in air quality and pollution events are possible and these features are screened in on a precautionary basis.
H1330 *Glauco-Puccinellietalia maritimae;* Atlantic salt meadows	✓	
H2110 Embryonic shifting dunes	✓	These features are mapped to 10 km resolution only[6] and are not present in any coastal areas within the draft Order Limits. Direct impacts are therefore not anticipated.
H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	✓	

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes")	✓	The nearest 10 km grid square containing these features is approximately 140 m south of the draft Order Limits on the Easington coast which lies within the ZoI for hydrological / hydrogeological change, changes in air quality and pollution events. As indirect impacts are possible (depending on the exact location/s of these features), these features are screened in on a precautionary basis.
H2160 Dunes with *Hippophae rhamnoides*	✓	
S1095 *Petromyzon marinus;* Sea lamprey	✓	Both species are present in the Humber Estuary, which functions as a key migratory route during spawning migrations, and may therefore be present within the draft Order Limits and / or ZoI. Direct impacts are not anticipated as a trenchless crossing will be used. However, indirect impacts as a result of noise / vibration, hydrological / hydrogeological change and pollution events are possible.
S1099 *Lampetra fluviatilis;* River lamprey	✓	
S1364 *Halichoerus grypus;* Grey seal	✓	The nearest known breeding colony for grey seals is located approximately 20 km south of the draft Order Limits at Donna Nook which lies outside of the ZoI for any indirect impacts as a result of the Project. Individual grey seal have been recorded within the Humber Estuary north of the draft Order Limits. Direct impacts are not anticipated as a trenchless crossing will be used. However, indirect impacts as a result of noise / vibration, hydrological / hydrogeological change and pollution events are possible.

6.3 Humber Estuary SPA Screening Matrix

Table 6-2: Humber Estuary SPA (UK9006111) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A021 *Botaurus stellaris*; Great bittern (non-breeding)[11]	✓	Individual birds have been recorded over winter within the draft Order Limits (and SPA boundary) at Killingholme Haven Pits, meeting the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7) and indirect impacts as a result of noise / vibration / light / visual disturbance and pollution events are possible.
A021 *Botaurus stellaris*; Great bittern (breeding)	X	There are no records of this species during the breeding season within the draft Order Limits. The nearest record is located approximately 830 m north-east of the draft Order Limits within Dawson City Claypits Local Wildlife Trust reserve, which is outside the ZoI for any indirect impacts as a result of the Project.
A026 *Egretta garzetta*; Little egret (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (2 based on WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. In addition, no direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A040 *Anser brachyrhynchus*; Pink-footed goose (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme and within the draft Order Limits at Goole Fields, Garthorpe, Winteringham, Barton-upon-Humber, East Halton and

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Easington in numbers exceeding the 1% threshold of the Humber Estuary population (161 based on WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and pollution events are also possible.
A043a *Anser anser*; Greylag goose (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme and within the draft Order Limits at Garthorpe in numbers exceeding the 1% threshold of the Humber Estuary population (18 based on WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and / or pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and pollution events are also possible.
A046 *Branta bernicla*; Brent goose (non-breeding)[11]	X	Infrequent records of this species were identified within the draft Order Limits, including records within the SPA boundary at Killingholme Haven Pits and Paull Holme, and within the ZoI at East Halton Brick Pits. However, of all records, the peak count was 6, which is below the 1% threshold of the Humber Estuary population (25, based on the WeBS 5-year mean peak).
A048 *Tadorna tadorna*; Common shelduck (non-breeding)[11]	X	Multiple records of this species were identified, including records within the draft Order Limits (and SPA boundary) at East Halton Skitter and within the ZoI at Paull Holme Strays. However, of all records, the peak count was 35, which is below the 1% threshold of the Humber Estuary population (76, based on the WeBS 5-year mean peak).

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A050 *Anas penelope*; Eurasian wigeon (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter and Paull Holme, and within the draft Order Limits at Drax and Paull Holme Strays in numbers exceeding the 1% threshold of the Humber Estuary population (32, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter and Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A052 *Anas crecca*; Eurasian teal (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter, Paull Holme and Salt End, and within the draft Order Limits at Paull Holme Strays in numbers exceeding the 1% threshold of the Humber Estuary population (54, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter, Paull Holme and Salt End are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and/or pollution events are also possible.
A056 *Anas clypeata*; Northern shoveler (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme in numbers meeting the 1% threshold of the Humber Estuary population (3 based on WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A059 *Aythya ferina*; Common pochard (non-breeding)[11]	✓	Recorded over winter within the ZoI at East Halton Brick Pits in numbers exceeding the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak).

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Indirect impacts to areas that may be functionally linked the SPA as a result of noise / vibration / light / visual disturbance and pollution events are possible.
A067 *Bucephala clangula*; Common goldeneye (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (3, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A068 *Aythya marila*; Greater scaup (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter in numbers exceeding the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A081 *Circus aeruginosus*; Eurasian marsh harrier (breeding)	X	Marsh Harriers breed in the Humber region and are also recorded during passage periods and the winter. They have been recorded foraging at multiple locations within the draft Order Limits at numbers exceeding the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). However, no confirmed evidence of breeding was identified within the draft Order Limits or ZoI.
A082 *Circus cyaneus*; Hen harrier (non-breeding)	✓	Hen Harriers are winter visitors and passage migrants on the Humber. They have been recorded within the draft Order Limits (and SPA boundary) at East Halton Skitter and within the draft Order

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Limits at Garthorpe, Winteringham and Paull Holme, in numbers meeting the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and/or pollution events are also possible.
A125 *Anas platyrhynchos*; Mallard (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter, Killingholme Haven Pits and Paull Holme, and within the draft Order Limits at Drax, Rawcliffe Bridge, Goole Fields, Garthorpe and Paull Holme Strays in numbers exceeding the 1% threshold of the Humber Estuary population (12, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter and Paull Holme are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A127 *Grus* grus; Crane (non-breeding)[11]	✓	No records of this species were identified within the draft Order Limits, but the records are present within the ZoI at West Halton in numbers above the 1% threshold of the Humber Estuary population (1 based on WeBS 5-year mean peak).

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Indirect impacts to areas that may be functionally linked to the SPA as a result of land noise / vibration / light / visual disturbance and / or pollution events are possible.
A130 *Haematopus ostralegus*; Eurasian oystercatcher (non-breeding)[11]	X	Multiple records of this species were identified within the draft Order Limits, including records within the SPA boundary at East Halton Skitter and Paull Holme. However, of all records, the peak count was 10, which is below the 1% threshold of the Humber Estuary population (66, based on the WeBS 5-year mean peak).
A132 *Recurvirostra avosetta*; Pied avocet (non-breeding[4] and breeding)	✓	Recorded over winter and during the breeding season within the draft Order Limits (and SPA boundary) at Killingholme Haven Pits, in numbers exceeding the 1% threshold for both overwintering and breeding of the Humber Estuary population (23 overwinter; 1 breeding, based on the WeBS 5-year mean peak). No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7) and indirect impacts as a result of noise / vibration / light / visual disturbance and pollution events are possible.
A137 *Charadrius hiaticula*; Common ringed plover (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (17, based on the WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA as a result of noise / vibration / light / visual disturbance and pollution events are possible.

[4] 'Main component species' not listed on the SPA citation but occurring at site-level in numbers exceeding 1% of the national population or >2,000 individuals (according to the most recent Humber Estuary WeBS five-year mean peak count) and thus treated as qualifying components of the assemblage and assessed individually as well as collectively as part of the assemblage feature (Natural England, 2023).

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A140 *Pluvialis apricaria*; European golden plover (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at Paull Holme, in numbers exceeding the 1% threshold of the Humber Estuary population (146, based on the WeBS 5-year mean peak). Direct impacts within the SPA are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA as a result of noise / vibration / light / visual disturbance and pollution events are possible. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A141 *Pluvialis squatarola*; Grey plover (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (21, based on the WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A142 *Vanellus vanellus*; Northern lapwing (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter and Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (121, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter and Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A143 *Calidris canutus*; Red knot (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (192, based on the WeBS 5-year mean peak). No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7) and indirect impacts as a result of noise / vibration / light / visual disturbance and pollution events are possible.
A144 *Calidris alba*; Sanderling (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits at Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (5, based on the WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA as a result of noise / vibration / light / visual disturbance and pollution events are possible.
A149 *Calidris alpina*; Dunlin (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter, Paull Holme and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (171, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter and Paull Holme are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A151 *Philomachus pugnax*; Ruff (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A156 *Limosa limosa islandica*; Black-tailed godwit (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (63, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A157 *Limosa lapponica*; Bar-tailed godwit (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter and Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (43, based on the WeBS 5-year mean peak). Direct impacts within the SPA are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible
A160 *Numenius arquata*; Eurasian curlew (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at Paull Holme, in numbers exceeding the 1% threshold of the Humber Estuary population (21, based on the WeBS 5-year mean peak). Direct impacts within the SPA at Paull Holme Strays are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise/vibration/light/visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A162 *Tringa totanus*; Common redshank (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the SPA boundary at East Halton Skitter, Paull Holme and Killingholme Haven Pits in numbers exceeding the 1% threshold of the Humber Estuary population (28, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter and Paull Holme are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and/or pollution events are also possible.
A163 *Tringa ochropus*; Green sandpiper (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits at Rawcliffe Bridge, Goole Fields, East Halton Skitter and Paull Holme Strays in numbers meeting/exceeding the 1% threshold of the Humber Estuary population (1 based on WeBS 5-year mean peak). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and/or pollution events are possible.
A164 *Tringa nebularia*; Common greenshank (non-breeding)[11]	✓	Recorded over winter at several locations within the draft Order Limits, including within the and SPA boundary at East Halton Skitter and Killingholme Haven Pits, in numbers exceeding the 1% threshold of the Humber Estuary population (1, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. No direct impacts within the SPA are anticipated at Killingholme Haven Pits. However, a temporary construction compound is proposed in the vicinity of Killingholme Haven Pits, exact location to be confirmed (see Section 4.7). Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and/or pollution events are also possible.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A166 *Numenius phaeopus*; Eurasian whimbrel (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at Paull Holme in numbers exceeding the 1% threshold of the Humber Estuary population (2, based on the WeBS 5-year mean peak). Direct impacts within the SPA are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events.
A169 *Arenaria interpres*; Ruddy turnstone (non-breeding)[11]	✓	Recorded over winter within the draft Order Limits (and SPA boundary) at East Halton Skitter within the draft Order Limits at Paull Holme Strays in numbers meeting the 1% threshold of the Humber Estuary population (2, based on the WeBS 5-year mean peak). Direct impacts within the SPA at East Halton Skitter are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA are possible as a result of noise / vibration / light / visual disturbance and pollution events. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.
A195 *Sterna albifrons*; Little tern (breeding)	✓	There are no records of this species during the breeding season within the draft Order Limits. The species is known to breed at Easington Lagoon, approximately 1.8 km south of the draft Order Limits. Indirect impacts as a result of hydrological/hydrogeological change and pollution events are possible.
Waterbird assemblage	✓	The Humber Estuary SPA qualifies for its internationally important non-breeding waterbird assemblage, which includes the species assessed individually above. Natural England advises that, in addition to individual species assessments, the assemblage should be considered as a feature in its own right. The draft Order Limits include intertidal and adjacent habitats that regularly support multiple assemblage species in combination. On this basis, the assemblage feature is screened in to ensure potential cumulative and functional effects are assessed alongside individual species impacts.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Direct impacts within the SPA are not anticipated as a trenchless crossing will be used. Indirect impacts within the SPA as a result of noise / vibration / light / visual disturbance and / or pollution events are possible. Direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take/land use change, noise / vibration / light / visual disturbance and / or pollution events are also possible.

6.4 Humber Estuary Ramsar site Screening Matrix

Table 6-3: Humber Estuary Ramsar site (UK11031) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
Criterion 1 – natural wetland habitats that are of international importance: Near-natural estuary with component habitats, specifically dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish / saline lagoons	✓	This includes habitats which are present within the draft Order Limits or in adjacent areas within the ZoI at the Humber Estuary and River Trent crossing locations. Direct impacts within the Ramsar site are not anticipated as a trenchless crossing will be used. Indirect impacts within the Ramsar site are possible as a result of hydrological / hydrogeological change and / or pollution events.
Criterion 3 – supports populations of plants and / or animal species of international importance: Breeding colony of S1364 *Halichoerus grypus;* Grey seals at Donna Nook	✓	Donna Nook (the nearest known breeding colony) is located approximately 20 km south of the draft Order Limits. However, individual grey seal have been recorded within the Humber Estuary north of the draft Order Limits. The rationale for screening in this species can be seen above in Table 6-1.
Criterion 3 – supports populations of plants and / or animal species of international importance: Breeding colony of breeding S1202 natterjack toad *Bufo calamita* at Saltfleetby-Theddlethorpe.	**X**	Saltfleetby-Theddlethorpe (the nearest known breeding site) is located over 35 km from the draft Order Limits and well beyond the ZoI of the Project.
Criterion 5 – Bird Assemblages of International Importance: Wintering waterfowl	✓	Species that form part of Criterion 6 have been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
Criterion 6 – Bird Species / Populations Occurring at Levels of International Importance: Golden Plover, Red Knot, Dunlin, Black-tailed Godwit, Redshank (passage), Shelduck, Golden Plover, Red Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Redshank (overwintering)	✓	Species that form part of Criterion 6 have been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.
Criterion 8 – Internationally important source of food for fishes, spawning grounds, nursery and / or migration path: S1099 *Lampetra fluviatilis;* River lamprey and S1095 *Petromyzon marinus;* sea lamprey	✓	River and sea lamprey have been screened into the assessment. The rationale for screening in these species can be seen above in Table 6-1.

6.5 Holderness Inshore MCZ Screening Matrix

Table 6-4: Holderness Inshore MCZ (UKMCZ0035) designated features relevant[5] to the screening assessment

Designated Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
Intertidal sand and muddy sand	✓	Feature is present within the ZoI, approximately 4.2 km from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological / hydrogeological change and / or pollution events.
Moderate energy circalittoral rock	✓	Feature is present within the ZoI, approximately 1.4 km from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological / hydrogeological change and / or pollution events.
High energy circalittoral rock	✓	Feature is present within the ZoI, approximately 1.3 km from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological/ hydrogeological change and / or pollution events.
Subtidal coarse sediment	✓	Feature is present within the ZoI, approximately 275 m from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological/ hydrogeological change and / or pollution events.
Subtidal sand	✓	Feature is present within the ZoI, approximately 360 m from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological/ hydrogeological change and / or pollution events.
Subtidal mud	✓	Feature is present within the ZoI, approximately 700 m from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological/ hydrogeological change and / or pollution events.

[5] The Holderness Inshore MCZ includes the geological feature Spurn Head (subtidal) and situated approximately 7.2 km from the draft Order Limits. As this is a geomorphological designation rather than an ecological qualifying feature, it does not fall within the scope of this HRA and is therefore not considered further here.

Designated Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
Subtidal mixed sediments	✓	Feature is present within the ZoI, approximately 430 m from the draft Order Limits. Indirect impacts within the MCZ are possible as a result of hydrological / hydrogeological change and / or pollution events.

6.6 Greater Wash SPA Screening Matrix

Table 6-5: Greater Wash SPA (UK9020329) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A005 *Gavia stellata;* Red-throated diver (non-breeding)	✓	Proposed construction activities are located within this SPA and within potential FLL, thus potential effects from the temporary loss of habitat used as foraging grounds cannot be ruled out at this stage.
A177 *Hydrocoloeus minutus;* Little gull (non-breeding)	✓	
A193 *Sterna sandvicensis*; Sandwich tern (breeding)	✓	
A194 *Sterna hirundo*; Common tern (breeding)	✓	
A195 *Sterna albifrons*; Little tern (breeding)	✓	

6.7 River Derwent SAC Screening Matrix

Table 6-6: River Derwent SAC (UK0030253) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
H3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	**X**	The Project is located 480 m downstream of the River Derwent SAC on the River Ouse and Humber Estuary. The River Derwent is hydraulically separated from the tidal Ouse and Humber waters by the Barmby Barrage, which prevents saline intrusion and upstream propagation of estuarine water. Hydrological connectivity at this location is one-directional, with discharge from the Derwent into the Ouse controlled by sluices and pumping infrastructure at the barrage. As there is no mechanism by which works in the tidal Ouse / Humber could influence the upstream freshwater habitats of the River Derwent SAC, this feature is screened out of further assessment.
S1095 *Petromyzon marinus*; Sea lamprey	✓	While the River Derwent is separated from tidal backflow by the Barmby Barrage, sluices and locks allow for fish passage, maintaining a connection between the estuary and the SAC. On this basis, these species have been screened into the assessment following the same rationale for screening for the Humber Estuary (see Table 6-1).
S1099 *Lampetra fluviatilis*; River lamprey	✓	
S1163 *Cottus gobio*; Bullhead	**X**	This species is a strictly freshwater, non-migratory species, with no estuarine or marine phase (JNCC, 2023). The qualifying populations within the River Derwent SAC are resident and confined to the freshwater catchment. The River Derwent is hydraulically separated from tidal influence by the Barmby Barrage, which prevents saline intrusion and estuarine backflow. On this basis, there is no hydrological or biological pathway by which works in the tidal Ouse and Humber could influence Bullhead populations within the SAC, and the feature has been screened out of further assessment.
S1355 *Lutra lutra;* Otter	✓	This species is widespread across the Derwent catchment and is known to utilise connected river corridors and associated wetlands, ranging extensively along river networks and can move between sub-catchments.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		Direct and indirect impacts to areas that may be functionally linked to the SAC as a result of land take / land use change, hydrological / hydrogeological change, noise / vibration / light / visual disturbance and / or pollution events are possible.

6.8 Thorne Moor SAC Screening Matrix

Table 6-7: Thorne Moor SAC (UK0012915) qualifying features relevant to the screening assessment

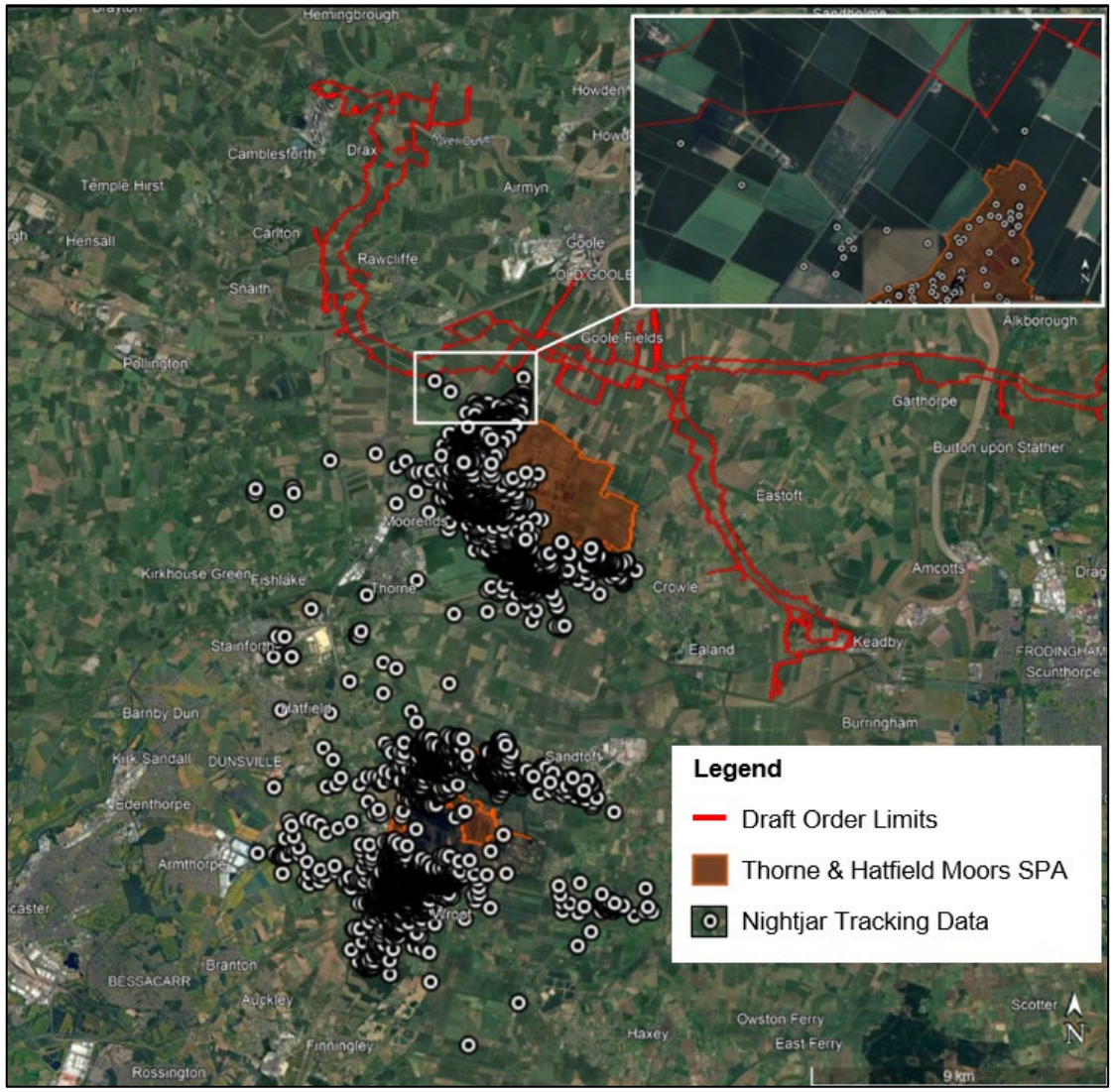
Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
H7120 Degraded raised bogs still capable of natural regeneration	X	The site is located approximately 800 m south of the draft Order Limits, upstream, and outside the precautionary 200 m buffer applied to the entire construction road network.

6.9 Thorne & Hatfield Moors SPA Screening Matrix

Table 6-8: Thorne & Hatfield Moors SPA (UK9005171) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A224 *Caprimulgus europaeus*; European nightjar (breeding)	X	In relation to Thorne and Hatfield Moors SPA, Natural England previously raised the potential for foraging nightjar within the draft Order Limits and referred the Applicant to radio-tracking data from Mitchell *et al.* (Ref 10). However, this dataset indicates that nightjar foraging activity is highly localised and strongly associated with specific habitat types. The research showed that the extensive arable monoculture surrounding the SPA, particularly to the north, provides poor-quality foraging habitat and was infrequently used by tracked individuals. In contrast, preferred foraging areas were linked to structurally diverse habitats such as woodland edges and rough grassland mosaics (for example, an old colliery site at Thorne Moor). In all cases birds rarely foraged more than 5 km from the SPA boundary. Crucially, no radio-tracking records fell within the draft Order Limits; Insert 6-1 illustrates the full set of foraging locations recorded by the study. Nightjar foraging patterns are known to shift in response to landscape changes (particularly following woodland clearance, which increases edge habitat and promotes use of early-successional areas). However, the habitats within the draft Order Limits, extending up to 3 km from the SPA boundary, are dominated by large open arable fields with minimal hedgerow or scrub structure and no woodland. These habitats are considered unsuitable for supporting nightjar foraging activity.

Insert 6-1: Nightjar foraging activity from Thorne and Hatfield Moors SPA (Ref 10)



6.10 Lower Derwent Valley SAC Screening Matrix

Table 6-9: Lower Derwent Valley SAC (UK0012844) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
H6510 Lowland hay meadows with *Alopecurus pratensis, Sanguisorba officinalis*	X	These habitats are situated greater than 3.8 km north of the draft Order Limits, upstream and outside the precautionary 200 m buffer applied to the entire construction road network. Further, the River Derwent is hydraulically separated from tidal influence by the Barmby Barrage, which prevents saline intrusion and estuarine backflow. On this basis, there is no hydrological or biological pathway by which the works in the tidal Ouse and Humber could influence these habitats within the SAC, and these features have been screened out of further assessment.
H91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	X	
S1355 *Lutra lutra;* Otter	✓	This species is widespread across the Derwent catchment and is known to utilise connected river corridors and associated wetlands, ranging extensively along river networks and can move between sub-catchments. Direct and indirect impacts to areas that may be functionally linked to the SAC as a result of land take / land use change, hydrological / hydrogeological change, noise / vibration / light / visual disturbance and / or pollution events are possible.

6.11 Lower Derwent Valley SPA Screening Matrix

Table 6-9: Lower Derwent Valley SPA (UK9006092) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A036 *Cygnus cygnus*; Whooper swan (non-breeding)[6]	✓	Recorded over winter at multiple locations in numbers exceeding the 1% threshold of the Lower Derwent population (7 based on WeBS 5-year mean peak). Indirect impacts within the SPA, and direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and / or pollution events are possible.
A037 *Cygnus columbianus bewickii*; Bewick's swan (non-breeding)	**X**	No records for this species were identified within the search area. This feature has been screened out of further assessment.
A050 *Anas penelope*; Eurasian wigeon (non-breeding)[14]	✓	Species has already been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.
A051 *Anas strepera*; Gadwall (non-breeding)[14]	**X**	No records for this species were identified within the search area. This feature has been screened out of further assessment.
A052 *Anas crecca*; Eurasian teal (non-breeding)[14]	**X**	Species has already been screened into the assessment for the Humber SPA (see Table 6-2). For the Lower Derwent Valley SPA, however, the closest significant records identified within the search area were situated on the River Trent, approximately 18 km from the site (note that a total of four records were identified between the

[6] 'Main component species' not listed on the SPA citation but occurring at site-level in numbers exceeding 1% of the national population or >2,000 individuals (according to the most recent Lower Derwent Ings Wetland Bird Survey WeBS five-year mean peak count) and thus treated as qualifying components of the assemblage and assessed individually as well as collectively as part of the assemblage feature (Ref 6)).

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
		River Trent and Drax, but these were for solitary birds). In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment for this European site.
A054 *Anas acuta*; Pintail (non-breeding)[14]	X	A total of 87 records were identified for this species. However, the closest records identified within the search area to the Lower Derwent Valley SPA were situated within Alkborough Flats, approximately 18 km from the site. In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment.
A056 *Anas clypeata*; Northern shoveler (breeding and non-breeding[14])	X	Species has already been screened into the assessment for the Humber SPA (see Table 6-2). For the Lower Derwent Valley SPA, however, the closest records identified within the search area were situated within Alkborough Flats and on the River Trent, approximately 18 km from the site. In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment for this European site.
A059 *Aythya ferina*; Common pochard (non-breeding)[14]	✓	Species has already been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.
A140 *Pluvialis apricaria*; European golden plover (non-breeding)	✓	Species has already been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.
A142 *Vanellus vanellus*; Northern lapwing (non-breeding)[14]	✓	Species has already been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2.
A151 *Philomachus pugnax*; Ruff (non-breeding)[14]	X	Species has already been screened into the assessment for the Humber SPA (see Table 6-2). For the Lower Derwent Valley SPA, however, the closest records identified within the search area were situated within Blacktoft Sands, approximately 16 km from the site. In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment for this European site.

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
A166 *Numenius phaeopus*; Whimbrel (non-breeding)[14]	X	Species has already been screened into the assessment for the Humber SPA (see Table 6-2). For the Lower Derwent Valley SPA, however, the closest records identified within the search area were situated within Alkborough Flats, approximately 18 km from the site. In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment for this European site.
Waterbird assemblage; international importance to waterfowl by regularly supporting over 20,000 waterfowl in winter	✓	The Lower Derwent Valley SPA qualifies for its internationally important non-breeding waterbird assemblage, which includes the species assessed individually above. Natural England advises that, in addition to individual species assessments, the assemblage should be considered as a feature in its own right. The draft Order Limits include intertidal and adjacent habitats that regularly support multiple assemblage species in combination. On this basis, the assemblage feature is screened in to ensure potential cumulative and functional effects are assessed alongside individual species impacts. Indirect impacts within the SPA, and direct and indirect impacts to areas that may be functionally linked to the SPA as a result of land take / land use change, noise / vibration / light / visual disturbance and / or pollution events are possible.

6.12 Lower Derwent Valley Ramsar site Screening Matrix

Table 6-10: Lower Derwent Valley Ramsar (UK11037) qualifying features relevant to the screening assessment

Qualifying Feature	Relevance and Justification (✓ requires consideration, X does not require consideration)	
Criterion 1 - Important examples of traditionally managed species-rich alluvial flood meadow habitat	X	The Lower Derwent Valley Ramsar site is situated approximately 3.8 km north of the draft Order Limits, upstream and outside the precautionary 200 m buffer applied to the entire construction road network. Further, the River Derwent is hydraulically separated from tidal influence by the Barmby Barrage, which prevents saline intrusion and estuarine backflow. On this basis, there is no hydrological or biological pathway by which the works in the tidal Ouse and Humber could influence these features within the SAC, and these features have been screened out of further assessment.
Criterion 2 - Supports a rich assemblage of wetland invertebrates	X	
Criterion 4 - Staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Philomachus pugnax* and Whimbrel, *Numenius phaeopus*.	X	Thes species have already been screened into the assessment for the Humber SPA (see Table 6-2). For the Lower Derwent Valley Ramsar site (and Lower Derwent Valley SPA, see Table 6-9), however, the closest records identified within the search area were situated within Alkborough Flats, approximately 18 km from the site. In the absence of records in closer proximity, and given the distance involved, this feature has been screened out of further assessment for this European site.
Criterion 5 - Assemblages of international importance	✓	Species that form part of Criterion 5 and 6 have been screened into the assessment. The rationale for screening in individual species can be seen above in Table 6-2 and Table 6-9.
Criterion 6 - Supports internationally important numbers of species including whooper swan, teal, wigeon, and golden plover.	✓	

7 Potential LSE on European Sites

7.1 Introduction

7.1.1 Stage 1 of the HRA process (the four-part screening exercise), identified the potential impacts of the Project on European site(s), either alone or 'in combination' with other projects or plans, and considered whether these impacts are likely to be significant.

7.2 LSE Ruled Out

7.2.1 The exercise concluded that there is no potential for LSEs to occur in relation:

- The H1150 qualifying feature of the Humber Estuary SAC.
- Five qualifying features (A021 (in relation to breeding great bittern), A046, A048, A081 and A130) of the Humber Estuary SPA.
- One qualifying feature (S1202) of the Humber Estuary Ramsar site.
- Two qualifying features (H3260 and S1163) of the River Derwent SAC.
- All qualifying features of Thorne Moor SAC.
- All qualifying features of Thorne and Hatfield Moors SPA.
- All qualifying habitat features (H6510 and H91E0) of the Lower Derwent Valley SAC.
- Seven qualifying features (A037, A051, A052, A054, A056, A151 and A166) of the Lower Derwent Valley SPA.
- Three qualifying habitat features (criterion 1, 2 and 4) of the Lower Derwent Valley Ramsar site.

7.2.2 As there are no pathways for LSEs (including de minimis) there is no potential for any in-combination LSEs for these European sites or qualifying features, and therefore there is no requirement for these to be taken forward to AA (Stage 2 of HRA).

7.3 LSE Not Ruled Out

7.3.1 The exercise identified that there is potential for LSEs to occur in relation to the following European sites:

- All qualifying features (except H1150) of the Humber Estuary SAC.
- All qualifying features (except A021 (in relation to breeding great bittern), A046, A048, A081 and A130) of the Humber Estuary SPA.
- All qualifying features (except S1202) of the Humber Estuary Ramsar site.

- All designated features of the Holderness Inshore MCZ.
- All qualifying features of Greater Wash SPA.
- Three qualifying features (S1095, S1099 and S1355) of the River Derwent SAC.
- The qualifying species feature (S1355) for the Lower Derwent Valley SAC.
- The remaining six qualifying features of the Lower Derwent Valley SPA.
- Two qualifying habitat features (criterion 5 and 6) of the Lower Derwent Valley Ramsar site.

7.4 Next Steps

7.4.1 This Preliminary Stage 1 HRA Screening Report has identified potential pathways of effect between the Project and a number of European sites or on FLL for which qualifying features depend, which will be taken forward to AA at the DCO application stage. The following next steps will be undertaken to ensure that the HRA is robust and proportionate:

- Refined screening – Screening will be repeated based on the finalised Order Limits and detailed Project design, incorporating any changes arising from design development and statutory consultation. This will include updated consideration of the ARN to identify any additional sites requiring assessment.
- Appropriate Assessment – Full AA will be undertaken for those features and pathways where LSE cannot be excluded at screening. This will assess potential impacts on site integrity in light of each site's conservation objectives and will consider avoidance and mitigation measures.
- Survey data and methodologies – The AA will present detailed survey findings, including bird surveys, fish and aquatic species assessments, and FLL mapping. Methodologies and effort will be clearly described, with reference to Natural England's guidance and agreed survey designs. The methodology for identifying FLL has been set out in Appendix A to enable stakeholders to review and provide feedback at this stage, ensuring that the approach is agreed and refined in advance of the final HRA.
- Stakeholder engagement – Engagement with stakeholders will continue, focusing on survey outputs, potential mitigation measures, and approaches to cumulative and in-combination assessment.
- Mitigation and monitoring – The AA will identify where Project design refinements, seasonal restrictions, best practice construction methods or other mitigation measures are required to rule out adverse effects on integrity. A monitoring framework will also be developed, where appropriate, to demonstrate the effectiveness of mitigation and compliance during construction and operation.

7.4.2 The updated shadow HRA, including AA where required, will be submitted alongside the Environmental Statement as part of the DCO application.

8 References

- Ref 1 Arcadis (2025). Humber Carbon Capture Pipeline – Preliminary Environmental Information Report (PEIR). Chapter 2: Project Description.
- Ref 2 East Coast Cluster (2021). Available at: https://eastcoastcluster.co.uk/ [Accessed September 2025].
- Ref 3 UK Government (2017). The Conservation of Habitats and Species (Amendment) Regulations 2017. (Online) Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made [Accessed July 2022].
- Ref 4 The Planning Inspectorate (2022). Advice Note Ten: Habitats Regulations Assessment relevant to Nationally Significant Infrastructure Projects.
- Ref 5 Natural England (2023a). Annex B: Humber Estuary Special Protection Area: non-breeding waterbird assemblage (Version 1.2, June 2023).
- Ref 6 Natural England (2023b). Annex B1: Lower Derwent Valley Special Protection Area: non-breeding waterbird assemblage (Version 1.1, June 2023).
- Ref 7 Natural England (2021). Annex C: Passage and wintering bird surveys for functionally linked land associated with the Humber Estuary and/or Lower Derwent Valley designated sites (Version 1.1, December 2021).
- Ref 8 The Court of Justice of the European Union (2018). Case C-323/17. People Over Wind and Peter Sweetman v Coillte Teoranta. Available at: https://curia.europa.eu/juris/liste.jsf?language=en&num=C-323/17 [Accessed September 2025].
- Ref 9 JNCC, 2019. Fourth Article 17 UK Habitats Directive Report (2019): Supporting Information (habitats & species) 2019. UK terrestrial habitats distribution. Available at: https://hub.jncc.gov.uk/assets/081db8a3-afa7-442b-bd0d-701aaf830bdc [Accessed September 2025].
- Ref 10 Mitchell, L., White, P.C.L. and Arnold, K.E. (2019). GPS tracking data for 32 individual European nightjars in Humberhead Peatlands NNR from 2015-2018. NERC Environmental Information Data Centre. Available at: https://doi.org/10.5285/aa20f8c4-bbdb-4dfa-82b4-b9b3fd8f34eb [Accessed September 2025].
- Ref 11 Bowland Ecology (2021). Identification of Functionally Linked Land supporting SPA waterbirds in the North West of England. NERC361. Natural England.
- Ref 12 Natural England (2007). Humber Estuary SPA Citation. [online]. Available at: https://publications.naturalengland.org.uk/file/4968674834251776 [Accessed September 2025].
- Ref 13 Natural England (1993). Lower Derwent Valley SPA Citation. [online]. Available at: https://publications.naturalengland.org.uk/file/5938978947596288 [Accessed September 2025].

Appendix A - Proposed Identification of FLL

A.1 Introduction

A.1.1 'Functionally linked land' (FLL) is a term used to describe areas of land or sea occurring outside a designated site which are critical to, or necessary for, the ecological or behavioural functions (e.g. foraging, roosting, loafing, commuting) of qualifying species for which a SAC, SPA or Ramsar site has been classified. Such habitats are frequently used by SPA species and contribute to the functionality and integrity of the designated sites.

A.1.2 For this Project, the assessment of FLL has been refined to focus only on those areas that fall within the draft Order Limits and their realistic zone of influence, i.e. land that could be directly or indirectly affected by construction or operation. This contrasts with previous regional-scale mapping exercises (e.g. NECR361 (Ref 11)), which adopted a buffer-based approach and considered all potential FLL up to 20 km from an SPA.

A.1.3 The approach has been developed in consultation with Natural England. Consistent with Natural England's Humber Estuary and Lower Derwent Valley guidance (Ref 5 and Ref 6), the identification of relevant species focuses on the 'main component species' of each SPA's non-breeding assemblage. These are defined as species listed individually on the SPA citation and/or species that occur at site levels of more than 1% of the national population, or where more than 2,000[7] individuals are present according to the most recent WeBS five-year mean.

A.1.4 Natural England advises that, for the Humber Estuary, wintering and passage bird surveys should be undertaken for sections of the route within a 4 km buffer of the designated site boundaries. For route sections beyond this radius, a desk-based assessment should be undertaken in the first instance, with targeted surveys commissioned where this indicates potential for FLL. A desk study has already been completed for the sections of the route lying beyond 4 km, and no locations were identified where additional surveys were required (survey results will be provided in

[7] Note: NECR361 applied a 0.5% of the GB population threshold to capture a broad evidence base across six SPAs in northwest England and to account for bird movements between sites. In contrast, for this Project Natural England has advised that the relevant benchmark is 1% of the national population (or >2,000 individuals), in line with the Humber Estuary and Lower Derwent Valley SPA assemblage guidance. This ensures consistency with site-specific Conservation Objectives and reflects the focus on affectable FLL within and adjacent to the draft Order Limits, rather than regional mapping.

full for the shadow HRA). It is recognised, however, that this approach results in a degree of bias towards the 4 km buffer area, as more detailed survey data exist within this zone compared to the desk-study only coverage beyond it.

A.1.5 Accordingly, this assessment draws on:

- Collation of available bird data (see Section 8.2), including targeted wintering and passage bird surveys, and
- application of the ≥1% Humber Estuary population threshold for relevant assemblage species (or lower numbers where species are locally vulnerable or declining).

A.1.6 The objective is to determine the extent to which land within or adjacent to the draft Order Limits may be functionally linked to the Humber Estuary SPA and/or Lower Derwent Valley SPA, and to ensure that the integrity of these sites can be safeguarded through the HRA and EIA processes.

A.2 Desk Study

A.2.1 Table 8-1 summarises the various sources of information utilised for the desk study and the information obtained.

Table 8-1: Sources of Information

Source	Information Obtained	Date received / accessed
Local Record Centres	Bird records within 2 km of the draft Order Limits were obtained from Lincolnshire Environmental Records Centre (LERC) and North & East Yorkshire Ecological Data Centre (NEYEDC). NB: any records older than 20 years were omitted from the results unless specified for that species/species group.	November 2024 (LERC) and October 2024 (NEYDC)
British Trust for Ornithology (BTO)	Wetland Bird Survey (WeBS) data from all WeBS Core Sites within 5km of the draft Order Limits. Data provided was from the most recent 5 years from the date ordered (January 2020 onwards).	February 2025
National Infrastructure Planning and Local Planning Portals	The National Infrastructure Planning website and local planning portals for North Lincolnshire Council, East Riding of Yorkshire Council, North East Lincolnshire Council and North Yorkshire County Council were searched for any relevant ecological survey information relating to birds within 2 km of the	August 2025

Source	Information Obtained	Date received / accessed
	draft Order Limits, dated within the last 20 years. Results relating to the following were reviewed: • The Keadby 3 Low Carbon Gas Power Station Project (Planning Inspectorate Ref: EN010114) • Humber International Enterprise Park (Planning Reference: 18/04071/STPLFE); • Yorkshire Energy Park (Planning Reference: 17/01673/STOUTE) • Able Marine Energy Park (TR030001 and TR030006) • Able Logistics Park (PA/2015/1264) • North Killingholme Power Project (EN010038)	

A.3 FLL Methodology

Definitions

A.3.1 In line with NECR361, FLL is defined as areas of land that are regularly used by significant numbers of qualifying bird species. For the purpose of this study, the assessment has focused on land situated within the draft Order Limits and within 4 km of the Humber Estuary and Lower Derwent Valley SPAs (where wintering and passage surveys were undertaken in accordance with Natural England guidance) and any land identified outside of this area up to 2 km from the draft Order Limits (based on desk study evidence).

A.3.2 For this assessment, regular use has not been applied as a strict criterion, recognising that the available datasets (surveys and desk study) do not provide the long-term, systematic coverage needed to establish repeat seasonal use. Instead, the assessment takes a precautionary approach, whereby:

- Significant numbers of qualifying SPA species are the primary determinant of whether land is identified as FLL (i.e. ≥1% of the Humber Estuary population, or citation species at locally important levels; with lower numbers considered for vulnerable or declining species).
- Where survey results or desk study evidence indicate repeated use by smaller but consistent flocks using an area, this is also taken to suggest regular usage, particularly where the species is locally vulnerable or declining.

- This approach ensures that potentially important land parcels are not overlooked, even if the absolute threshold for significance is not consistently reached, thereby safeguarding against underestimation of functional linkage.

A.3.3 The definition of qualifying bird species for this assessment includes both individually listed non-breeding species and those forming part of the qualifying waterbird assemblages, as set out in the SPA citations (Ref 12 and Ref 13) and the species list within Annex B (Ref 5) and Annex B1 (Ref 6), which identify the 'main component species' of the assemblages. These comprise species listed on the SPA citation as well as those occurring at levels exceeding 1% of the national population or 2,000 individuals, based on the most recent WeBS five-year means. Species listed on the SPA citation are retained within the assessment even if their current abundance falls below these thresholds, consistent with Natural England's advice.

Data Handling

A.3.4 All datasets were collated and reviewed to ensure consistency with the Project definition of FLL. Data sources included the WeBS five-year means, county recorder and local bird club datasets, project-specific survey results, and additional records obtained through the desk study (see Section 8.2).

A.3.5 All qualifying records were entered into a GIS database to enable mapping at field/parcel scale. Each polygon was attributed with species, count data, behaviour, threshold status and a confidence rating (high, moderate, low), reflecting both data quality and location accuracy.

A.3.6 Where spatial precision was limited (e.g. tetrad-level records), data were used to highlight potential supporting habitat rather than to delineate specific fields.

Screening and Confirmation

A.3.7 Every record was compared with the Humber 1% thresholds in (these are specified for relevant species within the screening matrices in see Section 6). This identified when a count is large enough to be potentially important for the SPA/assemblage.

A.3.8 For some species, the 1% value is very small (≤10 birds). A single, chance sighting can therefore meet 1% without showing that a field genuinely functions as supporting land. To avoid chance outliers being treated as functionally linked land, records were evaluated against the tests below. A record had to demonstrate functional behaviour (Test 1) and then meet at least one of the other confirmation routes (Tests 2 to 5).

Test 1 - Functional behaviour (quality of use)

A.3.9 Counts must show birds using the land (e.g., breeding, foraging, roosting or loafing). Over-flying records are excluded. Dates were checked to ensure they fell within the correct season for the feature (e.g., a “wintering” feature recorded in winter).

Test 2 Species with larger thresholds (1% ≥ 11)

A.3.10 For species with 1% values equal to or greater 11 (e.g., golden plover, lapwing), one ≥1% event with clear functional behaviour provisionally indicated FLL. This was then upgraded to regular with repeat evidence (i.e. see Test 3).

Test 3 - Regular use (validation)

A.3.11 Repeated use is essential for species with 1% values equal to or less than 10 and to improve confidence in all areas mapped as FLL. This is evidenced by either:

- Two field-precise records at or above the 1% threshold, on dates ≥10 days apart, or
- One field-precise record at or above the 1% threshold plus a second record at or above half of the 1% value within the same season.

A.3.12 The second record may be from the same field or an immediately adjacent field that functions as the same land parcel (contiguous, same management; not separated by a substantial barrier such as major road or woodland block).

A.3.13 Where half-thresholds are not whole numbers, they were rounded up (e.g., 0.5 of a 1-bird threshold = 1 bird; 0.5 of a 5-bird threshold = 3 birds).

A.3.14 A “record” is a field-precise observation (or one from a directly contiguous, functionally identical field) made in the appropriate season for that feature (breeding, passage, or wintering, as per the SPA citation).

A.3.15 Worked examples:

- Sanderling (1% = 4): 5 birds recorded on 10 September 2025 and 2 birds on 28 September 2025 within the same beach unit would qualify (1% once + ≥0.5×1% within same season).
- Ringed Plover (1% = 10): 12 birds recorded on 3 September only, does not yet qualify. Because the 1% threshold is ≤10, Test 3 applies, which requires repeat evidence (a second qualifying record in the same season) before confirmation as FLL.

Test 4 - Assemblage backup (when no single species is consistently over 1%)

A.3.16 Some fields hold several main component species at sub-threshold levels at the same time. We therefore calculated an Assemblage Index for each survey date by dividing the count of each qualifying species by that species' 1% threshold and adding the results together. Where the Assemblage Index was equal to or greater than 1, the field or land parcel (i.e., contiguous, same management; not separated by a major road or woodland block) was treated as functionally linked on an assemblage basis, even if no single species was regularly ≥1%.

A.3.17 Worked example:

- A land parcel has records of 3 sanderling (3/4 = 0.75) and 1 turnstone (1/2 = 0.5) on the same date, then the Assemblage Index would equal 1.25 and FLL confirmed.

Test 5 - Special cases (sensitive/Annex I species)

A.3.18 For particularly vulnerable features (e.g., bittern, crane, little tern, marsh harrier), lower counts may still be relevant where there is clear functional dependence on the land. In these circumstances, we applied professional judgement and sought repeat evidence where possible.

Classification and Mapping

A.3.19 All qualifying records were plotted in GIS against the draft Order Limits and surrounding land within the defined Study Area. Where a record or field/land parcel met the criteria for significance as per the above tests, the entire field parcel containing that record was highlighted as FLL, irrespective of field size.

A.3.20 The mapping therefore presents FLL at the field parcel scale, reflecting the practical resolution of the available data and ensuring that areas of potential functional linkage are not underestimated.

A.3.21 All FLL parcels were assigned a confidence category as follows:

- High (red): field-precise counts with repeated significant use (or repeated Assemblage Index ≥ 1) and clear functional behaviour.
- Moderate (amber): significant use indicated but with limited replication or spatial precision (e.g., one qualifying event plus corroboration; or Assemblage Index ≥ 1 once and strong supporting context).
- Low/Candidate (green): single significant record without replication; over-flying only; coarse/uncertain location data; or fields immediately adjacent to a mapped FLL field that function as the same land parcel (contiguous, same management; not separated by a substantial barrier such as a major road or woodland block) but lack sufficient replication.

A.3.22 Pure over-flight records did not classify a parcel as FLL. However, where consistent flightlines corresponded with ground records (e.g., repeated movements into particular fields or towards known roosts), they were used to support interpretation.

Assessment Outputs

A.3.23 The outcome of data handling, and the screening and confirmation tests will be a set of field-level polygons representing land identified as FLL within or adjacent (to the extent that the available data permits) to the draft Order Limits. Polygons will correspond to single fields or directly contiguous fields that function as one land parcel (i.e. same management; not separated by a substantial barrier).

A.3.24 Each polygon will be assigned a unique reference and annotated with:

- The qualifying species present (and any sensitive/Annex I flags).
- The counts used and the Humber or Derwent 1% threshold applied (including any half-threshold rounding where this was used).
- The evidence route by which it qualified (e.g., regular use, Assemblage Index or sensitive-species professional judgement).
- The dates of qualifying records and the interval between them (showing replication), and any Assemblage Index calculations.
- The behavioural context (foraging/roosting/loafing; over-flying excluded) and seasonality.
- A confidence category (High, Moderate, Low/Candidate) reflecting the strength of evidence and spatial precision.

A.3.25 Assessment outputs will be presented as maps and supporting tables. For each polygon, the tables will provide a clear audit trail. The baseline records that informed the assessment (project surveys and desk-study sources) will also be provided.

A.4 Limitations and Caveats

A.4.1 The FLL assessment draws on a combination of Project-specific survey data and desk study sources. Survey effort was concentrated within 4 km of the Humber Estuary SPA, in accordance with Natural England guidance, while land up to 2 km from the draft Order Limits beyond this buffer was assessed through desk study. This approach provides higher data resolution (i.e. more detailed, precise and frequent information) within the 4 km SPA buffer, but this does not constrain the overall assessment. Desk study evidence will be applied with professional judgement and in line with the precautionary principle to identify any additional land parcels that may function as FLL.

A.4.2 The dataset does not provide long-term, systematic coverage across multiple years at all locations. A precautionary approach has therefore been adopted to ensure that land parcels of potential functional importance were not overlooked, even where absolute thresholds for significance were not consistently reached.

A.4.3 Spatial resolution varies between data sources. Records collected during targeted surveys provided field-level precision and could be directly mapped as FLL. In contrast, broader-scale records from the desk study (e.g. tetrad-level or ad-hoc observations) were treated as indicators that suitable habitat may be present in a general area, but were not sufficient on their own to map a field parcel as FLL without supporting evidence.

A.4.4 Overflying records will not be used alone to classify FLL, but where consistent flightlines corresponded with ground records, they were used to strengthen confidence in interpretation.

A.4.5 Inter-annual and seasonal variation in bird numbers is inherent in migratory species. By applying significance thresholds alongside precautionary interpretation of repeated use by smaller flocks, the assessment safeguards against underestimation of functional linkage.

A.4.6 Overall, these limitations and caveats have been explicitly accounted for in the assessment design. The precautionary approach adopted ensures that the outputs are sufficiently robust to inform the HRA.

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