H2Teesside Project

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Land within the boroughs of Redcar and Cleveland and Stockton-on-Tees, Teesside and within the borough of Hartlepool, County Durham

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1.0 INTRODUCTION

1.1 Overview

1.1.1 This Report to Inform Habitats Regulations Assessment (HRA) has been prepared on behalf of the Applicant. The Applicant is H2 Teesside Limited, a bp company. H2 Teesside Limited will be the lead developer of the Proposed Development and bp will be appointed as the operator of the Proposed Development

1.1.2 This report forms part of the application (the 'Application') for a Development Consent Order ('DCO'), that was submitted to the Secretary of State for Energy Security and Net Zero, under Section 37 of the Planning Act 2008 on the 25 March 2024.

1.1.3 The Applicant is seeking development consent for the construction, operation and decommissioning of a 1.2-Gigawatt Thermal (GWth) Hydrogen Production Facility with associated Carbon Capture and Storage (CCS) and hydrogen transport pipeline network on land in Redcar and Cleveland, Stockton-on-Tees, and Hartlepool on Teesside (hereafter referred to as the 'Proposed Development Site') (see Figure 1, Annex A).

1.1.4 A DCO is required for the Proposed Development as the Proposed Development has been brought into the Planning Act 2008 regime through a Section 35 Direction.

1.2 The Proposed Development

1.2.1 The Main Site, which comprises the Production Facility together with the associated carbon capture and compression facilities and ancillary infrastructure, will be located within the South Tees Development Corporation (STDC) development site. Carbon dioxide (CO_2) captured from the process will be compressed at the Main Site and will be transported for geological storage offsite using Northern Endurance Partnership (NEP) infrastructure.

1.2.2 The Hydrogen Pipeline Corridor will connect the Main Site to off-takers at various industrial installations across the Tees Valley. A Natural Gas Connection Corridor will connect the Production Facility to gas transmission infrastructure and an electrical connection corridor will connect the Production Facility to the National Grid Network.

1.2.3 Connections are required for water supply and effluent discharge at the Production Facility. Discharge of treated process effluent will be via the Net Zero Teesside project outfall at Tees Bay. Further information regarding the Project is provided in Chapter 4: Proposed Development [APP-056].

1.3 Legislative Context

1.3.1 The Conservation of Habitats and Species Regulations 2017, hereafter referred to as the 'Habitats Regulations', provide for the designation of sites for the protection of certain species and habitats. These are collectively termed 'European sites' (in legislation, 'Habitats sites' in the National Planning Policy Framework (NPPF))

(Department for Levelling Up, Housing and Communities, 2023) and form part of a network of protected sites across the UK known as the 'national site network' (NSN). For ease of expression, this report uses the term 'European site' for both European sites and European offshore marine sites. European sites protected by the Habitats Regulations include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Additionally, it is a matter of UK Government policy (NPPF) and guidance that the following sites should also be subject to HRA, where affected by a plan or project: proposed SACs; potential SPAs; and Ramsar sites (both proposed and listed); and areas secured as sites compensating for damage to a European site.

1.3.2 Under the Habitats Regulations, a Competent Authority must consider whether a development will have a likely significant effect (LSE) on a European site, either alone or in combination with other plans or projects. Where LSE are likely and a project is not directly connected with or necessary to the management of that site(s), an appropriate assessment (AA) is required of the implications of the plan or project for that site(s) in view of its conservation objectives.

1.3.3 Further to this, where an AA has been carried out and results in a negative assessment (i.e. where Adverse Effects on Integrity (AEoI) of European site(s) cannot be ruled out, despite any proposed avoidance or reduction (mitigation) measures), consent can only be granted if: there are no alternative solutions; there are Imperative Reasons of Overriding Public Interest (IROPI); and Compensatory Measures have been secured. These latter stages are known as the 'derogations'.

1.3.4 HRA is a multi-stage process which identifies LSE, assesses any AEoI of a European site, and considers the derogations (as appropriate). The joint Defra, Welsh Government, Natural England and Natural Resources Wales guidance (2021) 'Habitats regulations assessments: protecting a European site' (hereafter referred to as the 'joint guidance') identifies a three-stage process, as set out below. It may not be necessary to complete all stages, depending on what conclusion is reached at each stage. The stages are:

- Stage 1. Screening – check if the proposal is likely to have a significant effect on the European site(s)'s conservation objectives, both alone or in combination with other plans or projects. At this stage, and in accordance with case law (People Over Wind and Sweetman v Coillte Teoranta (Case C-323/17)), mitigation measures proposed for the purpose of avoiding or minimising risk to a European site should not be taken into account. If a conclusion of no LSE is reached for all European sites and their qualifying features considered, it is not necessary to proceed to the next stages of HRA.
- Stage 2. Appropriate assessment (AA) – assess the implications of the proposal for the qualifying features of the European site(s), in view of the site(s)' conservation objectives and identify ways to avoid or minimise any effects.
- Stage 3. Derogation – consider if proposals that would have an AEoI of a European site(s) qualify for an exemption. There are three tests to this stage to be followed in order: consider alternative solutions; consider IROPI; and secure

compensatory measures. Each test must be passed in sequence for a derogation to be granted.

1.3.5 This is a technical report to inform and support the competent authority (the Secretary of State) in its decision making.

1.3.6 The United Kingdom (UK) left the European Union (EU) on 31 January 2020 under the terms set out in the EU (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"). The Withdrawal Act retains the body of existing EU-derived law within our domestic law, and this include the provisions of the Habitats Directive from which the requirement for HRA arises. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 maintains the existing protections for habitats and species.

2.0 METHOD

2.1 Introduction

2.1.1 This report has been prepared with reference to the general European Commission guidance on HRA (European Commission, 2001), general guidance on HRA published by the UK government in 2021 (Ministry of Housing, Communities & Local Government, 2021) and Planning Inspectorate (PINS) Advice Page on HRA (The Planning Inspectorate, 2024).

2.1.2 The assessment of LSEs takes account of relevant EU case law (for instance, the Holohan and People over Wind cases, discussed below).

2.1.3 Whilst the HRA decisions must be taken by the competent authority (The Planning Inspectorate as Examining Authority advising the Secretary of State as competent authority), the information needed to undertake the necessary assessments must be provided by the Applicant. The information needed for the competent authority to establish whether there are any LSEs from the Proposed Development is therefore provided in this Report.

2.1.4 There are three stages to the HRA process which are summarised below.

HRA Stage 1 – Screening for LSEs

2.1.5 The objective of the LSE test is to 'screen out' those aspects of a project and / or the European sites that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction (i.e., a pathway) with European sites. The remaining aspects are then taken forward to Stage 2 of the HRA Process - Appropriate Assessment. The assessment must consider the potential for effects 'in combination' with other plans and projects.

2.1.6 This report has been prepared having regard to all relevant case law relating to the 2017 Regulations, the Habitats Directive and Birds Directive. This includes the ruling by the Court of Justice of the European Union (CJEU) in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17).

2.1.7 This case held that; "it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site" (paragraph 40). This establishes that 'mitigation measures' cannot be taken into account at the HRA Stage 1 (screening), but they can be taken into account at HRA Stage 2 - Appropriate Assessment. However, it is important to note that not all mitigation measures are excluded from consideration – only those "intended to avoid or reduce the harmful effects of the… project on that site". Mitigation measures which are, for example, intended to avoid effects on a local watercourse outside the European site designated boundary but which outfalls into the European designated site, can be taken into account as the benefit conveyed to the European site is coincidental and the measures would be delivered as part of good practice even if no European sites were present.

2.1.8 This represents a deviation from the approach usually adopted in the Ecological Impact Assessment (EcIA), which considers embedded mitigation (even those measures that are included to directly avoid or reduce harmful effects on a European designated site) to form a part of the Proposed Development and takes these measures into account when assessing the potential impacts on qualifying habitats and species.

2.1.9 Where mitigation measures are mentioned in this report and taken into account at the screening stage, they are therefore ones which may reduce or avoid harmful effects on certain (local) habitats or species but are not relied on to directly avoid or reduce harmful effects on the qualifying features of the European designated sites. This includes standard best practice mitigation measures incorporated into the Framework Construction Environmental Management Plan (CEMP) (EN070009/APP/5.12) such as surface water drainage attenuation which will be further refined within the Final CEMP(s).

HRA Stage 2 – Appropriate Assessment

2.1.10 Where it is determined that a conclusion of 'no Likely Significant Effect' cannot be drawn, the HRA assessment proceeds to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no specific technical analyses, or level of detail, that are classified by law as belonging to Appropriate Assessment rather than the screening for LSE. The Appropriate Assessment constitutes whatever level of further assessment is required to determine whether an adverse effect on integrity would arise.

2.1.11 By virtue of the fact that it follows the screening process, there is an understanding that the analysis will be more detailed than that undertaken at the previous stage. One of the key considerations during Appropriate Assessment is whether there is available mitigation that would address the potential effect, allowing for a conclusion of no adverse effect on integrity. In practice, the Appropriate Assessment takes any element of the Proposed Development that could not be excluded as having LSE following HRA Stage 1 and assesses the potential for an effect in more detail, with a view to concluding whether there would be an adverse effect on site integrity. Adverse effects on site integrity include disruption of the coherent structure and function of the European site(s) and the ability of the site to achieve its conservation objectives.

2.1.12 In 2018 the Holohan ruling was handed down by the European Court of Justice. Among other provisions paragraph 39 of the ruling states that *'As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, … typical habitats or species must be included in the appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area'* [emphasis added]. This ruling has been considered in relation to the Proposed Development and European sites that are linked to the proposal via an impact pathway. For example, the Southern North Sea SAC is designated for harbour porpoise, which range vast distances beyond the designated site boundary.

Harbour porpoise (*Phocoena Phocoena*) are known to regularly forage within the lower stretches of the River Tees and potential impacts of the Proposed Development on habitat use in the lower Tees require assessment.

HRA Stage 3: Derogations

2.1.13 In certain circumstances, where Adverse Effects on Integrity cannot be excluded, a proposal can go ahead under a derogation. There are three legal tests to this stage and each needs to be passed in order for a derogation to be granted. These are:

- Assessment of Alternative Solutions;
- Consideration of Imperative Reasons of Over-riding Public Interest; and,
- Compensatory Measures.

2.1.14 This report to inform HRA covers Stages 1 and 2 of the HRA process.

2.2 The Rochdale Envelope

2.2.1 In July 2018, the Planning Inspectorate published Advice Note Nine: Rochdale Envelope (The Inspectorate, 2018), explaining how the principles of the Rochdale Envelope should be used by planning applications for the Environmental Impact Assessment (EIA) process.

2.2.2 The Rochdale Envelope is applicable where some of the details of a Proposed Development cannot be confirmed when an application is submitted, and flexibility is needed to address uncertainty. Notwithstanding, all significant potential effects of a Proposed Development must be properly addressed.

2.2.3 The Rochdale Envelope arises from two cases: R. v Rochdale MBC ex parte Milne (No.1) and R. v Rochdale MBC ex parte Tew [1999], which are cases that dealt with outline planning applications for a proposed business park in Rochdale (The Inspectorate, 2018).

2.2.4 It encompasses three key principles:

- The assessment should use a cautious worst-case approach;
- The level of information assessed should be sufficient to enable the Likely Significant Effects of a Proposed Development to be assessed; and
- The allowance for flexibility should not be abused to provide inadequate descriptions of projects.

2.2.5 This HRA has given due consideration to the Rochdale Envelope. The worst-case (i.e., the potentially most impactful) construction/decommissioning and operational scenarios (as described in ES Chapter 4) have been assessed in relation to impact pathways.

2.3 Nutrient Neutrality

2.3.1 Natural England has issued advice highlighting the need to consider the LSEs of nutrients on internationally designated sites (Natural England, 2022). Development plans or projects can be considered 'nutrient neutral' where they can demonstrate

that they will cause no overall increase in nutrient pollution affecting specified European sites. This has been considered in the compiling of this report.

2.4 In Combination Effects

2.4.1 It is a requirement of Regulation 63(a) of the 2017 Regulations to not only assess the impacts of a development project alone, but also to investigate whether there is a potential for in-combination effects with other projects or plans. In practice, such in-combination assessment is of greatest relevance when an impact pathway relating to a project would otherwise be screened out – not because it is not present – but because its individual contribution is considered not to result in LSEs.

2.4.2 For the purposes of this HRA, several plans, projects and strategies proposing/ aiming for development have been identified, which may act in-combination with the Proposed Development. These are set out in Chapter 5 of this report.

2.4.3 The Inspectorate Advice Page requires consideration of the potential for the Project to require other consents which could also require HRA by different competent authorities, and a statement as to whether the Scheme boundary overlaps with devolved administrations or other European Economic Area (EEA) States. The Secretary of State is the competent authority for the Proposed Development and the Proposed Development Site does not overlap with any other devolved administrations or other EEA States.

3.0 BASELINE EVIDENCE GATHERING

3.1 Scope of the Project

3.1.1 There is no guidance that dictates the general physical scope of a HRA of a Project. Therefore, in considering the physical scope of the assessment, the authors were guided primarily by the identified impact pathways (called the source-pathway-receptor model).

3.1.2 Briefly defined, impact pathways are routes by which the implementation of a project can lead to an effect upon a European designated site. An example of this would be visual and noise disturbance arising from the construction/decommissioning work or operational phase associated with a project.

3.1.3 If there are sensitive ecological receptors within a nearby European site (e.g., non-breeding overwintering birds), this could alter their foraging and roosting behaviour and potentially affect the site's integrity. For some impact pathways (notably air pollution) there is guidance that sets out distance-based zones required for assessment. For others, a professional judgment must be made based on the best available evidence.

3.2 Relevant European Sites

3.2.1 Guidance published by the Environment Agency (Environment Agency, 2016) recommends that for large power generation developments greater than 50 MW, a radius of search of 15 km should be used when identifying relevant European designated sites which may be affected by the development. The Proposed Development is a 1.2 GWth Hydrogen Production Facility and as such, a Zone of Influence of 15 km (minimum) has been used.

3.2.2 The following European sites (as shown on Figure 2) were identified within a 15 km radius of the Proposed Development.

Table 3-1: European Designated Sites within 15 km of the Proposed Development Site

SITE NAME	PROXIMITY TO MAIN SITE (APPROX)	PROXIMITY TO CONNECTION CORRIDORS
Teesmouth and Cleveland Coast Special Protection Area (SPA)	Adjacent	Overlapping
The Teesmouth and Cleveland Coast Ramsar	Adjacent	Overlapping
North York Moors Special Area of Conservation (SAC)	12.1 km south-east	8 km south-east
North York Moors SPA	12.1 km south-east	8 km south-east
Durham Coast SAC	13.7 km north-west	11.4 km north-west

SITE NAME	PROXIMITY TO MAIN SITE (APPROX)	PROXIMITY TO CONNECTION CORRIDORS
Northumbria Coast SPA	13.7 km north	11.3 north-west
Northumbria Coast Ramsar	13.7 km north-west	11.3 km north-west
Castle Eden Dene SAC	Over 15 km	14.2 km north-west

3.2.3 The North York Moors SAC / SPA, Northumbria Coast SPA / Ramsar and Castle Eden Dene SAC are considered in the context of operational stack emissions from the Proposed Development, which have the potential to affect European sites that lie relatively far from industrial developments. As Castle Eden Dene SAC is over 15 km from the Main Site and operational air quality effects will be not be generated from the connection corridors, this has been screened out of the assessment.

3.2.4 Functionally Linked Land (FLL) is a term 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 qualifying species and support the functionality and integrity of the designated sites for these features. Bird survey areas were selected to cover any areas of functionally linked land potentially susceptible to adverse effects from the Proposed Development, and that might provide a supporting role in the function and integrity of the Teesmouth and Cleveland Coast SPA and Ramsar. Generally speaking, this included all areas of habitat that are suitable for breeding and non-breeding water birds across Teesside beyond the boundaries of the designations, as identified by:

- the spatial extent of habitats surveyed year-round by Wetland Bird Survey (WeBS) data;
- the distribution of non-statutory and statutory sites at National level or lower; the spatial distribution of bird records obtained from third party providers;
- advice received from Natural England during an initial engagement meeting in February 2022 during the early design phase of the Proposed Development; and,
- professional judgement.

3.2.5 Survey areas covered all such habitats up to at least 500m from the Proposed Development.

3.2.6 The following European designated sites list marine mammals or migratory fish as qualifying species which range great distances and these are therefore screened into the assessment of LSE. The locations of these sites in relation to the Proposed Development Site are shown on Figure 3.

Table 3-2: European Sites >15 km from the Proposed Development which Support Qualifying Features which could be Affected

SITE NAME	APPROX. DISTANCE AND DIRECTION FROM PROPOSED DEVELOPMENT SITE (AT CLOSEST POINT)
Berwickshire and North Northumberland Coast SAC	87.72 km north
Humber Estuary SAC	106.38 km south
Southern North Sea SAC	101.34 km east
River Tweed SAC	107.27 km north
Tweed Estuary SAC	135.95 km north
The Wash and North Norfolk Coast SAC	187.05 km south

3.2.7 Although Ramsar sites are not explicitly covered by the Conservation of Habitats and Species Regulations (2017), paragraph 176 of the National Planning Policy Framework (NPPF) in England extends Ramsar sites the same level of protection as SPAs and SACs. Therefore, the Teesmouth and Cleveland Coast Ramsar and the Northumbria Coast Ramsar are considered in this assessment.

3.3 Summary of Designated Sites and Qualifying Features

3.3.1 An introduction to the designated sites listed within Tables 3-1 and 3-2 above, and a summary of the qualifying features, conservation objectives and threats / pressures to site integrity is provided in the following sections.

Teesmouth and Cleveland Coast SPA

Introduction

3.3.2 The Teesmouth and Cleveland Coast SPA, originally classified in 1995, is an estuarine and coastal site located on the north-eastern coast of England of approximately 12,210.62 ha. It comprises a range of coastal habitats, such as sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. The SPA / Ramsar lies along a stretch of coast that has been significantly modified by human activity. The site provides feeding and roosting opportunities for a significant number of waterfowl in winter and the passage period. Furthermore, little tern (Sterna albifrons) breed on beaches within the site during summer and sandwich tern Sterna sandvicensis use the SPA / Ramsar as a stop-over location on passage.

3.3.3 The SPA was extended in January 2020 to add breeding avocet (*Recurvirostra avosetta*), breeding common tern (*Sterna hirundo*) and non-breeding ruff (*Calidris pugnax*) as protected features. The extension also included additional areas of coastal and wetland habitats, the River Tees channel and the shallow coastal waters of Tees Bay.

SPA Qualifying Features

3.3.4 The site qualifies as a Ramsar for the following Ramsar criteria (Natural England, 2020c):

- Pied avocet (*Recurvirostra avosetta*) (breeding[1]);
- Red knot (*Calidris canutus*) (non-breeding);
- Ruff (*Calidris pugnax*) (non-breeding);
- Common redshank (*Tringa totanus*) (non-breeding);
- Sandwich tern (*Sterna sandvicensis*) (non-breeding);
- Common tern (*Sterna hirundo*) (breeding);
- Little tern (*Sterna albifrons*) (breeding); and,
- Waterbird assemblage.

3.3.5 The waterbird assemblage includes a wide range of breeding, wintering and passage waterbird species, including those of European importance described above, as well as numbers exceeding 1% of the Great Britain (GB) non-breeding populations of gadwall (*Mareca strepera*), northern shoveler (*Spatula clypeata*) and sanderling (*Calidris alba*). Additionally, Eurasian wigeon (*Mareca penelope*), northern lapwing (*Vanellus vanellus*), herring gull (*Larus argentatus*) and black-headed gull (*Chroicocephalus ridibundus*) are also present in sufficient numbers to warrant their being listed as a major component species of the assemblage, as their numbers exceed 2,000 individuals (10% of the minimum qualifying assemblage of 20,000 individuals) (Natural England, 2020a).

Conservation Objectives

3.3.6 The conservation objectives for the Teesmouth and Cleveland Coast SPA are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the population of each of the qualifying features; and,
- the distribution of the qualifying features within the site" (Natural England, 2020b).

[1] the breeding bird season is generally between March and August; however, timings will vary depending upon weather.

Threats and Pressures

3.3.7 The following threats / pressures to the site integrity of the Teesmouth and Cleveland Coast SPA have been identified in Natural England's Site Improvement Plan (Natural England, 2014a):

- Physical modification
- Public access / disturbance
- Direct land take from development
- Water pollution
- Fisheries: Commercial marine and estuarine
- Fisheries: Recreational marine and estuarine
- Undergrazing
- Inappropriate water levels
- Predation
- Coastal squeeze
- Change to site conditions
- Air pollution: Impact of atmospheric nitrogen deposition.

Teesmouth and Cleveland Coast Ramsar

Introduction

3.3.8 The Teesmouth and Cleveland Coast Ramsar site is a wetland of international importance, comprising intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. The boundaries of the Teesmouth and Cleveland Coast Ramsar overlap with the Teesmouth and Cleveland Coast SPA. The Ramsar site was extended in 2020 to include additional terrestrial areas within the Tees estuary and along the foreshore to the north and south because of the site's international importance for waterbirds.

Qualifying Features

3.3.9 The site qualifies as a Ramsar for the following Ramsar criteria (Natural England, 2020c):

- Criterion 5 - Assemblages of international importance
  - Species with peak counts in winter
  - 26,786 waterfowl (5-year peak mean 2011/12-2015/16)
- Criterion 6 - Species/populations occurring at levels of international importance
  - Qualifying Species/populations (as identified at designation)
  - Species with peak counts in spring / autumn:

        - Common redshank (*Tringa totanus*); 1,648 individuals representing an average of 1.1% of the East Atlantic population (1987-91)
    - Species with peak counts in winter:
        - Red knot (*Calidris canutus islandica*); 5,509 individuals representing an average of 1.6% of the NE Canada/Greenland/Iceland/UK population (5-year peak mean 1991/92-1995/96)
        - Sandwich tern (*Thalasseus sandvicensis*); 1,900 individuals representing an average of 4.3% of the GB population (1988-1992)

3.3.10 The threats and pressures to the Teesmouth and Cleveland Coast Ramsar are considered to be the same as for the Teesmouth and Cleveland Coast SPA (refer to section 3.3).

North York Moors SAC

Introduction

3.3.11 The North York Moors SAC is a 44,053.29 ha in size and is a large site that comprises a variety of habitats, most notably heath and scrub (73%), dry grassland (15%), and bogs and marshes (4%). The site lies in north-east Yorkshire within the North York Moors National Park and contains the largest contiguous area of upland heather moorland in England.

3.3.12 Half the site is covered by dry heath, which forms the main vegetation type on the western, southern and central moors. Wet heath is the second most dominant habitat that is found in the eastern and northern moors, where the soil is not as free-draining. Together the heathland components are the primary reason for qualifying the SAC.

3.3.13 Blanket bog is also a qualifying feature, which occurs along the watersheds of some of the high moors on relatively deep peat. The blanket bog areas are managed for grouse through rotational burning and extensive sheep grazing. In recent decades bracken has become dominant in areas that used to harbour ericaceous species. The site comprises boggy flushes with rushes and mires with Sphagnum mosses and sedges. The SAC, particularly the bog elements, support populations of upland breeding bird species including merlin and golden plover (see the North York Moors SPA below).

Qualifying Features (Natural England, 2019a)

- Annex I habitats that are a primary reason for selection of this site:
    - Northern Atlantic wet heaths with *Erica tetralix*; and
    - European dry heaths
- Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:
    - Blanket bogs

Conservation Objectives (Natural England, 2018a and 2019)

3.3.14 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;*

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

Threats and Pressures to Site Integrity (Natural England, 2014b)

3.3.15 The following threats / pressures to the site integrity of the North York Moors SAC have been identified in Natural England's Site Improvement Plan:

- Climate change;
- Air pollution: Impact of atmospheric nitrogen deposition;
- Disease;
- Invasive species;
- Managed rotational burning;
- Planning permission: Mineral and waste;
- Game management: Grouse Moors;
- Changes in species distributions;
- Agriculture;
- Energy production;
- Wildfire / arson.

North York Moors SPA

Introduction

3.3.16 The upland moorland that represents the qualifying habitat of the North York Moors SAC (described above) also supports significant populations of upland breeding birds, in particular golden plover and merlin.

Qualifying Features (Natural England, 2019b)

- Annex II species that are a primary reason for selection of this site:
  - Merlin (*Falco columbianus*); 526 pairs representing at least 2.3% of the breeding population in Great Britain (numbers are at time of designation); and

- European golden plover (*Pluvialis apricaria*); 40 pairs representing at least 3.1% of the breeding population in Great Britain

Conservation Objectives (Natural England, 2019b and 2019c)

3.3.17 With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:*

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

Threats / Pressure to Site Integrity

3.3.18 The following threats / pressures to the site integrity of the North York Moors SPA have been identified in Natural England's Site Improvement Plan (Natural England, 2014c):

- Climate change;
- Air pollution: Impact of atmospheric nitrogen deposition;
- Disease;
- Invasive species;
- Managed rotational burning;
- Planning permission: Mineral and waste;
- Game management: Grouse Moors;
- Changes in species distributions;
- Agriculture;
- Energy production; and
- Wildfire / arson.

Durham Coast SAC

Introduction

3.3.19 The Durham Coast SAC is a 389.61 ha site comprising coastal sand dunes (43%), shingle / sea cliffs (31%), marine areas (21%) and humid grassland (5%). It is the only example of a vegetated sea cliff on Magnesian Limestone in the UK, extending along the North Sea coastline for 20 km.

3.3.20 The SAC's vegetation is unique in the British Isles, consisting of a mosaic of calcareous and neutral grasslands, tall-herb fen, seepage flushes and wind-pruned scrub. These habitats harbour a wide range of species with varied ecological niches and requirements, often including rare or scarce species. The Durham Coast SAC also supports significant populations of breeding seabirds, wintering waders and rare invertebrates, such as the Durham argus (*Aricia Artaxerxes salmacisi*) (Natural England, 2014c).

Qualifying Features

- Annex I habitats that are a primary reason for selection of this site:
  - Vegetated sea cliffs of the Atlantic and Baltic Coasts

Conservation Objectives

3.3.21 The conservation objectives for the Durham Coast SAC are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;*

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which the qualifying natural habitats rely" (Natural England, 2018c).

Threats and Pressures

3.3.22 The following threats / pressures to the site integrity of the Durham Coast SAC have been identified in Natural England's Site Improvement Plan (Natural England, 2014d):

- Natural changes to site conditions;
- Inappropriate coastal management;
- Invasive species;
- Fertiliser use;
- Vehicles: Illicit;
- Changes to site conditions; and
- Public access / disturbance.

3.3.23 Additional supplementary advice on conserving and restoring site features was published in 2019 and should be read together with the conservation objectives (Natural England, 2019d).

Northumbria Coast SPA / Ramsar

Introduction

3.3.24 The Northumbria Coast SPA comprises several discrete sections of rocky foreshore between the north of Northumberland and the County Durham. The site also includes an area of sandy beach. The SAC largely includes cliffs, crags / ledges, intertidal rock, open coast and pools. The site is subject to a range of recreational activities, including walking, sea angling, birdwatching and water sports.

3.3.25 The SPA was classified in 2000 for supporting internationally important populations of over-wintering purple sandpiper and turnstone, and a breeding colony of little tern at Beadnell Bay.

SPA Qualifying Features (JNCC, 2018)

3.3.26 Annex I species that are a primary reason for selection of this site:

- Arctic tern (*Sterna paradisaea*); 1,549 pairs representing 2.92% of the GB population
- Little tern (*Sternula albifrons*); 40 pairs representing 1.7% of the GB population

3.3.27 Annex II species that are a primary reason for selection of this site:

- Turnstone (*Arenaria interpres*); 1,739 individuals representing 2.6% of the biogeographic population
- Purple sandpiper (*Calidris maritima*); 787 individuals representing 1.6% of the biogeographic population

Ramsar Qualifying Features (RSIS, 2000b)

3.3.28 The site qualifies as a Ramsar for the following Ramsar criteria:

- Criterion 6 - Species/populations occurring at levels of international importance
  - Qualifying Species/populations (as identified at designation)
  - Species with peak counts in winter:
- Purple sandpiper (*Calidris maritima*); 787 individuals representing an average of 1.6% of the population (5-year peak mean for 1992/93 to 1996/97)
- Turnstone (*Arenaria interpres*); 1,739 individuals representing an average of 2.6% of the population (5 year peak mean for 1992/93 to 1996/97)
  - Species with peak counts during the breeding season:
- Little tern (*Sterna albifrons*); 40 pairs representing an average of 1.7% of the GB population (5 year mean for 1993 to 1997)

SPA Conservation Objectives (Natural England, 2019e)

3.3.29 With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

3.3.30 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

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

Threats / Pressures to Site Integrity (Natural England, 2015b)

3.3.31 The following threats / pressures to the site integrity of the Northumbria Coast SPA have been identified in Natural England's Site Improvement Plan:

- Public access / disturbance;
- Water pollution;
- Invasive species;
- Changes in species distributions;
- Predation;
- Coastal squeeze;
- Direct impact from third party;
- Transportation and service corridors;
- Change in land management;
- Air pollution: Risk of atmospheric nitrogen deposition; and
- Fisheries: Commercial marine and estuarine.

Berwickshire and North Northumberland Coast SAC

Introduction

3.3.32 The Berwickshire and North Northumberland Coast SAC is a 65,226.12 ha site in north-east England comprising a variety of habitats, including marine areas / sea inlets (73.2%), tidal rivers and estuaries (13.4%), coastal sand dune (4.5%) and shingle / sea cliffs (6.7%).

3.3.33 The SAC comprises an extensive stretch of intertidal sand- and mudflats, which range from wave-exposed beaches to sheltered muddy flats. Parts of these harbour the largest intertidal beds of narrow-leaved eelgrass (*Zostera angustifolia*) and dwarf eelgrass (*Z. noltei*). Some of the beds harbour large beds of mussels, sand-eels, small crustaceans and polychaete worms.

3.3.34 Furthermore, the SAC comprises an extensive stretch of reef coastline. The subtidal rocky reefs harbour rich marine communities. The community variety is due to the wide range of physical conditions in the area, ranging from wave-exposed locations,

open coast to sheltered reefs. The Farne Islands are especially important because they are some of the few rocky islands with extensive reefs.

3.3.35 It is the most south-easterly site selected for grey seal, supporting around 2.5% of the annual UK pup production.

Qualifying Features (JNCC, 2020a)

3.3.36 Annex I habitats that are a primary reason for selection of this site:

- Mudflats and sandflats not covered by seawater at low tide;
- Large shallow inlets and bays;
- Reefs; and
- Submerged or partially submerged sea caves.

3.3.37 Annex II species that are a primary reason for selection of this site:

- Grey seal (Halichoerus grypus)

Conservation Objectives (Natural England, 2014e)

3.3.38 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

3.3.39 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

Threats / Pressures to Site Integrity (Natural England, 2015b)

3.3.40 The following threats / pressures to the site integrity of the Berwickshire and North Northumberland Coast SAC have been identified in Natural England's Site Improvement Plan:

- Public access / disturbance;
- Water pollution;
- Invasive species;

- Changes in species distribution;
- Predation;
- Coastal squeeze;
- Transportation and service corridors;
- Change in land management;
- Air pollution: Risk of atmospheric nitrogen deposition; and
- Fisheries: Commercial marine and estuarine.

Humber Estuary SAC

Introduction

3.3.41 The Humber Estuary SAC is 36,657.15 ha in size and is a large estuarine site in north-eastern England comprising a variety of habitats, including tidal rivers / estuaries (94.9%), saltmarsh (4.4%), coastal sand dunes (0.4%) and bogs / marshes (0.4%).

3.3.42 The SAC is a large macro-tidal coastal plain estuary with high suspended sediment loads. It is a dynamic system that feeds accreting and eroding intertidal and subtidal sand- and mudflats, saltmarsh and reedbeds. It also harbours a range of sand dune types, sandbanks and coastal lagoons. Salinity declines upstream, giving rise to tidal reedbeds and brackish saltmarsh communities. The SAC harbours a significant fish assemblage, including river lamprey and sea lamprey.

3.3.43 The estuary is a favoured feeding site for wintering and passage wildfowl, which forage in the different habitats of the SPA. The sandy habitats attract knot and grey plover, while waterfowl prefer the wetland zones. At high tide, mixed flocks of birds occupy key roost sites, which are under pressure due to the combined effects of land claim, coastal squeeze and habitat loss.

Qualifying Features (JNCC, 2020c)

3.3.44 Annex I habitats that are a primary reason for selection of this site:

- Estuaries; and
- Mudflats and sandflats not covered by seawater at low tide.

3.3.45 Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- Sandbanks which are slightly covered by sea water all the time;
- Coastal lagoons;
- Salicornia and other annuals colonizing mud and sand;
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae);
- Embryonic shifting dunes;
- Shifting dunes along the shoreline with Ammophila arenaria (“white dunes”);
- Fixed coastal dunes with herbaceous vegetation (“grey dunes”); and

- Dune with Hippopha rhamnoides.

3.3.46 Annex II species present as a qualifying feature, but not a primary reason for site selection:

- Sea lamprey (Petromyzon marinus);
- River lamprey (*Lampetra fluviatilis*); and
- Grey seal (Halichoerus grypus).

Conservation Objectives (Natural England, 2020b)

3.3.47 With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

3.3.48 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

Threats / Pressures to Site Integrity (Natural England, 2020c)

3.3.49 The following threats / pressures to the site integrity of the Humber Estuary SAC have been identified in Natural England's Site Improvement Plan:

- Water pollution;
- Coastal squeeze;
- Changes in species distributions;
- Undergrazing;
- Invasive species;
- Natural changes to site conditions;
- Public access / disturbance;
- Fisheries: Fish stocking;
- Fisheries: Commercial marine and estuarine;
- Direct land take from development;

- Air pollution: Impact of atmospheric nitrogen deposition;
- Shooting / scaring; and
- Inappropriate scrub control.

Southern North Sea SAC

Introduction

3.3.50 The Southern North Sea SAC is a large (3,695,054 ha), offshore site comprising entirely marine habitat (100%). Its purpose is to protect the primary habitat for harbour porpoise (Phocoena Phocoena), which uses a network of habitat patches in the North Sea.

3.3.51 Harbour porpoises display seasonal differences in the relative use of marine habitats. The SAC was identified using harbour porpoise sightings data to identify areas that consistently harboured elevated densities of harbour porpoise. The SAC has been designated due to its importance for porpoise both in the summer and winter months.

Qualifying Features (JNCC, 2020d)

3.3.52 Annex II species that are a primary reason for selection of this site:

- Harbour porpoise (Phocoena Phocoena)

Conservation Objectives (JNCC and Natural England, 2019e)

3.3.53 To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site;
- There is no significant disturbance of the species; and
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Threats / Pressures to Site Integrity

3.3.54 The following threats / pressures to the site integrity of the Southern North Sea SAC have been identified based on the site's qualifying feature:

- Water pollution;
- Changes in species distributions;
- Fisheries: Commercial marine and estuarine;
- Construction of offshore and coastal infrastructure projects (e.g. wind farms, pipelines, harbours); and
- Noise disturbance.

River Tweed SAC

Introduction

3.3.55 The River Tweed SAC is the most species-rich river with water crowfoot (*Ranunculus sp*.) in the north-eastern part of its range. It has high ecological diversity which is partly due to its diverse geological setting. Examples of its vegetation include stream water-crowfoot (*Ranunculus penicillatus*), fan-leaved water-crowfoot (*R. circinatus*) and common water-crowfoot (*R. aquatilis*). The river is also designated for its significant assemblage of Atlantic salmon (*Salmo salar*), otter (*Lutra lutra*), sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*) and river lamprey (*Lampetra fluviatilis*).

Qualifying Features (JNCC, 2020e)

3.3.56 Annex I habitats that are a primary reason for selection of this site:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

3.3.57 Annex II species that are a primary reason for selection of this site:

- Atlantic salmon; and
- Otter.

3.3.58 Annex II species present as a qualifying feature, but not a primary reason for site selection:

- Sea lamprey;
- Brook lamprey; and
- River lamprey.

Conservation Objectives (Natural England, 2014f)

3.3.59 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

3.3.60 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

- The distribution of qualifying species within the site.

Threats / Pressures to Site Integrity (Natural England, 2014g)

3.3.61 The following threats / pressures to the site integrity of the River Tweed SAC have been identified in Natural England's Site Improvement Plan:

- Water pollution;
- Invasive species;
- Physical modification; and
- Water abstraction.

Tweed Estuary SAC

Introduction

3.3.62 The Tweed Estuary SAC is a 156.24 ha European site, comprising tidal rivers / estuaries (90%) and salt marsh (10%). The SAC is a long and narrow estuary that discharges into the North Sea. Its water quality is classified as excellent throughout, supporting a wide range of habitats. These include substantial sandbanks, areas of rocky shore (at its mouth), estuarine boulders and cobbles (further upstream). The most exposed sandy shores are subject to wave action from the sea and scouring from the outflowing river. Species and habitats reflect these conditions, with diversity decreasing with increasing exposure.

3.3.63 The SAC also harbours intertidal sand- and mudflats. The sand is subject to wave action and scouring by the river, which is reflected by a mobile infaunal community consisting mainly of crustaceans and few polychaetes. More sheltered areas of the estuary support robust polychaetes, amphipods, oligochaetes and enchytraeids.

Qualifying Features (JNCC, 2020f)

3.3.64 Annex I habitats that are a primary reason for selection of this site:

- Estuaries; and
- Mudflats and sandflats not covered by seawater at low tide.

3.3.65 Annex II species present as a qualifying feature, but not a primary reason for site selection:

- Sea lamprey; and
- River lamprey.

Conservation Objectives (Natural England, 2014h)

3.3.66 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

3.3.67 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

Threats / Pressures to Site Integrity (Natural England, 2015)

3.3.68 The following threats / pressures to the site integrity of the Tweed Estuary SAC have been identified in Natural England's Site Improvement Plan:

- Public access / disturbance;
- Water pollution;
- Invasive species;
- Changes in species distribution;
- Predation;
- Coastal squeeze;
- Transportation and service corridors;
- Change in land management;
- Air pollution: Risk of atmospheric nitrogen deposition; and
- Fisheries: Commercial marine and estuarine.

The Wash and North Norfolk Coast SAC

Introduction

3.3.69 The Wash is the largest marine embayment (107,718ha) with the second largest intertidal sediment flats in the country. It comprises extensive fine sand and coarse sand banks, which support a community of polychaetes, bivalves and crustaceans. Some unusual communities also occur, including brittlestar beds and reef-building ross worm (*Sabellaria spinulosa*).

3.3.70 The North Norfolk Coast is the only British example of a barrier beach system, with extensive areas of saltmarsh with characteristic creek patterns having developed behind sand and shingle spits and bars. Communities include the bivalve peppery furrow shell (*Scrobicularia plana*) and lugworm (*Arenicola marina*). In the more exposed open coast areas, the fauna is sparser.

3.3.71 The SAC is important for breeding and moulting of one of Europe's largest populations of common seal (*Phoca vitulina*). Furthermore, the intertidal mudflats

and salt marshes represent one of Britain's most important winter-feeding areas for waders and wildfowl.

Qualifying Features (JNCC, 2020b)

3.3.72 Annex I habitats that are a primary reason for selection of this site:

- Sandbanks which are slightly covered by sea water all the time;
- Mudflats and sandflats not covered by seawater at low tide;
- Large shallow inlets and bays;
- Reefs;
- Salicornia and other annuals colonizing mud and sand;
- Atlantic salt meadows (Glauco-Puccinelllietalia maritimae); and
- Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticose).

3.3.73 Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- Coastal lagoons

3.3.74 Annex II species that are a primary reason for selection of this site:

- Harbour seal (*Phoca vitulina*)

3.3.75 Annex II species present as a qualifying feature, but not a primary reason for site selection:

- Otter (Lutra lutra)

Conservation Objectives (Natural England, 2014i)

3.3.76 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; the conservation objectives are to:

3.3.77 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

- The distribution of qualifying species within the site.

Threats / Pressures to Site Integrity (Natural England, 2014j)

3.3.78 The following threats / pressures to the site integrity of The Wash and North Norfolk Coast SAC have been identified in Natural England's Site Improvement Plan:

- Inappropriate water levels;
- Public access / disturbance;
- Siltation;
- Fisheries: Recreational marine and estuarine;
- Invasive species;
- Inappropriate coastal management;
- Fisheries: Commercial marine and estuarine;
- Predation;
- Coastal squeeze;
- Change in land management;
- Air pollution: Impact of atmospheric nitrogen deposition; and
- Changes in species distributions.

4.0 TEST OF LIKELY SIGNIFICANT EFFECTS

4.1 Introduction

4.1.1 This section examines the LSEs of the Proposed Development. It is structured by development phase (i.e. construction, operation and decommissioning), and the works and methodologies as described within ES Chapter 4: Proposed Development and ES Chapter 5: Construction and Programme Management. Within each development phase each potential impact pathway (e.g., noise & visual disturbance, air quality etc.) is discussed separately, covering all European sites to which that impact pathway applies. Each European site to which an impact pathway potentially applies is considered below under the heading describing the type of impact. The analysis is summarised in the screening matrices in Appendix B of this HRA.

4.2 Construction

Direct Habitat Loss – HDD Collapse / Leaking of Drilling Fluid

Teesmouth and Cleveland Coast SPA and Ramsar

4.2.1 The Main Site is located immediately adjacent to the Teesmouth and Cleveland Coast SPA and Ramsar. The Main Site will require a hydrogen pipeline network to various potential industrial off-takers across the Tees Valley to the Production Facility. Various construction methodologies will be used including Horizontal Direct Drilling (HDD), Micro Bored Tunnel (MBT) or open-trench for below ground works, installation on existing above ground pipe racks, and repurposing and reuse of existing pipelines.

4.2.2 The Teesmouth and Cleveland Coast SPA and Ramsar are within the boundary of the Proposed Development Site. The Proposed Development has been designed to avoid the direct loss of habitat within the SPA and Ramsar site boundaries through use of HDD. However, direct habitat loss could occur in the event of HDD collapse. The risk of HDD collapse / leakage of drilling fluid was considered in the Secretary of State's HRA for the Net Zero Teesside (Department for Energy Security and Net Zero (DESNZ), 2024) (which is adjacent to the Proposed Development) project following concerns by Natural England raised by NE in Relevant Representation and during Examination. It has therefore also been considered here.

4.2.3 Therefore, direct habitat loss within the Teesmouth and Cleveland Coast SPA and Ramsar due to risk of HDD collapse is screened into Appropriate Assessment.

4.2.4 There will be no direct habitat loss within any other European sites listed in Tables 3-1 and 3-2 and these can be screened out.

Loss of Functionally Linked Habitat - Birds

Teesmouth and Cleveland Coast SPA and Ramsar

4.2.5 As discussed in section 3.2 above, functionally linked habitat is a term 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. Habitats within and adjacent to the Proposed Development Site are used by the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar for breeding, roosting and/or feeding. Surveys have been completed to confirm if these areas are functionally linked; the survey method and full results of the breeding and non-breeding bird surveys are presented in ES Chapter 13: Ornithology and Appendix 13A: Ornithology Baseline and the Supplementary Ornithological Baseline Report submitted alongside this report. Figure 4 within this report shows the bird survey sectors and Tables 1 to 26 within Annex B summarises the results of the high tide and low tide surveys for the qualifying bird species of the SPA and Ramsar.

4.2.6 Table 4-1 below summarises the locations where the qualifying bird species from the Teesmouth and Cleveland Coast SPA and Ramsar were recorded. Where qualifying bird species have been recorded within land, this land is considered functionally linked land. Where this overlaps with the Proposed Development Site there is therefore potential for those species to be affected by loss of functionally linked land.

Table 4-1: Summary of Qualifying Bird Species with the Potential to be Affected by Loss of Functionally Linked Land During Construction

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY LOSS OF FUNCTIONLLY LINKED LAND?
Avocet	[redacted]	
Red knot	The Foundry survey area (6, 7, 8a) Seal Sands (18, 18a, 19, 20, 23d) North Tees Marshes (G6, G7)	No - recorded within sectors outside the Proposed Development Site.
Ruff	North Tees Marshes (B5, G2, G6)	Yes – recorded in B5 within the Proposed Development Site (the Transmission and Distribution Infrastructure Connection at Cowpen Bewley)).
Common redshank	The Foundry survey area (2, 3a, 6, 7, 8a, 16, 18) Seal Sands (2, 4, 25, 17, 17a, 18, 18a, 19, 20, 21, 22a, 22b, 22c, 22d, 22e, 22f, 23d, 25, G4, G5)	Yes – recorded within Sector 18 (The Foundry), Seal Sands Sector 2, 22e, G4 and 25 and North Tees Marshes B5 and B6 (the Transmission and Distribution Infrastructure Connection at

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY LOSS OF FUNCTIONLLY LINKED LAND?
	North Tees Marshes (G1, B5, B6, G2, G3, G6, G7, G8, G9, G12, G13, B8, B9, B10, B11, B12, B14, B15, B16, B17, B18, B22, B23, G7)	Cowpen Bewley)) within the Proposed Development Site.
Sandwich tern	The Foundry survey area (6, 7, 8a, 14) Seal Sands (18, 18a) North Tees Marshes (B15, G7)	Yes – Sector 14 (The Foundry).
Common tern	The Foundry survey area (7, 8a, 18) Seal Sands (17, 17a, 18, 18a, 19, 21, G5) North Tees Marshes (G2, G3, G6, B15, G7)	Yes – Sector 18 (The Foundry) within the Proposed Development Site.
Little tern	-	No – not recorded.
Gadwall	The Foundry survey area (15, 16, 18) Seal Sands (4, 17, 21, 22a, 22c, 22d, 22e, 23b, 23d, 24, G4, G5) North Tees Marshes (G1, G2, G3, G6, G7, G11, G13, G13a, B1, B4, B5, B6, B7, B8, B9, B10, B11, B12, B16, B22, B23)	Yes – Sectors 15 (The Foundry) and 18 (Dabholm Gut), G4 and 17 (Seal Sands), B4, B5, B6 (North Tees Marshes).
Northern shoveler	Seal Sands (4, 19, 24, G4, 22a, 22b, 22c, 22d, 22e, 24) North Tees Marshes (G1, B1, B3, B4, B5, B6, G1, G2, G3, B7, B8, B10, B11, B12, B23, B15, B16,G7, G10, G11, G13, G13a)	Yes – G4 (Seal Sands), B1, B3, B4, B5, B6 (North Tees Marshes).
Sanderling	The Foundry survey area (1, 2, 6, 7) Seal Sands (25)	No – recorded within sectors outside the Proposed Development Site.
Wigeon	The Foundry survey area (2, 16) Seal Sands (18, 18a, 19, 21, 24, G5, 22a,22c, 22b, 22d, 22e, 23d, 24) North Tees Marshes (G1, B2, B5, B6, G2, G3, G6, G13, B7, B8, B9, B10, B11, B12, B15, B16, B17, B23, G7, G8, G13).	Yes – B2, B5, B6 (North Tees Marshes)

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY LOSS OF FUNCTIONLLY LINKED LAND?
Lapwing	The Foundry survey area (3a, 8a, 14, 15, 16, 18, 7) Seal Sands (2, 6, 25, 18a, 24, 25, G4, G5, 22c, 24, 19, 21, 22d) North Tees Marshes (G1, B1, B3, B4, B5, B6, G2, G3, G6, B7, B10, B11, B12, B13, B14, B15, B17, B18, G7, G8, G10, G11, G13, G13a).	Yes – 15, 18 (The Foundry), 2 and 25 (Seal Sands), B1, B3, B4, B5, B6 (North Tees Marshes).
Herring gull	The Foundry survey area (1, 2, 6, 7, 8, 8a, 9, 10, 12, 13, 14, 15, 16, 18) Seal Sands (8, 25 18, 18a, 19, 20, 24, 25, 21, 17) North Tees Marshes (G1, G6, G7, G8, G10, G13, G13a, B8, B10, B12, B15, B16)	Yes – 9, 10, 12, 13, 15, 18 (The Foundry). 25 (Seal Sands)
Black-headed gull	The Foundry survey area (1, 2, 3a, 6, 7, 8, 8a, 9, 14, 15, 16, 18). Seal Sands (2, 4, 17, 17a, 21, 22, 22c, 22d, 25, 18, 18a, 19, 20, 24, 25, G4, G5, 21, 22a, 22b, 22e, 23a, 23d, 23g, 24) North Tees Marshes (G1, B5, B6, G2, G3, G6, B7, B9, B10, B11, B12, B14, B15, B16, B17, B22, B23, B18, G7, G8, G10, G11, G13, G13a).	Yes – 9, 15, 18 (The Foundry), 2, 22, G4 (Seal Sands), B5, B6 (North Tees Marshes).

4.2.7 Where qualifying bird species have been recorded within count sectors which overlap the Proposed Development Site they have been screened into Appropriate Assessment. Therefore, loss of functionally linked habitat for avocet, ruff, redshank, sandwich tern, common tern, gadwall, shoveler, wigeon, lapwing, herring gull and black-headed gull are screened into Appropriate Assessment.

4.2.8 Knot, little tern and sanderling were not recorded within the Proposed Development Site and can be screened out.

North York Moors SPA

4.2.9 The North York Moors SPA is designated for breeding golden plover which nest within the moorland vegetation. As the habitats within and adjacent to the Proposed Development site are unsuitable for breeding golden plover there will be no LSE upon breeding habitat. The non-breeding bird surveys found that golden

plovers were not recorded within sectors which overlap with the Proposed Development Site. Therefore, there will be no LSE upon golden plover and this species can be screened out.

4.2.10 The site is also designated for breeding merlin which nest within mature or degenerate heather. As the habitats within and adjacent to the Proposed Development site are unsuitable for breeding golden plover and merlin there will be no LSE and this pathway can be screened out. Merlin was not recorded within the Proposed Development Site during the bird surveys.

Northumbria Coast SPA and Ramsar

4.2.11 Northumbria Coast SPA/Ramsar is the next closest European site designated for bird species. It is located 10.1 km north of the Proposed Development Site. According to unpublished Natural England guidance on functionally linked land Impact Risk Zones for sites designated for birds (Knight, 2019), significant impacts on functionally-linked habitats from this type of development will not arise more than 10 km at most from the designated site. There will thus be no LSEs and this pathway can be screened out.

4.2.12 All other European sites listed in Tables 3-1 and 3-2 are designated for habitats or non-avian qualifying features and can be screened out.

Visual Disturbance

Teesmouth and Cleveland Coast SPA and Ramsar

4.2.13 Visual disturbance during the construction phase has the potential to disturb the bird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. At the Main Site, visual disturbance could arise from increased human activity on site, the use of machinery and plant and construction of the new building (the tallest element will be the Flares, with a maximum height of 108 m above ground level). Visual disturbance from human activity, plant and machinery could also occur during the construction of new pipeline routes.

4.2.14 Lighting during construction also has the potential to disturb the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar. Birds flying at night are known to aggregate around artificial light and may collide with illuminated objects. This may result from attraction and / disorientation. Birds may also be repelled by light sources. Artificial light can change birds perceptions of habitat quality, resulting in selection or avoidance of illuminated areas (Adams *et al*, 2021).

4.2.15 The Natural England Site Improvement Plan (SIP) for the Teesmouth and Cleveland Coast SPA / Ramsar highlights that the site is sensitive to public access and disturbance, primarily as a result of recreational users accessing the beach (Natural England, 2014a). This recreational pressure effect is primarily due to the birds responding to visual and (probably to a lesser extent) auditory stimuli, which also result from the construction / decommissioning or operation of nearby industrial plants. Therefore, it is considered that the SPA / Ramsar is sensitive to visual and noise disturbance associated with the Proposed Development.

4.2.16 For visual disturbance of birds within functionally linked land, a generic response threshold of c. 300 m has been used to screen the potential for visual disturbance (Cutts *et al*, 2009). Areas of the Teesmouth and Cleveland Coast SPA and Ramsar lie within 300 m of the Proposed Development Site and there is the potential for visual disturbance of birds within the SPA and Ramsar Site Boundaries. Figure 5 shows the Proposed Development Site, the SPA and Ramsar Site Boundaries and the bird survey areas which fall with a 300 m buffer.

4.2.17 Table 4-2 summarises the locations where the qualifying bird species from the Teesmouth and Cleveland Coast SPA and Ramsar were recorded and whether there is potential for those species to be affected by visual disturbance. Bird survey sectors are shown in Figure 4.

Table 4-2: Summary of Qualifying Bird Species with the Potential to be Affected by Visual Disturbance During Construction

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY VISUAL DISTURBANCE?
Avocet	[redacted]	
Red knot	The Foundry (6, 7, 8a) Seal Sands (18, 18a, 19, 20, 23d) North Tees Marshes (G6, G7)	Yes – 6, 7, 8a (Bran Sands Bay), 18, 19, 20, 23d (Seal Sands). G6, G7 (North Tees Marshes)
Ruff	North Tees Marshes (B5, G2, G6)	Yes – B5 the Transmission and Distribution Infrastructure Connection at Cowpen Bewley)) G2, G6
Common redshank	The Foundry (2, 3a, 6, 7, 8a, 16, 18) Seal Sands (2, 4, 25, 17, 17a, 18, 18a, 19, 20, 21, 22a, 22b, 22c, 22d, 22e, 22f, 23d, 25, G5) North Tees Marshes (G1, B5, B6, G2, G3, G6, G7, G8, G9, G12, G13, B8, B9, B10, B11, B12, B14, B15, B16, B17, B18, B22, B23, G7)	Yes – The Foundry / Bran Sands Bay (3a 6, 7, 8a, 16, 18), Seal Sands 2, 4, 25, 17, 17a, 19, 20, 21, 22b, 22c, 22d, 22e, 22f, 25, G5. Yes - North Tees Marshes (G1, B5, B6, G2, G3, G13, B12, B14, G7).
Sandwich tern	The Foundry (6, 7, 8a, 14) Seal Sands (18, 18a) North Tees Marshes (B15, G7)	Yes – The Foundry (6, 7, 8a, 14), North Tees Marshes (G7)

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY VISUAL DISTURBANCE?
Common tern	The Foundry (7, 18, 8a) Seal Sands (17, 17a, 18, 18a, 19, 21, G5, G6) North Tees Marshes (G2, G3, B15, G7)	Yes – The Foundry (7, 18, 8a) Seal Sands (17, 17a, 19, 21, G5, G6) North Tees Marshes (G2, G3, G7)
Little tern	-	No – not recorded
Gadwall	The Foundry (15, 16, 18) Seal Sands (4, 17, 21, 22a, 22c, 22d, 22e, 23b, 23d, 24, G4, G5) North Tees Marshes (G1, G2, G3, G6, G7, G11, G13, G13a, B1, B4, B5, B6, B7, B8, B9, B10, B11, B12, B16, B22, B23)	Yes – The Foundry (15, 16, 18) Seal Sands (4, 17, 21, 22a, 22c, 22d, 22e, 23b, 23d, 24, G4, G5) North Tees Marshes (G1, G2, G3, G6, G7, G13, B1, B4, B5, B6, B7, B12)
Northern shoveler	Seal Sands (4, 19, 24, G4, 22a, 22b, 22c, 22d, 22e) North Tees Marshes (G1, B1, B3, B4, B5, B6, G2, G3, B7, B8, B10, B11, B12, B23, B15, B16, G7, G10, G11, G13, G13a)	Yes – Seal Sands 4, 19, 24, G4, 22a, 22b, 22c, 22d, 22e. North Tees Marshes (G1, B1, B3, B4, B5, B6, G2, G3, B7, B12, G7, G13).
Sanderling	The Foundry (1, 2, 6, 7) Seal Sands (25)	Yes – The Foundry (6, 7) Seal Sands (25)
Wigeon	The Foundry (2, 16) Seal Sands (18, 18a, 19, 21, 24, G5, 22a, 22c, 22b, 22d, 22e, 23d) North Tees Marshes (G1, B2, B5, B6, G2, G3, G6, B7, B8, B9, B10, B11, B12, B15, B16, B17, B23, G7, G8, G13).	Yes – The Foundry (16) Seal Sands (19, 21, 24, G5, 22a, 22c, 22b, 22d, 22e, 23d) North Tees Marshes (G1, B2, B5, B6, G2, G3, B7, B12, G7, G13).
Lapwing	The Foundry (3a, 8a, 14, 15, 16, 18, 7) Seal Sands (2, 6, 25, 18a, 24, G4, G5, 22c, 19, 21, 22d) North Tees Marshes (G1, B1, B3, B4, B5, B6, G2, G3, G6, B7, B10, B11, B12, B13, B14, B15, B17, B18, G7, G8, G10, G11, G13, G13a).	Yes – The Foundry (3a, 8a, 14, 15, 16, 18, 7). Seal Sands (2, 25, 24, G4, G5, 22c, 19, 21, 22d). North Tees Marshes (G1, B1, B3, B4, B5, B6, G2, G3, B7, B12, B13, B14, G7, G13).
Herring gull	The Foundry (1, 2, 6, 7, 8a, 9, 10, 12, 13, 14, 15, 16, 18) Seal Sands (8, 25, 18, 18a, 19, 20, 24, 21, 17)	Yes – The Foundry (6, 7, 8a, 9, 10, 12, 13, 14, 15, 16) Seal Sands (25, 19, 20, 24, 21, 17). North Tees Marshes (G1, G7, G13, B12).

QUALIFYING BIRD SPECIES	SECTORS RECORDED	POTENTIAL TO BE AFFECTED BY VISUAL DISTURBANCE?
	North Tees Marshes (G1, G6, G7, G8, G10, G13, G13a, B8, B10, B12, B15, B16)	
Black-headed gull	The Foundry (1, 2, 3a, 6, 7, 8, 8a, 9, 14, 15, 16, 18). Seal Sands (2, 4, 17, 17a, 21, 22, 22a, 22c, 22d, 25, 18, 18a, 19, 20, 24, 25, G4, G5, 21, 22b, 22e, 23a, 23d, 23g) North Tees Marshes (G1, B5, B6, G2, G3, G6, B7, B9, B10, B11, B12, B14, B15, B16, B17, B22, B23, B18, G7, G8, G10, G11, G13, G13a).	Yes – The Foundry (3a, 6, 7, 8, 8a, 9, 14, 15, 16, 18). Seal Sands (2, 4, 17, 17a, 21, 22, 22c, 22d, 25, 19, 20, 24, 25, G4, G5, 22b, 22e, 23a, 23d, 23g) North Tees Marshes (G1, B5, B6, G2, G3, B7, B12, B14, G7, G13).

4.2.18 Based upon Table 4-2 above, visual disturbance of avocet, knot, ruff, redshank, sandwich tern, common tern, gadwall, shoveler, sanderling, wigeon, lapwing, herring gull, and black-headed gull are screened into Appropriate Assessment for visual disturbance. Little tern was not recorded within the Proposed Development Site, or within 300 m, and can be screened out.

4.2.19 Visual disturbance for all other sites listed in Tables 3-1 and 3-2 can be screened out due to distance.

Noise Disturbance

4.2.20 Noise during the construction phase of the Proposed Development has the potential to disturb the bird assemblage within the wider area. Baseline sound levels were measured at 13 locations to inform the impact assessment and the results are summarised in Table 4-3 below. The L_{Aeq}[2] values presented combine all measurements taken in each time period (day/night). The L_{AF} Max level is the maximum sound level with 'A' frequency weighting and Fast Time weighting during the measurement period. The sound monitoring locations are shown in Figure 6.

[2] A-weighted, equivalent continuous sound level in decibels. 'A' weighting is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

Table 4-3: Baseline Sound Survey Data

MONITORING LOCATION	TIME PERIOD	$L_{Aeq,T}$ dB	HIGHEST $L_{AF\ MAX}$ dB
H1	Daytime	50	98
	Night-time	44	90
H2	Daytime	51	73
	Night-time*	-	-
H3	Daytime	49	78
	Night-time	57	84
H4	Daytime	51	73
	Night-time*	-	-
H5	Daytime	51	96
	Night-time	44	80
H6	Daytime	56	102
	Night-time	45	77
Eb1	Daytime	51	78
	Night-time	-	-
Eb2	Daytime	67	95
	Night-time	62	90
Eb3	Daytime	48	92
	Night-time	46	79
Eb4	Daytime	51	101
	Night-time	49	85
Eb5	Daytime	57	79
	Night-time	-	-
Eb6	Daytime	53	76
	Night-time	53	88
Eb7	Daytime	47	88
	Night-time	42	82

**Only attended daytime measurements made at H2, H4, Eb1 and Eb5*

Teesmouth and Cleveland Coast SPA and Ramsar

4.2.21 The Site Improvement Plan for the Teesmouth and Cleveland Coast identifies that red knot, common redshank, sandwich tern, little tern and the waterbird assemblage can be affected by public access and disturbance (Natural England, 2014a).

4.2.22 The Waterbird Disturbance Mitigation Toolkit (Cutts *et al*, 2013) gives general guidance to assess potential impacts upon migrating and wintering waterbirds. The toolkit notes that different types of disturbance stimuli are characterised by different avifaunal reactions. Furthermore, the level of reaction is not uniform to certain types of activity and is not always intuitive. Generic guidelines employ an approach distance to 300m and a low noise threshold figure of 55dB (possibly based on research by Wintermans in 1991 which recorded no effect of shooting on roosting waders where noise levels did not exceed 55dB e.g. a level where no effect occurred rather than a threshold where effect commenced).

4.2.23 A 70dB noise threshold has however been developed over a period of years, based on published data as well as findings from primary observations (e.g. Cutts & Allen, 1999; Cutts and Phelps & Burdon, 2008). It is considered that the threshold works as a general rule but is relatively simplistic as it does not take into account the type of stimuli or the species of bird involved.

4.2.24 Whilst 'rules of thumb' can be applied, development specific details are required to improve predictions. Although in many instances, the larger the visual stimuli the greater the disturbance response, counter-intuitively this is not always the case and a large plant undertaking vigorous work may cause less disturbance than a single worker walking along the floodbank, particularly if walking onto the intertidal zone. A single sudden sound will generally cause more disturbance than a constant or regular noise regardless of noise level, e.g. a dropped piece of scaffold at 65dB will cause a greater disturbance reaction than ongoing vibration piling at 80dB. Habituation to a stimuli will also usually entail a reduction in the level of reaction - this applies to both visual and noise related disturbance. An exception to this is if multiple stimuli occur at the same time e.g. walkers, works and planes. In this case an effect called facilitation may occur, where a greater reaction than expected is observed (Cutts *et al*, 2013).

4.2.25 As part of discussions involving the adjacent Net Zero Teesside Project, Natural England officers advised that a 70 dB metric was appropriate to use for impact assessment regarding the Teesmouth and Cleveland Coast SPA / Ramsar. Natural England confirmed that the birds of the SPA / Ramsar site are tolerant of a wide range of noise variation, including levels higher than those to which they are currently exposed at Coatham Dunes (bp, 2022). Consultation with Natural England undertaken for this project has indicated that the potential change in baseline noise levels should also be considered (refer to ES chapter 12: Ecology and Nature Conservation, for further information on consultation). A change in noise levels of 3 dB has been used to screen the potential for LSE within this HRA. 3 dB is the smallest change in noise that can be perceived as a change; it is not a damage or impact threshold but merely identifies the need for further consideration as there

is a considerable difference between a sound being perceptible and it being disturbing.

4.2.26 As an Engineering, Procurement and Construction (EPC) Contractor is yet to be appointed, site-specific details on the construction activities, programme and numbers and types of construction plant are not yet available. Therefore, worst case construction noise predictions have been undertaken using the calculation methods set out in BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (BSI, 2014a), using the expected construction programme and methods of working, based on current understanding at this stage in the design of the Proposed Development (refer to ES Chapter 11: Noise and Vibration [APP-063]. The indicative construction programme for the Proposed Development is set out in Chapter 5: Construction Programme and Management [APP-057].

4.2.27 The following assumptions have been made with regard to the construction phase of the Proposed Development:

- Main Site and compound establishment activities are assumed to take place in the whole of the compound extent. Activities have their listed programme duration for quarterly analysis.
- Main Site and compound construction activities are modelled as area sources.
- Pipeline construction methodology is assumed to be the same for each pipeline regardless of the type of material they transport once operational. Only changes from pipeline construction come from pipeline types (e.g buried, above ground or trenchless crossing), their corresponding plant list, programme and proposed layout.
- It is assumed that Phase 1 of the Proposed Development will be operational and running from 2028 onwards. Noise contribution from the operational Phase 1 is considered for construction noise predictions after 2028.
- As a worst-case scenario, the Main Site and compound construction average monthly noise levels and the highest daily output of worst-case pipeline construction works are combined (decibel addition) to provide the total predicted construction noise levels.
- The highest construction noise level is presented for each pipeline construction activity rather than all activities at once, as only one activity could occur at the closest approach at any one time.
- Pipeline construction has been assumed to take place at the nearest part of the Connection Corridors to Noise Sensitive Receptors.
- Pipeline construction activities and plant have been assumed to be in constant operation through the 07:00 to 19:00 working day, for further information see Appendix 11A [APP-198].
- Predictions made for construction noise in the evening and night-time period for residential NSRs assume the same intensity of operation as during the

daytime for activities listed to have working periods of 24/7 or extended hours outside the standard construction hours as detailed in Appendix 11A: Construction Noise Levels and Assumptions [APP-198], activities listed to have standard working hours are solely assessed for daytime noise emissions.

4.2.28 Noise construction effects have been assessed for:

- Construction of the Hydrogen Production Facility;
- Construction of the connection corridors; and
- Temporary construction compounds (including accounting for the changes to compounds and compound activities proposed as part of the Category C Changes in the Change Request Application).

4.2.29 Figures 7 to 12 show the predicted noise levels for the construction phase of the Proposed Development in the absence of mitigation. These have been updated to account for the changes to construction compound locations and activities proposed as part of the Category C Changes in the Change Request Application.

Noise Disturbance within the Teesmouth and Cleveland Coast SPA and Ramsar Site Boundaries

4.2.30 The following activities will result in noise levels of up to or above 70 dB within the designated site boundaries, or changes in baseline noise above 3 dB, and therefore have the potential to disturb qualifying bird species:

- Piling;
- Fencing and preparatory construction works;
- Buried pipeline construction;
- Above ground pipeline construction;
- Pipeline testing; and
- Horizontal directional drilling.

4.2.31 As the above activities have the potential to disturb the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar they are screened into Appropriate Assessment.

Noise Disturbance within Functionally Linked Land for Birds

Right of Way Fencing and Preparatory Construction Works

4.2.32 Right of Way (ROW) fencing and preparatory construction works involve lorry movements on access roads, lifting using a telehandler, and vegetation clearance described in Chapter 5: Construction and Programme Management [APP-057] and Appendix 11A: Construction Noise Levels and Assumptions [APP-198] and as updated in the Change Application. These activities will be site-wide; however, work will not take place in all areas simultaneously and the exact nature of the works will not be known until works commence (for example, use of chainsaws will not be needed at all locations). Therefore, the distance bands shown in Figure 7 have been

modelled based on a precautionary approach and assume the worst-case scenario. Table 4-4 summarises the sectors which have the potential to be affected by noise levels at or above 70 dB or a change in noise greater than 3 dB. Where numbers are greater than or equal to 1% of the SPA or Ramsar qualifying population the species name is highlighted in bold.

Table 4-4: Qualifying Bird Species Recorded within Sectors Affected by Noise – ROW Fencing and Preparatory Works

SURVEY AREA	SECTORS AFFECTED BY NOISE ABOVE 70 DB OR A CHANGE GREATER THAN 3DB	QUALIFYING BIRD SPECIES RECORDED WITHIN AFFECTED SECTORS[3]
The Foundry	3, 3a, 4, 5, 5a, 8, 8b, 9, 10, 11, 12, 13, 14, 15, 16, 17, [redacted], 19.	3a: black-headed gull, lapwing, redshank. 8: black-headed gull, herring gull 9: black headed gull, herring gull. 10: Herring gull 11: none recorded 12: Herring gull 13: Herring gull 14: black headed gull, herring gull, lapwing, sandwich tern. 15: Herring gull, lapwing, black-headed gull, gadwall. 16: black headed gull,, gadwall, herring gull, lapwing, redshank, wigeon. 17: none recorded. [redacted]
Seal Sands	23a, 23b, 22, [redacted] 17, 21, 2, 4, G5, G4, G3, 24.	23: none recorded 23a: black headed gull 23b: gadwall 22: black headed gull [redacted] 17: black-headed gull, common tern,, gadwall, herring gull, redshank. 21: black-headed gull, common tern,, gadwall, herring gull, redshank, wigeon, lapwing. 2: lapwing, black-headed gull, redshank.

[3] Species highlighted in bold occurred in numbers >1% of the SPA or Ramsar qualifying population.

SURVEY AREA	SECTORS AFFECTED BY NOISE ABOVE 70 DB OR A CHANGE GREATER THAN 3DB	QUALIFYING BIRD SPECIES RECORDED WITHIN AFFECTED SECTORS[3]
		4: black-headed gull, gadwall, redshank, shoveler. [redacted] black-headed gull, common tern, gadwall, lapwing, redshank, wigeon. G4: black-headed gull, gadwall, lapwing, shoveler, redshank. [redacted]
North Tees Marshes	G1, [redacted] B1, B2, B3, B4, B5, B6, B14.	G1: Black-headed gull, gadwall, herring gull, lapwing, redshank, shoveler, wigeon. [redacted] B1: gadwall, lapwing, shoveler. B2: wigeon. B3: lapwing, shoveler. B4: lapwing, gadwall, shoveler. B5: black-headed gull, gadwall, lapwing, redshank, ruff, shoveler, wigeon. B6: black-headed gull, lapwing, redshank, shoveler, gadwall, wigeon. B14: black-headed gull, lapwing, redshank.

4.2.33 As there is potential for noise during ROW and preparatory works to affect the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar, this is screened into Appropriate Assessment.

Construction of the Hydrogen Production Facility and Compounds

4.2.34 Construction of the hydrogen production facility will involve compound establishment, piling and foundation works, road construction and general site activities. Figure 8 shows that noise from the Main Site will be under 70 dB, and noise from construction compounds will be up to or equal to 75 dB.

4.2.35 The nearest noise monitoring location to the main site is H5, which has a LAeq, T of 51 dB during the daytime and 44 dB at night-time. Noise from the Main Site and

construction compounds has the potential to result in a change in baseline conditions equal to or above 3 dB affecting the following sectors: 3, 4, 5, 5a, , 8, 8b, 9, 10, 11, 12, 13, 14, 15.

4.2.36 The following qualifying bird species have been recorded within the sectors affected by noise (the preceding numeral is the sector). Where the species name is highlighted in bold, numbers recorded were greater than or equal to 1% of the SPA qualifying population.

- 8: black-headed gull, herring gull.
- 8b: none recorded
- 9: herring gull, black-headed gull
- 10: herring gull
- 12: herring gull
- 13: herring gull
- 14: black-headed gull, herring gull, lapwing, sandwich tern
- 15: black-headed gull, herring gull, gadwall, lapwing

4.2.37 As there is a potential perceptible difference in noise levels during the construction of the Hydrogen Production Facility, this is taken forward to Appropriate Assessment.

4.2.38 There are also construction compounds proposed within sectors G4 B1 and 25. In the absence of mitigation, noise from these compounds has the potential to affect the following sectors and species. Where the species name is highlighted in bold, numbers recorded were greater than or equal to 1% of the SPA qualifying population.

- G1: black-headed gull, herring gull, gadwall, lapwing, redshank,, shoveler, wigeon.
- [redacted] black-headed gull, common tern, gadwall, lapwing, redshank, ruff, shoveler, wigeon.
- [redacted] black-headed gull, common tern, gadwall, lapwing, redshank, shoveler, wigeon.
- G4: black-headed gull, gadwall, lapwing, shoveler, redshank.
- B1: gadwall, lapwing, shoveler.
- B2: wigeon
- B4: lapwing, gadwall, shoveler
- B5: black-headed gull, gadwall, lapwing, ruff, shoveler, redshank, wigeon.
- B14: black-headed gull, lapwing, redshank.
- 25: lapwing, herring gull, redshank, black-headed gull, sanderling.

4.2.39 As there is a potential perceptible difference in noise levels from construction compounds, this is taken forward to Appropriate Assessment.

Construction of the Connection Corridors – Above Ground

4.2.40 Above ground construction of the pipeline corridors will involve pipeline storage and stringing, lorry movements along access roads, fabrication and ancillary works.

4.2.41 Figure 9 shows the noise distance bands modelled for the construction of the above ground connection corridors. The following sectors and bird species could be subject to noise exceeding 70 dB o or a change in baseline noise levels greater than 3 dB. Where the species name is highlighted in bold, numbers recorded were greater than or equal to 1% of the SPA qualifying population.

- G1: black-headed gull, herring gull, gadwall, lapwing, redshank, shoveler, wigeon.
- 16: black headed gull, gadwall, herring gull, lapwing, redshank, wigeon.
- 17: none recorded
- [redacted] black headed gull, common tern, gadwall, herring gull, lapwing, redshank.

4.2.42 As there is a potential perceptible difference in noise levels during the construction of above ground pipeline corridors, this is taken forward to Appropriate Assessment.

Construction of the Connection Corridors – Below ground

4.2.43 Below ground construction of connection corridors will involve topsoil strip, dewatering, pipe storage and stringing, fabrication and ancillary works, concrete coating, lower and lay and backfill and reinstatement. Table 4-5 summarises the sectors have the potential to be affected by noise 70 dB or over or a change in noise above 3 dB. Where species have been recorded in numbers equal to or above 1% of the SPA qualifying population the names are highlighted in bold.

Table 4-5: Qualifying Bird Species with the Potential to be Affected by Noise – Below Ground Connection Corridors

SURVEY AREA	SECTORS AFFECTED BY NOISE ABOVE 70 dB OR A 3 dB CHANGE	QUALIFYING BIRD SPECIES AFFECTED
The Foundry	12, 13, 15, 15a	12: Herring gull 13: Herring Gull 15: Herring gull, lapwing, black-headed gull, gadwall. 15a: none recorded
Seal Sands	23, 23a, 23b, 22 [redacted] 17, 17a, 21, 21a, 2, [redacted] G4	23: none recorded 23a: black headed gull 23b: gadwall

SURVEY AREA	SECTORS AFFECTED BY NOISE ABOVE 70 dB OR A 3 dB CHANGE	QUALIFYING BIRD SPECIES AFFECTED
		22: black headed gull [redacted] 17: black-headed gull, common tern, gadwall, herring gull, redshank. 17a: common tern, redshank, black-headed gull. 21: black headed gull, herring gull, lapwing, redshank, wigeon, common tern, gadwall, wigeon. 21a: none recorded. 2: lapwing, black-headed gull, redshank. [redacted] G4: black-headed gull, gadwall, lapwing, shoveler, redshank.
North Tees Marshes	G1, B1, B2, B3, B4, B5, B6	G1: Black-headed gull, gadwall, herring gull, lapwing, redshank, shoveler, wigeon. B1: gadwall, lapwing, shoveler. B2: wigeon. B3: lapwing, shoveler. B4: lapwing, gadwall, shoveler. B5: black-headed gull, gadwall, lapwing, redshank, ruff, shoveler, wigeon. B6: black-headed gull, lapwing, redshank, shoveler, gadwall, wigeon.

4.2.44 As there is a potential perceptible difference in noise levels during the construction of below ground pipeline corridors, this is taken forward to Appropriate Assessment.

Pipeline Testing

4.2.45 Pipeline testing involves the use of a compressor and diesel generator. Figure 11 shows the predicted noise levels during pipeline testing. Table 4-6 summarises the sectors which have the potential to be subject to noise over 70 dB or a change compared to baseline noise exceeding 3 dB. Where qualifying bird species were recorded in numbers equal to or greater than 1% of the SPA qualifying population the species name is highlighted in bold.

Table 4-6: Sectors and Qualifying Bird Species with the Potential to be Affected by Noise During Pipeline Testing

SURVEY AREA	SECTORS AFFECTED BY NOISE OVER 70dB OR A CHANGE OVER 3dB	QUALIFYING BIRD SPECIES RECORDED WITHIN SECTORS
The Foundry	3a, 8, 8b, 9, 10, 11, 12, 13, 14, 15, 16, 17, [redacted]	3a: black-headed gull, lapwing, redshank. 8: black-headed gull, herring gull. 8b: none recorded. 9: black headed gull, herring gull. 10: herring gull 11: none recorded 12: herring gull 13: herring gull 14: black headed gull, herring gull, lapwing. 15: Herring gull, lapwing, black-headed gull, gadwall 16: black headed gull, gadwall, herring gull, lapwing, redshank, wigeon. 17: none recorded. [redacted]
Seal Sands	23, 23a, 23b, 22, [redacted] 21a, 21, 17, 17a, 2, 4, G5, G4, 25.	23: none recorded 23a: black headed gull 23b: gadwall 22: black headed gull [redacted] 21a: none recorded 21: black headed gull, herring gull, lapwing, redshank, wigeon, common tern, gadwall. 17: black-headed gull, common tern, , gadwall. Herring gull, redshank. 17a: common tern, redshank, black-headed gull. 25: black headed gull, herring gull, lapwing, redshank, sanderling.
North Tees Marshes	G1, [redacted] B1, B2, B3, B4, B5, B6, B13, B14.	G1: Black-headed gull, gadwall, herring gull, lapwing, redshank, shoveler, wigeon. [redacted]

SURVEY AREA	SECTORS AFFECTED BY NOISE OVER 70dB OR A CHANGE OVER 3dB	QUALIFYING BIRD SPECIES RECORDED WITHIN SECTORS
		[redacted] B1: gadwall, lapwing, shoveler. B2: wigeon. B3: lapwing, shoveler. B4: lapwing, gadwall, shoveler. B5: black-headed gull, gadwall, lapwing, redshank, ruff, shoveler, wigeon. B6: black-headed gull, lapwing, redshank, shoveler, gadwall, wigeon. B13: lapwing. B14: black-headed gull, lapwing, redshank.

4.2.46 As there is a potential perceptible difference in noise levels during pipeline testing, this is taken forward to Appropriate Assessment.

HDD

4.2.47 HDD will be used at the following locations:

- Dabholm Gut (HDD Site 1) and Navigator Terminals to cross the River Tees;
- Venator and Sabic brine fields to cross Greatham Creek;
- Sabic Brinefields
- Sabic Brinefields and Seal Sands Road
- Cowpen Bewley to cross the existing railway.

4.2.48 The estimated working hours and timescales for the works are provided in the outline construction methodology in Chapter 5: Construction Programme and Management [APP-057].

4.2.49 Figure 12 shows the HDD locations and the predicted noise levels.

4.2.50 At HDD Site 1, noise over 70 dB or a change in baseline noise over 3 dB is predicted within sectors 14, 16 and 18. Black-headed gull, , gadwall, herring gull, lapwing, and redshank were recorded within Sector 16 and black headed gull, common tern, gadwall, herring gull, lapwing and redshank were recorded in Sector 18. Black-headed gull, herring gull, lapwing and sandwich tern were recorded within Sector 14.

4.2.51 At HDD Site 2, Sector 25, noise is predicted to be between 60 and 65 dB which is below the 70 dB disturbance threshold. Noise monitoring location H4 is located closest to HDD site 2 and the LAeq, T during the daytime was 51 dB. This would result in a change in noise levels greater that 3 dB. Black-headed gull, , herring gull,

lapwing, sanderling, redshank, sandwich tern and wigeon were recorded within Sector 25.

4.2.52 Noise monitoring location Eb2 is located closest to HDD Site 3 and the LAeq,T during daytime was 67 dB and at night-time this was 62 dB. Noise equal to or over the 70 dB threshold is predicted to affect sectors 22, 23, 23a and 23b. Black headed gull was recorded within Sector 22. No qualifying species were recorded within Sector 23. Black headed gull was recorded within 23a and gadwall was recorded within 23b. Black-headed gull and gadwall were recorded in numbers below 1% of the SPA qualifying population.

4.2.53 Noise monitoring location Eb3 is closest to HDD Site 4 and the LAeq,T during the daytime was 48 dB and at night-time this was 46 dB. At HDD Site 4, noise equal to or over the 70 dB threshold is predicted to affect Sectors G4, [redacted] 2 and 4. Black-headed gull, gadwall, lapwing, shoveler, redshank were recorded at G4. [redacted] black-headed gull, common tern, gadwall, lapwing, redshank, teal and wigeon were recorded at [redacted] Lapwing, black-headed gull and redshank were recorded within sector 2 and black-headed gull, gadwall, redshank, shoveler and teal were recorded within Sector 4. Noise over 55 dB (a 3 dB increase on baseline levels) has the potential to affect sectors within a wider area including 22, 22a, 22b, 22c, 22d, 22e, 21, 21a, 17 and 17a. A likely significant effect would typically be a change in noise levels greater than 3 dB. However, it is generally accepted that noise under 55 dB would not result in disturbance irrespective of the degree of change. Generally, research has shown that above noise levels of 84 dB waterfowl show a flight response, while at levels below 55 dB there is no effect on their behaviour.

4.2.54 At HDD Site 5, baseline noise levels are likely to be similar to Eb3. Noise over 55 dB (up to 85 dB) is predicted to affect sector G4 which would be a change in noise levels greater than 3 dB. Black-headed gull, gadwall, lapwing, shoveler, redshank were recorded at G4.

4.2.55 At HDD Site 6, noise above or equal to 60 dB is predicted to affect sectors G4 and 24. Baseline noise levels are likely to be similar to Eb3 so 60dB would be a change in noise levels greater than 3 dB. Black-headed gull, gadwall, lapwing, shoveler, redshank were recorded at G4 and black-headed gull, gadwall, herring gull, lapwing, shoveler, wigeon, [redacted]

4.2.56 Noise monitoring location H1 is closest to HDD Site 7, and the LAeq,T during the daytime was 50 dB and at night-time 44 dB. Noise between 55 and 60 dB is predicted to affect Sectors B3, B6 and B13 which is a change in baseline noise greater than 3 dB. Lapwing and shoveler were recorded within B3 and gadwall, redshank, shoveler and wigeon were recorded within B6.

4.2.57 As there is a potential perceptible difference in noise levels during HDD, this is taken forward to Appropriate Assessment.

Summary

4.2.58 The Teesmouth and Cleveland Coast SPA/Ramsar site harbours qualifying species throughout the entire year, and visual and noise disturbance associated with construction / decommissioning work is thus not a seasonal issue. It requires

consideration throughout the entire year. However, only some parts of the SPA / Ramsar are used for nesting by the breeding species.

4.2.59 [redacted]

4.2.60 Noise and visual disturbance of all other non-breeding and breeding interest features of the Teesmouth & Cleveland Coast SPA / Ramsar are screened into Appropriate Assessment.

4.2.61 Noise disturbance for all other sites listed in Tables 3-1 and 3-2 can be screened out due to distance.

Marine Mammals

4.2.62 Within the wider area which surrounds the Proposed Development Site there are four SACs designated for marine mammals:

- Berwickshire and North Northumberland Coast SAC (approximately 87 km to the north; designated partly for grey seal),
- the Humber Estuary SAC (approximately 106 km to the south-east; designated partly for grey seal),
- Southern North Sea SAC (approximately 101 km to the east; designated partly for harbour porpoise).
- The Wash and North Norfolk Coast SAC (approximately 187 km to the south-east; designated partly for harbour seal).

4.2.63 All these qualifying marine mammal species are mobile and might travel far beyond the designated site boundaries. Therefore, it cannot be excluded that the Proposed Development (or the area immediately surrounding it) might perform a role in supporting these qualifying species.

4.2.64 The Proposed Development Site is located within the International Council for the Exploration of the Sea (ICES) Greater North Sea Ecoregion, which in part forms the boundaries for the Inter-Agency Marine Mammal Working Group (IAMMWG) Marine Mammal Management Units (MUs) for the North Sea (ICES, 2021; IAMMWG, 2022).

4.2.65 The presence of harbour and grey seals within the Teesside area is well known, including abundances, seasonality, and known haul out locations (locations on land where seals come ashore to rest, moult or breed) for these species. The immediate area around the Proposed Development Site is of local importance for harbour seal and grey seal due to the presence of a breeding colony and haul-out sites at Seal Sands and along Greatham Creek. Harbour seals are the most abundant (INCA, 2022).

Harbour Seal

4.2.66 Seal Sands is a known haul-out site for a breeding colony of harbour seal, which use the intertidal mudflats in this area. Greatham Creek is also known to be frequented by small numbers of individuals, which haul-out at multiple locations along the creek, particularly at Bailey Bridge.

4.2.67 Seals Sands and its population in the River Tees, is the only significant haul-out site within the NE England MU (Natural Environment Research Council Special Committee on Seals, 2021), which also includes harbour seals found at Holy Island, situated off the north-east coast of England, south of Berwick-upon-Tweed.

4.2.68 Incidental sightings of harbour seals were recorded on Seal Sands during Proposed Development related surveys, on nine different days between October 2022 and March 2023. A total of 144 were recorded across this period and all were considered to be adults. The seals were observed hauled-out at scattered locations on Seal Sands and in Greatham Creek.

4.2.69 The maximum number of harbour seal in the Tees Estuary has increased overall since 2010, with the highest estimate recorded to date observed in August 2022 with 162 individuals (INCA, 2022). This included 36 pups, the highest number and increase recorded. There were also no pup deaths reported during weaning in 2022, being the highest survivability rate recorded since 1989. Within the Tees Estuary, pupping is known to take place mostly at Seal Sands, with some also at Bailey Bridge.

4.2.70 The pupping season at the Tees typically occurs during late June and lasts for about three weeks into late July, typical of other populations in the north-east Atlantic (INCA, 2022). The moulting season follows, typically from mid-August until early September, when seals spend a considerable amount of time out of the water to rest and conserve heat.

4.2.71 Although harbour seals are present within the vicinity of the Proposed Development Site and are likely to use the adjacent sea area for foraging, in the context of wider populations in the North Sea, the immediate Study Area is not considered to be heavily used by this species compared to other areas around the UK coast (refer to ES Chapter 14: Marine Ecology for further detail).

Grey Seal

4.2.72 The Proposed Development Site and the wider Tees area falls within the North-east England Seal MU. Within this management unit there are major colonies of grey seals in both the north (Isle of May, Fast Castle, Farne Islands) and south (Donna Nook, Blakeney Point and Horsey/Winterton), either side of the Tees area (refer to ES Chapter 14 for further detail).

4.2.73 The latest count of grey seals in the North Sea, which included the North-east England MU, as well as East Scotland and Southeast England MUs, took place in between 2016-2018 and was estimated at 19,160 individuals (Natural Environment Research Council Special Committee on Seals, 2021). Pup production in North-east England has continued to increase rapidly with a mean increase of 53% between

2014 and 2019. Most of the increase in the North Sea has been due to the continued rapid expansion of newer colonies on the mainland coasts in Berkwickshire, Lincolnshire, Norfolk and Suffolk.

4.2.74 Grey seals forage in the open sea in depths up to 100 m and, like harbour seals, they return regularly to haul-out on land where they rest, moult and breed. They may range widely to forage, with foraging trips lasting between 1 to 30 days (Natural Environment Research Council Special Committee on Seals, 2021). Modelling has shown that grey seals typically spend 43% of their foraging time within 10 km of a haul-out site (McConnell et al., 1999), with maximum foraging range believed to be up to 135 km (Natural Environment Research Council Special Committee on Seals, 2020).

4.2.75 Seal Sands site on the River Tees is an important haul-out site for this species, although the grey seal population here is smaller than that for harbour seals (INCA, 2022). However there has been an overall increase in the grey seal population since 2010. Maximum recordings of individuals on Seal Sands were down between 2018 and 2020. However, a peak count of 96 individuals was recorded in August 2022, when all grey seals counted were hauled-out on Seal Sands, suggesting that population size is increasing.

4.2.76 Incidental sightings recorded during Proposed Development related surveys on nine different days between October 2022 and March 2023 observed 94 adult grey seals, all hauled-out on Seal Sands.

4.2.77 In December 2022, a grey seal pup at Seal Sands was recorded alongside an adult female, which is thought to be the first observation of a grey seal born in the Tees (INCA, 2022). Grey seals are also known to use Greatham Creek but are only occasionally recorded there in small numbers.

4.2.78 Although grey seals are present within the Study Area and are likely to use the adjacent sea area for foraging, in the context of the populations in the wider North Sea the Study Area is not considered to be heavily used by this species.

Noise and Visual Disturbance - Seals

4.2.79 The potential for noise and visual disturbance to affect harbour seals and grey seals is considered in ES Chapter 14: Marine Ecology. Construction activities associated with the Proposed Development will create airborne sound and changes in visual cues which have the potential to disturb seals that are hauled-out nearby or have surfaced. The effects of disturbance could include a cessation of feeding, travelling, resting, breeding and/or socialising. Long-term effects of repeated disturbance could include a permanent displacement and/or a decline in fitness and productivity (such as moulting and breeding success).

4.2.80 Noise and visual disturbance of grey seals and harbour seals within functionally linked land (qualifying features of the Berwickshire and North Northumberland Coast SAC, the Humber Estuary SAC and the Wash and North Norfolk Coast SAC) are taken forward to Appropriate assessment.

Harbour Porpoise

4.2.81 The Southern North Sea SAC, which is designated for harbour porpoise, is located over 100 km away from the Proposed Development Site. The Planning Inspectorate have agreed that effects upon the Southern North Sea SAC can be scoped out of the ES as there are no impact pathways from underwater sound arising from the proposals (Appendix 1B (EN070009/APP/6.4). As such, LSE upon harbour porpoise is also screened out.

Migratory Fish

4.2.82 Two sites to the north of the Proposed Development are designated for migratory fish; the River Tweed SAC (direct distance approximately 107 km north) and the Tweed Estuary SAC (direct distance approximately 135 km north). The River Tweed SAC is designated for Atlantic salmon and sea lamprey, while the Tweed Estuary SAC is designated for sea lamprey only. The aforementioned Humber Estuary SAC (106 km south) is also designated partly for sea lamprey. These species are anadromous (i.e. spawn upstream in rivers) and complete their life cycle in the sea. Atlantic salmon in particular are known to undertake long migratory journeys in the sea during their adult life stage. Therefore, it was considered to what extent the Proposed Development could interfere with fish migration routes along the east coast of England.

4.2.83 While river lamprey might use functionally linked habitat beyond the designated site boundary, they are not migratory and there will not be Likely Significant Effects from the Proposed Development due to the separation distances between the Site the Tweed Estuary SAC, the River Tweed SAC or the Humber Estuary SAC.

4.2.84 The proposed connection routes will cross under the River Tees and Greatham Creek by HDD, and there is potential for noise and vibration arising from construction to affect migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect Atlantic salmon and sea lamprey (qualifying features of the River Tweed SAC, the Tweed Estuary SAC and Humber Estuary SAC) will be taken forward to Appropriate Assessment.

Atmospheric Pollution

4.2.85 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2) and are summarised in Table 4-1. Ammonia can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges (CEH, 2016a). NOx can also be toxic at very high concentrations (far above the annual average Critical Level). However, in particular, high levels of NOx and NH_3 are likely to increase the total nitrogen deposition to soils, potentially leading to deleterious effects in resident ecosystems. For example, an increase in the total nitrogen deposition from the atmosphere is widely known to enhance soil fertility and to lead to eutrophication. This often has adverse effects on the community composition and quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats (Wolseley et al, 2006; Dijk, 2011). The total nitrogen deposition resulting from a plan or project is therefore often assessed as the overarching parameter determining atmospheric pollution.

4.2.86 The only pollutants likely to be associated with construction of the Proposed Development are NOx and ammonia, which will be primarily determined by the associated traffic movements (relating to both on-site construction traffic and commuter traffic) and any diesel plant required for construction or decommissioning.

Table 4-7: Main Sources and Effects of Air Pollutants on Habitats and Species (CEH, 2016b)

POLLUTANT	SOURCE	EFFECTS ON HABITATS AND SPECIES
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilization of animal wastes. It is a naturally occurring trace gas, but ammonia concentrations are directly related to the distribution of livestock. It also derives from some vehicle exhausts. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_{4+}) - containing aerosol. Due to its significantly longer lifetime, NH_{4+} may be transferred much longer distances (and can therefore be a significant trans-boundary issue). While ammonia deposition may be estimated from its atmospheric concentration, the deposition rates are strongly influenced by meteorology and ecosystem type.	The negative effect of NH_{4+} may occur via direct toxicity, when uptake exceeds detoxification capacity and via N accumulation. Its main adverse effect is eutrophication, leading to species assemblages that are dominated by fast-growing and tall species. For example, a shift in dominance from heath species (lichens, mosses) to grasses is often seen. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides (NOx)	Nitrogen oxides are mostly produced in combustion processes. Half of NO_X emissions in the UK derive from motor vehicles, one quarter from power stations and the rest from other industrial and domestic combustion processes. In contrast to the steep decline in Sulphur dioxide emissions, nitrogen oxides are falling slowly due to control strategies being offset by increasing numbers of vehicles.	Direct toxicity effects of gaseous nitrates are likely to be important in areas close to the source (e.g. roadside verges). A critical level of NOx for all vegetation types has been set to 30 ug/m^3. Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) contributes to the total nitrogen deposition and may lead to both soil and freshwater acidification. In addition, NOx contributes to the eutrophication of soils and water, altering the species composition of

POLLUTANT	SOURCE	EFFECTS ON HABITATS AND SPECIES
		plant communities at the expense of sensitive species.
Nitrogen deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g. NO_X) or reduced (e.g. NH_3) nitrogen emissions (described separately above). While oxidized nitrogen mainly originates from major conurbations or highways, reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	All plants require nitrogen compounds to grow, but too much overall N is regarded as the major driver of biodiversity change globally. Species-rich plant communities with high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as well as many graminoid (grass) species. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.

4.2.87 The Air Pollution Information System (APIS) forms the major source of information regarding the air quality impact pathway. It specifies a NOx concentration (Critical Level) for the protection of vegetation of 30 µg/m^{-3}. In addition, ecological studies have determined 'Critical Loads' for atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3).

4.2.88 There are no construction period stack emissions. [redacted] An assessment of plans and projects (as required by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations')) likely to generate road traffic emissions to air which are capable of affecting European Sites has been completed (See Annex G Applicant Consideration of Natural England's Steps on advising a competent authority on the HRA of a road traffic project), following Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations. Natural England guidance[4] identifies that traffic exhaust emissions are only relevant to ecological receptors located within 200m of the source. Further details on the assessment of cumulative road traffic emissions impacts using the NAE001 Methodology are included in Annex G.

[4] Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations - NEA001

4.2.89 

4.2.90 Therefore construction period air quality impacts on European sites are screened out from appropriate assessment.

Changes in Water Quality (including Nutrient Neutrality)

4.2.91 There is potential for changes in water quality resulting from:

- disturbance of contaminated soils and perched groundwater, and the creation of new pathways to sensitive receptors (including construction workers and controlled waters) during construction;
- pollution of surface watercourses within or near the Proposed Development Site during construction and decommissioning, due to spillages or polluted surface water run-off entering a watercourse.

4.2.92 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support, and therefore integral to meeting a site's Conservation Objectives. Poor water quality can have a range of environmental impacts. At high concentrations, toxic chemicals and heavy metals can result in the immediate death of aquatic life (both flora and fauna). At lower concentrations, negative impacts may be more subtle and could increase vulnerability to disease or change the behaviour of wildlife. These substances, especially Polychlorinated Biphenyls (PCBs), accumulate in minuscule benthic organisms and then biomagnify as they are passed up the food chain. Furthermore, they are not easily biodegraded over time. Overall, there are two broad types of toxic compounds in aquatic environments, namely synthetic and non-synthetic (i.e. naturally occurring) substances.

4.2.93 Toxic contamination may arise from synthetic toxic compounds, such as pesticides, PCBs (polychlorinated biphenyls) and biocides. Some of these substances are endocrine disrupting chemicals, which have the capacity to mimic animal hormones, prevent their production or breakdown. As discussed above, many of the synthetic compounds tend to accumulate over time and are likely to be present in animal tissue or substrate for long periods of time. Another factor in determining the magnitude of water pollution is the amount of hydrological mixing and tidal flushing that a site receives.

4.2.94 Non-synthetic compounds, such as fuel oils and heavy metals, occur in the environment naturally at relatively low concentrations, but become toxic at higher

concentrations. Oil pollution is particularly damaging (and persistent) in intertidal environments, where natural degradation and weathering of oils is slow. Aside from their significant contribution to nutrient levels, Wastewater Treatment Works (WwTWs) are also major contributors of heavy metals, such as zinc, lead, copper and nickel. Heavy metal pollution might change the benthic assemblages in intertidal habitats. For example, it was demonstrated that a high concentration of heavy metals resulted in less diverse communities with lower overall abundances of crustaceans and polychaetes (Stark, 1998). The Teesmouth and Cleveland Coast SPA / Ramsar is designated for its breeding tern and [redacted] and overwintering waterfowl. While aquatic pollutants may have direct effects on SPA / Ramsar birds, it is the indirect effects of synthetic and non-synthetic compounds on their supporting habitats and prey species that are of greatest concern. Natural England's SIP for the SPA / Ramsar indicates that past improvements to wastewater treatment and catchment management have significantly reduced the input of nutrients and contaminants into the Tees (Natural England, 2014a). However, the SIP still identifies water pollution as a concern for the SPA / Ramsar because contaminants from historic pollution events are stored in the sediments, potentially still affecting the benthic fauna.

4.2.95 To establish the ecological baseline communities, a Phase 1 study and macroinvertebrate sampling was undertaken in sites relevant to the Proposed Development. These included Greatham Creek and Bran Sands. The saltmarsh habitat located around Greatham Creek is comprised of species such as annual sea-blite (*Suaeda maritima)*, common saltmarsh-grass (*Puccinellia maritima)*, sea plantain (*Plantagon maritima)*, greater sea-spurrey (*Spergularia media)*, sea lavender (*Limonium vulgare)*, long-spiked glasswort (*Salicornia dolichostacha)*, yellow glasswort (*Salicornia fragilis)*, sea aster (*Aster tripolium)*, sea arrowgrass (*Triglochin maritima)* and saltmarsh rush (*Juncus gerardii)*. Bran Sands is an area of intertidal muddy sandflats to the north of the Proposed Development. The results show that Bran Sands supports relatively complex and diverse benthic communities, including species such as common cockle (*Cerastoderma edule)* and lugworm (*Arenicola marina*).

4.2.96 While none of the species of the infaunal community are qualifying features of the SPA / Ramsar, they are likely to be integral food sources for qualifying waders, including redshank and knot. These species forage on a range of species, such as molluscs and crustaceans. By affecting the prevailing water quality, the Proposed Development might reduce the abundance and diversity of benthic invertebrates, which could have a knock-on effect on the qualifying bird species. This is particularly important because, despite the industrialised nature of the surrounding area, chemical sediment analysis has shown no evidence of high contaminant levels that might affect benthic habitat and / or species.

4.2.97 It is considered that the potential for toxic contamination of European sites during the construction phase is an issue that requires further consideration, given that in places the SPA/Ramsar site lies adjacent to the Proposed Development Site, and in some instances overlaps with the boundary. Given the short distance involved, there is potential for toxic runoff and leachate reaching sensitive ecological

receptors. This impact pathway is screened in for Appropriate Assessment regarding the Teesmouth and Cleveland Coast SPA / Ramsar as it could affect the ability of the site to achieve its Conservation Objectives by impacting the supporting processes on which the qualifying features of the SPA/Ramsar rely.

4.2.98 During the construction / decommissioning phase of the Proposed Development, non-toxic wastewater will be primarily produced by toilets for construction / decommissioning staff. This will be treated on-site using package plant with effluent disposed off-site (i.e. not discharged into local watercourses). Therefore, it is concluded that organic pollution from sewage effluent is not an issue for the construction or decommissioning period. Construction / decommissioning period treated wastewater impacts on the Teesmouth and Cleveland Coast SPA / Ramsar are therefore screened out from Appropriate Assessment as there is no mechanism for it to affect the Conservation Objectives of the site.

4.2.99 In summary, the Proposed Development is screened in for Appropriate Assessment due to potential water quality impacts during construction / decommissioning as a result of oil, fuel and chemical spillages resulting in toxic surface run-off and leachate into the Teesmouth and Cleveland Coast SPA / Ramsar.

4.3 Operational Period

Visual and Noise Disturbance

4.3.1 Once complete, the Proposed Development will be operational 24 hours a day. An assessment of the potential for visual and noise disturbance during the operational period was therefore undertaken. It is considered that activity within the Main Site options would not result in significant visual disturbance of qualifying birds in the Teesmouth and Cleveland Coast SPA / Ramsar because the site of the Proposed Development has a long history of industrial use and the overwintering birds in this SPA / Ramsar have traditionally been used to activity from site staff even though numbers of people in the area have been low in recent years.

4.3.2 Disturbance within the Main Site will be limited once the Proposed Development becomes operational. Typical activities will include the arrival and departure of site staff; the average daily operational traffic will comprise fewer than 15 Heavy Goods Vehicles (HGVs) and approximately 50 light vehicles during regular operations. Some external lighting would be required to ensure that the Hydrogen Production Facility can operate safely at all times. This is defined in the Indicative Lighting Strategy (Operation) [APP-038]. It would be at the appropriate luminance required to provide safe working conditions. Lighting would be designed, positioned and directed to prevent or minimise light disturbance to sensitive receptors (human and ecological) and low-energy fittings would be used where possible. As such, visual disturbance during operation is anticipated to be lower than that historically or currently experienced within the site.

4.3.3 Operational requirements in the pipeline corridor will be limited, requiring occasional arrival by LGV and walkover visual inspection. Plant or equipment would, in the main, not be required, but there may be isolated incidents where

unplanned/emergency repair is required where they may be necessary. Such isolated activities would not lead to likely significant effects.

4.3.4 An additional consideration relevant to the operation of the Main Site is that habitats immediately adjacent to it are sand dunes containing dune ponds, all but one of which are choked with swamp vegetation and therefore unsuitable for SPA birds. The remaining habitats within much of the dune system are also topographically "enclosed" and therefore suboptimal for most SPA birds, which is reflected in the baseline survey and desk study data presented to support the HRA. The dune system physically separates the main site from the open habitats of Coatham Sands and Bran Sands Bay, which are more readily used by SPA birds. Overall, visual disturbance of Teesmouth and Cleveland Coast SPA / Ramsar during operation is screened out from Appropriate Assessment due to habituation which will not interfere with the ability of the SPA to achieve its Conservation Objectives.

4.3.5 Figure 13 shows the predicted noise during operation. Outside the main site, the highest noise levels occur immediately north of the site boundary. These areas comprise of dune habitat are unsuitable for the qualifying bird species. Habitats within sectors 9 and 12 will be lost during the construction phase of the Proposed Development. Habitats within Sectors 8, 10, 11, 13, 14, 15 will be available to the qualifying bird species during operation. Black-headed gull and herring gull were recorded within these sectors. Therefore, LSE on black-headed gull and herring gull which are qualifying species of the Teesmouth and Cleveland Coast SPA / Ramsar are screened into Appropriate Assessment for operational noise. All other European sites can be screened out due to their distances from the Project.

Atmospheric pollution

4.3.6 This assessment of likely significant effects strictly follows Natural England guidance[5]. As such, if an impact 'alone' or 'in combination' exceeds 1% of the critical level or critical load for the relevant pollutant (10% of the critical level for 24hr NOx), it is taken forward to appropriate assessment. At the appropriate assessment stage, other factors are then taken into account such as whether the critical level or load will actually be exceeded even with the 'in combination' impact, and ecological factors.

4.3.7 The discussion below focusses on stack emissions (from the operational period) rather than vehicle exhaust emissions. [redacted]

[5] Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations - NEA001

4.3.8 The model outputs shown in the tables below were extracted from the air quality assessment as presented in Appendix 1A.0 Air Quality of the Change Report. The data used in the dispersion model has been updated following the Changes as described in the Change Report and using the latest available data based on further development of the technical solutions used in the process.

Annual Average Oxides of Nitrogen NOx

4.3.9 It can be seen below (Table 4-8) that likely significant effects can be dismissed on all European sites except for Teesmouth & Cleveland Coast SPA/Ramsar site which is marginally above the 1% insignificance threshold.

Table 4-8: Annual Mean Oxides of Nitrogen Concentrations within the Study Area

RECEPTOR	EUROPEAN SITE	ALONE PC (PROCESS CONTRIBUTION) ($\mu g/m^{-3}$)	ALONE PC AS % OF CRITICAL LEVEL	IN COMBINATION PC ($\mu g/m^{-3}$)	IN COMBINATION PC AS % OF CRITICAL LEVEL
OE1 – OE3 (worst case data reported)	Teesmouth & Cleveland Coast SPA/Ramsar	0.3	1.1	2.5	8.2
OE7	North York Moors SPA/SAC	<0.1	<0.1	0.3	0.9
OE8	Northumbria Coast SPA/Ramsar and Durham Coast SAC	<0.1	<0.1	0.3	0.9

24hr Oxides of Nitrogen NOx

4.3.10 It can be seen below (Table 4-9) that likely significant effects can be dismissed on all European sites except for Teesmouth & Cleveland Coast SPA/Ramsar site. For that SPA/Ramsar it is due to the 'in combination' impact, with the contribution of H2T alone being below 10% of the critical level.

Table 4-9: Maximum 24hr Oxides of Nitrogen Concentrations within the Study Area

RECEPTOR	EUROPEAN SITE	ALONE PC (µg/m^{-3})	ALONE PC AS % OF CRITICAL LEVEL	IN COMBINATION PC (µg/m^{-3})	IN COMBINATION PC AS % OF CRITICAL LEVEL
OE1 – OE3 (worst case data reported)	Teesmouth & Cleveland Coast SPA/Ramsar	2.9	3.8	17.0	22.6
OE7	North York Moors SPA/SAC	0.2	0.2	3.2	4.3
OE8	Northumbria Coast SPA/Ramsar and Durham Coast SAC	0.1	0.2	2.8	3.7

Ammonia

4.3.11 It can be seen below (Table 4-10) that likely significant effects from ammonia in atmosphere can be dismissed on all European sites. Since the interest features of Teesmouth & Cleveland Coast SPA/Ramsar are not dependent on lichens and bryophytes a critical level of 3 µ/gm^{-3} has been used for that site.

Table 4-10: Annual Mean Ammonia Concentrations within the Study Area

RECEPTOR	EUROPEAN SITE	ALONE PC (µg/m^{-3})	ALONE PC AS % OF CRITICAL LEVEL	IN COMBINATION PC (µg/m^{-3})	IN COMBINATION PC AS % OF CRITICAL LEVEL
OE1 – OE3 (worst case data reported)	Teesmouth & Cleveland Coast SPA/Ramsar	0.01	0.4	0.01	0.4
OE7	North York Moors SPA/SAC	<0.01	<0.1	<0.01	<0.1
OE8	Northumbria Coast SPA/Ramsar and Durham Coast SAC	<0.01	<0.1	<0.01	<0.1

Nitrogen deposition

4.3.12 It can be seen below (Table 4-11) that likely significant effects can be dismissed on all European sites except for Teesmouth & Cleveland Coast SPA/Ramsar site. For that SPA/Ramsar it is due to the 'in combination' impact, with the contribution of H2T alone being marginally above the insignificance threshold of 1% of the critical load. It should be noted that The Environment Agency and Natural England have agreed that depositional impacts that are below 1% of the relevant critical load for a site can be regarded as likely to be insignificant. Guidance from the IAQM clarifies that the 1% threshold is not intended to be precise to a set number of decimal places but to the nearest whole number (paragraph 5.5.2.6 of Institute of Air Quality Management, 2020).

Table 4-11: Nitrogen deposition values within the Study Area

RECEPTOR	EUROPEAN SITE	CRITICAL LOAD USED	ALONE PC (KGN/HA/YR)	ALONE PC AS % OF CRITICAL LEVEL	IN COMBINATION PC (KGN/HA/YR)	IN COMBINATION PC AS % OF CRITICAL LEVEL
OE1 – OE3 (worst case data reported)	Teesmouth & Cleveland Coast SPA/Ramsar	10[6]	0.11	1.1	0.42	4.2
OE7	North York Moors SPA/SAC	5[7]	<0.01	0.1	0.04	0.9
OE8	Northumbria Coast SPA/Ramsar and Durham Coast SAC	10[8]	<0.01	<0.1	0.04	0.4

Acid deposition

4.3.13 It can be seen below (Table 4-12) that likely significant effects can be dismissed on all European sites. While the 'in combination' impact on North York Moors SAC/SPA exceeds 1% of the critical load, the contribution of H2T is less than 0.001 i.e.

[6] Critical load for calcareous dunes. Appropriate habitat for areas of greatest deposition.
[7] Critical load for Dry heaths, Raised and blanket bogs, Valley mires, poor fens and transition mires
[8] For Durham Coast SAC, APIS Site Relevant Critical Load app provides a critical load range for 'fixed coastal dunes with herbaceous vegetation' but these are not present on the vegetated sea cliffs of the Durham Coast. Vegetated sea cliffs are mentioned on the Site Relevant Critical Load app for the SAC but no critical load is given because vegetated sea cliffs can encompass a range of habitats. However, the Durham Coast SAC vegetation is on magnesian limestone and flushed with calcareous water (Durham Coast - Special Areas of Conservation (jncc.gov.uk)). As such the lowest critical load for calcareous grassland (10 kgN/ha/yr) is used in lieu of no critical load.

effectively zero. As such it is considered reasonable to dismiss the contribution of H2T to the modelled in combination impact as imperceptible.

Table 4-12: Acid deposition values within the Study Area

RECEPTOR	EUROPEAN SITE	ALONE PC (KEQ/HA/YR)	ALONE PC AS % OF CRITICAL LEVEL	IN COMBINATION PC (KEQ/HA/YR)	IN COMBINATION PC AS % OF CRITICAL LEVEL
OE1 – OE3 (worst case data reported)	Teesmouth & Cleveland Coast SPA/Ramsar	0.008	<0.1	0.030	<0.1
OE7	North York Moors SPA/SAC	<0.001	<0.1	0.003	<0.1
OE8	Northumbria Coast SPA/Ramsar and Durham Coast SAC	<0.001	<0.1	0.003	<0.1

4.3.14 Having assessed the likely significant effects of H2Teeside with reference purely to exceedance (or otherwise) of the numerical screening criteria, two in-combination impacts could not be screened out on purely mathematical grounds:

- NOx at Teesmouth & Cleveland Coast SPA/Ramsar
- Nitrogen deposition at Teesmouth & Cleveland Coast SPA/Ramsar

4.3.15 These will therefore both be discussed in the appropriate assessment.

Water quality

4.3.16 In the absence of mitigation, similar water quality issues are likely to be relevant for the Proposed Development in the operational phase as apply in the construction / decommissioning phase. This includes potentially toxic surface run-off and leachate from machinery and plant involved in the day-to-day operation of the power plant, and non-toxic pollution from sewage effluent. Unmitigated, these pollutants may enter the Teesmouth and Cleveland Coast SPA / Ramsar directly or indirectly via groundwater / surface water in hydrological continuity with these European sites.

4.3.17 The effluent streams from the Proposed Development will include process water (e.g. process condensate from the reforming process, cooling tower blowdown water and demineralisation plant rejects), foul water and surface water runoff. A summary of the water cycle is provided in Appendix 9B Nutrient Neutrality Screening Assessment (Volume III, EN070009/APP/6.4).

4.3.18 A new surface water drainage network and management system will be provided for the Main Site that will provide adequate interception, conveyance, and

treatment of surface water runoff from buildings and hard standing. This will be separate to foul systems for welfare facilities and process effluent generated by the operation of the Proposed Development Site. The connection corridors will not require additional drainage as they will be using existing pipe racks, pipe bridges, culverts or otherwise installed underground.

4.3.19 Process wastewater would be treated in a Bio-treatment Plant while other wastewater streams would be treated in an Effluent Treatment Plant (ETP). Both treatment plants would be located on the Main Site

4.3.20 ~~Process effluent management requires treatment of processed effluent in the bio-treatment plant and discharge via the NZT outfall to Tees Bay~~. Discharge of treated process effluent will be via the Net Zero Teesside project outfall at Tees Bay.

4.3.21 Due to the nature of the Proposed Development, there is a risk that a range of different diffuse pollutant types may be present in surface water runoff. This risk will be minimised by the fact that any process effluent will be segregated from surface water drainage and handling of chemicals on site will be regulated through the Environmental Permit.

4.3.22 A Surface Water Drainage Strategy will be defined in consultation with the Environment Agency, the Lead Local Flood Authorities and other statutory agencies.

4.3.23 Foul wastewater from the Proposed Development will connect to the STDC sewage network for appropriate treatment and discharge. This is likely to be via Bran Sands WwTW but may also be via Marske-by-the-Sea WwTW. It is assumed given the relatively low volumes of foul effluent anticipated from the Proposed Development that NWL will treat this within their consent limits and in accordance with requirements to not cause deterioration or prevent improvement under the WFD. No nutrient neutrality issues will arise because Natural England guidance indicates that operational staff who also live in the catchment do not need to be considered as foul water generated from those individuals is already part of the baseline [ES Appendix 9b, Nutrient Neutrality Assessment; Document reference EN070009/APP/5.13].

4.3.24 In summary, surface water drainage and the discharge of Process Wastewater affecting the Teesmouth and Cleveland Coast SPA and Ramsar is screened into Appropriate Assessment for the operational period. All other European designated sites are screened out due to the distance from the Project or the lack of hydrological connections.

Coastal squeeze

4.3.25 Coastal squeeze is a term that originates from coastal management, whereby intertidal habitats which could be used by the Teesmouth and Cleveland Coast SPA / Ramsar birds are lost as the sea level rises and inland brownfield development (e.g., a sea wall or an industrial complex) prevents the inland migration of habitats (e.g. saltmarsh) and its associated species. A good background summary on this impact pathway can be found in Doody (2013). As a result, the habitat is ‘squeezed’ and reduces in size. This is a significant process, particularly in geographic areas that

are highly urbanised or that are rapidly transitioning from an undeveloped to developed state.

4.3.26 The main site will be located on brownfield land in a coastal landscape. As such, the project will not result in any loss of greenfield land adjacent to the coast. Overall, it is considered that LSEs can be excluded, and coastal squeeze as a result of the Proposed Development is screened out from Appropriate Assessment as it will not arise.

4.3.27 In summary, coastal squeeze will not arise and is therefore not taken forward to Appropriate Assessment.

4.4 Decommissioning Period

4.4.1 At the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above ground structures on the Main Site removed, and the ground remediated as required to facilitate future re-use. The Applicant will assess at that time whether any infrastructure should be retained for future use. The same timescales would apply for the hydrogen pipeline and utility connections.

4.4.2 A Decommissioning Environmental Management Plan (DEMP) would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The Decommissioning Environmental Management Plan (DEMP) would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated.

4.4.3 It is considered that the following pathways of effect could occur during decommissioning and based upon a precautionary approach, these will be considered further at Appropriate Assessment.

- Loss of functionally linked land;
- Noise and visual disturbance;
- Noise and visual disturbance within functionally linked land;
- Atmospheric pollution;
- Changes in water quality.

5.0 IN COMBINATION EFFECTS

5.1 Introduction

5.1.1 It is a requirement of Regulation 63(a) of the 2017 Regulations to not only assess the impacts of a development project alone, but also to investigate whether there might be 'in-combination' effects with other projects or plans proposing development in adjacent authorities. In practice, such an 'in-combination' assessment is of greatest relevance when an impact pathway relating to a project would otherwise be screened out not because there is no impact pathway but because its individual contribution is considered to be inconsequential.

5.1.2 For example, other industrial development projects near the Proposed Development might also have effects on the air quality within the Teesmouth and Cleveland Coast SPA / Ramsar, acting in-combination with the potential NOx deposition from the Proposed development. In combination with other projects and plans nitrogen deposition is forecast to exceed 1% of the critical load at Coatham Sands/Dunes (receptors OE_1, OE_2, OE_3, OE_6) whether the lower critical load of 10 kgN/ha/yr (applicable to terns) or the higher critical load of 20 kgN/ha/yr [redacted] are used.

5.1.3 Furthermore, the potential contaminant and nutrient input from the Proposed Development will act in-combination with water pollutants deriving from housing or industrial development allocated in Local Plans that cover adjacent authorities. Therefore, due consideration must be given to these 'in-combination' proposals because they might exacerbate the impacts identified as relevant for the Proposed Development.

5.1.4 Chapter 23 of the ES identifies the long and short lists of developments considered for their potential to have cumulative and combined effects with the Proposed Development. Table 5-1 summarises the plans and projects which have been considered within this HRA and whether there is potential for LSE upon the European designated sites in combination with the Proposed Development.

Table 5-1: Assessment of LSE in Combination with Other Plans and Projects

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
2	EN010082	The Tees Combined Cycle Power Plant. A gas fired combined cycle gas turbine (CCGT) power station with a maximum generating capacity of up to 1,700 MWe (Tbc). The project will utilise existing Gas and National Grid connections.	The ecology and nature conservation chapter of the ES reported negligible ecological value for habitats and species of flora and fauna. No significant effects were predicted. There were no significant effects predicted on off-site habitats due to changes in air quality, nitrogen deposition and acid deposition. The HRA screening report concluded no significant effects on European designated sites.	Yes – changes in air quality during operation. .	Yes
3	EN10103	Net Zero Teesside. A full chain carbon capture, utilisation and storage ('CCUS') project, comprising a CO_2 gathering network, including CO_2 pipeline connections from industrial facilities on Teesside to transport the captured CO_2 (including the connections under the tidal River Tees); a combined cycle gas turbine ('CCGT') electricity	The report to inform HRA identified the potential for LSE upon the Teesmouth and Cleveland Coast Cleveland Coast SPA and Ramsar from noise and visual disturbance during construction of breeding and non-breeding features. Changes in water quality during construction and decommissioning were screened in. Disturbance in	There will be an overlap of construction periods, therefore there is potential for in combination effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from noise and visual disturbance of qualifying bird species during construction and decommissioning.	Yes – construction, operation, and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		generating station with an abated capacity circa 850 gigawatts output (gross), cooling water, gas and electricity grid connections and CO_2 capture; a CO_2 gathering-booster station to receive the captured CO_2 from the gathering network and CCGT generating station; and the onshore section of a CO_2 transport pipeline for the onward transport of the captured CO_2 to a suitable offshore geological storage site in the North Sea.	functionally linked land affecting harbour porpoise, a qualifying features of the Southern North Sea SAC was screened in. Atmospheric pollution during operation was screened in due to potential effects upon the Teesmouth and Cleveland Coast SPA and Ramsar.	There is potential for changes in water quality to affect the Qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar during construction and operation. There is potential for in combination effects on air quality to affect the Teesmouth and Cleveland Coast SPA and Ramsar during operation.	
5	NZT Offshore Elements	Net Zero Teesside offshore elements to be consented by Marine Licence including CO_2 Export Pipeline below MHWS and geological store and associated facilities.	No significant effects upon terrestrial ecology are reported within the ES. The potential for in combination effects upon ornithology and marine ecology are discussed in ES Chapter 13: Ornithology [APP-065] and ES Chapter 14: Marine Ecology [APP-067] respectively.	There is potential for disturbance of birds during the construction period. The herring gull and cormorant may be present during their respective non-breeding seasons. During the breeding season, common tern may be found in the Development area. Sandwich tern and arctic tern also may be present during their	Yes – construction

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
				respective breeding seasons, although both species' density layers likely represent migratory movements. The Development will not result in long-term changes to the functioning of any marine mammal population. The risk of collision arising from the Development is expected to be greatest during the construction phase. However, vessels will likely be travelling at slow speeds, meaning the collision risk is low. Disturbance is also expected to minimal, when placed in the context of the vessels already present in the region. In addition, no impacts to seals at haul-out locations are expected.	
6	EN010051	Forewind Ltd. (formerly Dogger Bank Teesside B) - Project previously known as Dogger Bank Teesside A&B. Dogger Bank Teesside A & B is	No significant effects upon terrestrial ecology are reported within the Environmental Report.	The report to inform HRA for the other development considered potential effects upon Flamborough and Filey Coast SPA	No

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		the second stage of Forewind's offshore wind energy development of the Dogger Bank Zone (Zone 3, Round 3). Dogger Bank Teesside A & B will comprise up to two wind farms, each with an installed capacity of up to 1.2GW, which are expected to connect to the National Grid at the existing National Grid substation at Lackenby, near Eston. It follows that Dogger Bank Teesside A & B could have a total installed capacity of up to 2.4GW Dogger Bank Teesside A & B is located within The Dogger Bank Zone which comprises an area of 8660 square kilometres (km^2) located in the North Sea between 125 kilometres (km) and 290 km off the UK North East coast.		and the Southern North Sea SAC. There are no pathways of effect between the Proposed Development and Filey coast SPA, and LSE upon harbour porpoise, a qualifying species of the Southern North Sea SAC, are screened out.	
8	EN010150	'Waste-to-sustainable aviation fuel' facility with on-site generating station capacity of up to 150 MW	The scoping reports identifies the potential for effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from air and water	Potential for in-combination effects from changes in air quality, water quality, noise, vibration, lighting and visual	Yes – construction, operation and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
			pollution events, noise, vibration, lighting, and / or visual disturbance during construction and operation.	disturbance which could affect the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	
19	R/2017/0876/FFM	Construction and operation of a mineral processing and refining facility including ancillary development, car parking and landscaping.	No effects on European designated sites identified.	No in-combination effects identified.	No
20	R/2016/0484/FFM	Proposed anaerobic biogas production facility	No effects upon European designated sites are identified.	No in-combination effects identified.	No
22	R/2019/0767/OOM	Director of Regeneration & Neighbourhoods Hartlepool, outline application for the construction of an energy recovery facility (ERF) and associated development, Grangetown Prairie Land east of John Boyle Road and west of Tees Dock Road, Grangetown.	The report to inform HRA screening identified that the nitrogen nutrient baseline deposition exceeds the minimum critical level (AQAL) of 8 kg/ha/yr regardless of the operation of the Proposed Facility. The maximum Process Contribution from the Proposed Facility anywhere within the Teesmouth and Cleveland Coast ecological site is 0.75 kg/ha/yr, which is 9.4% of the	As an updated Appropriate Assessment will be required for the other development at detailed planning stage, therefore potential cumulative effects upon air quality during operation cannot be discounted.	Yes

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
			AQAL. As such the potential for significant effects cannot be discounted. The Appropriate Assessment states that the Proposed Facility will be required to demonstrate that Best Available Techniques (BAT) have been implemented during the Environmental Permitting process. A further Appropriate Assessment will be required once the detailed design has been completed.		
30	R/2019/0031/FFM	Tourian Renewables Ltd, construction and operation of a plastic conversion facility including office and welfare buildings, workshops, weighbridges and associated infrastructure, former Croda Site Wilton International, Redcar	No effects upon European designated sites are identified.	No in-combination effects identified.	No
33	R/2017/0906/OOM	Sirius Minerals Plc, outline planning application for an overhead conveyor and associated storage facilities in connection with the York	The shadow HRA screening report concluded that there is potential for LSE from noise and visual disturbance during construction,	Yes – potential for cumulative effects on the Teesmouth and Cleveland Coast SPA and Ramsar as a result of noise and visual	Yes - construction

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		potash project, land between Wilton International and Bran Sands, Redcar.	reduction in sightlines and overshadowing of Bran Sands lagoon. No likely significant effect is predicted for noise and visual disturbance during the operational phase.	disturbance affecting Bran Sands Lagoon.	
35	R/2014/0627/FFM	York Potash Ltd: Full planning application: The winning and working of polyhalite by underground methods including the construction of a minehead at doves nest farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between doves nest farm and land at wilton that links to the mine below, comprising 1 shaft at doves nest farm, 3	The report to inform HRA identified the potential for disturbance effects and changes in lighting to affect qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	Potential for cumulative effects on the Teesmouth and Cleveland Coast SPA and Ramsar from disturbance effects and changes in lighting during construction. Areas subject to disturbance from both projects include Bran Sands Lagoon and Dabholm Gut.	Yes - construction

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		intermediate access shaft sites, each with associated landforming of associated spoil, construction of buildings, access roads and car parking, landscaping, restoration and aftercare, the construction of a tunnel portal at wilton comprising buildings, landforming of spoil and associated works			
41	R/2014/0372/OOM	The Lady Hewley Charity Trust Company Ltd & Taylor - Outline application for residential development (up to 1250 dwellings) (all matters reserved)	No effects on European designated sites identified.	No in-combination effects have been identified.	No
42	R/2020/0357/OOM	South Tees Development Corporation (STDC): Outline planning application for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated	The HRA Stage 1 assessment identified the following potential impacts to the Teesmouth and Cleveland Coast SPA and Ramsar sites: i. During construction: the risk of disturbance and/or loss of habitats that support foraging and commuting activities, and/or roosting of the qualifying features,	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from noise and visual disturbance of qualifying bird species, disturbance and / or habitat loss and pollution.	Yes - construction

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		infrastructure works all matters reserved other than access	due to pollution from within The Proposed Development site; ii. During construction: the risk of noise/visual disturbance of small numbers of qualifying species utilising the adjacent SPA/Ramsar site for foraging and commuting activities, and/or roosting; and iii. During operation: the risk of disturbance and/or loss of habitats that support foraging and commuting activities, and/or roosting of the qualifying features, due to pollution from within The Proposed Development site.		
48	R/2006/0433/OO	P D Teesport: Outline application for development of a container terminal	No effects on European designated sites were identified.	No in-combination effects identified.	No
51	R/2020/0819/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 139,353 sqm (gross) of general industry (Use	A Habitats Regulations Assessment ('HRA') has been completed for the other development and is submitted alongside the planning application. The following impacts were	Yes – potential for in-combination effects from habitat loss, disturbance, changes in water quality and changes in air quality affecting the qualifying	Yes – construction, operation and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourse including realignment and associated infrastructure works. All matters reserved.	identified as having the potential to have a likely significant effect at HRA Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development; iv Discharges to water caused by The Proposed Development; and v Emissions to air caused by The Proposed Development.	features of the Teesmouth and Cleveland Coast SPA and Ramsar.	
52	R/2020/0820/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 92,903sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV	Stage 1 of the report to inform HRA identifies the potential for effects upon redshank and the waterbird assemblage which are qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar. Pathways of effect considered are loss of habitat, changes to flight	There is potential for cumulative effects from disturbance to waterbirds, discharges to water and discharges to air.	Yes – construction and operation.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		and car parking and associated infrastructure works. All matters reserved.	lines or sight lines, disturbance to waterbirds, discharges to water and discharges to air.		
53	R/2020/0821/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 464,515 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	The Teesmouth and Cleveland Coast SPA and Ramsar site is within 100m of the site at its closest point, which is Bran Sands Lagoon. A HRA has been completed and the following impacts were identified as having the potential to have LSE at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development; iv Discharges to water caused by The Proposed Development; v Emissions to air caused by The Proposed Development; and	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	Yes – construction, operation and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
			vi Reduced groundwater infiltration caused by The Proposed Development.		
54	R/2020/0822/ESM	South Tees Development Corporation (STDC): Outline planning application for the development of up to 185,806 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourses including realignment and associated infrastructure works. All matters reserved.	A HRA has been completed and the following impacts were identified as having the potential to have a likely significant effect at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development; iv Discharges to water caused by The Proposed Development; v Emissions to air caused by The Proposed Development; and vi Reduced groundwater infiltration caused by the development.	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	Yes – construction, operation, decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
55	R/2020/0823/ESM	South Tees Development Corporation (STDC): Outline planning application for the development of up to 15,794sqm (gross) of office accommodation (Use Class E) and car parking and associated infrastructure works. All matters reserved.	HRA has been completed and the following impacts were identified as having the potential to have a likely significant effect at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development; iv Discharges to water caused by The Proposed Development; v Emissions to air caused by the development; and vi Reduced groundwater infiltration caused by The Proposed Development.	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	Yes – construction, operation, decommissioning.
65	MWP8 South Tees Eco-Park	Tees Valley Joint Minerals and Waste Development Plan Documents, A site of approximately 27 hectares is	There is potential for projects brough forward under within this local plan allocation to have effects upon European designated sites.	Yes – individual projects will require assessment if there is potential for effects upon European designated sites.	No – projects identified with the potential for in-combination

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		allocated for the development of the South Tees Eco-Park.			effects will be assessed by each project separately as they are brought forward for development.
76	H/2022/0181	Outline planning application for the erection of up to 1400no. dwellings and up to 750sqm of non-residential floorspace (comprising Use Class E and Sui Generis) with associated parking, landscaping and infrastructure with all matters reserved except access.	The ES chapter notes that the site is within the same catchment of the Teesmouth and Cleveland Coast Ramsar and Special Protection Area. As such there is the potential for the development to development to add nitrogen and phosphate pollution to this site which is in unfavourable condition.	Yes – potential for changes in water quality.	Yes – construction and operation.
80	H/2020/0276	Erection of 570 dwellings and provision of a new roundabout and associated infrastructure	No effects upon European designated sites identified.	No in-combination effects identified.	No
91	H/2014/0428	Erection of 570 dwellings and provision of a new roundabout and associated infrastructure	HRA screening identified the potential for recreational disturbance to affect the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes – both projects have the potential for disturbance of qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes - operation.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
121	21/0594/EIASCP	Redevelopment of land to provide urban logistics and industrial development - Link to 21-2124-SOR (ID: 231)	No effects upon European designated sites identified.	No in-combination effects identified.	No
121	21/2124/SOR	Scoping request for outline planning permission with all matters reserved except for access comprising the demolition of existing buildings and the construction of employment floorspace (Use Classes E(g)(iii) (Light Industrial Processes), B2 (General Industrial) and B8 (Storage and Distribution) and ancillary office floorspace (E(g)(iii))), and associated infrastructure, drainage, landscaping and other works - Link to 21-0594-EIASCP (ID: 175)	The scoping report scopes out biodiversity. No effects upon designated sites identified.	No in-combination effects identified.	No
131	22/2386/SOR	Scoping opinion for Green Hydrogen Production Facility and Wind Turbine	The scoping report identifies the potential for effects on the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes - potential for cumulative effects on designated sites from habitat loss, noise and visual disturbance, changes in lighting and loss of functionally linked land.	Yes – construction, operation, and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
135	23/0090/EIS	Carbon capture facility for existing Energy from Waste site	Natural England correspondence states that there are potential significant effects on Teesmouth and Cleveland Coast Special Protection Area (SPA) and Ramsar Site from nitrogen. Natural England require further details to demonstrate if the proposed wastewater discharge will result in additional Total Nitrogen and other pollutants being discharged to the Tees catchment. A mitigation strategy may be required to prevent additional Total Nitrogen reaching the SPA.	Yes - Potential for cumulative effects on designated sites from nitrogen.	Yes - operation
150	13/0342/EIS	Outline application for the construction of up to 500 houses, Primary School (inc Sport Facilities) and nursery, Retail Units (up to 500 sqm), Doctors Surgery, Community Facilities, access and associated landscaping, footpaths and open space (all matters reserved)	No effects upon European designated sites identified.	No in-combination effects identified.	No.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
157	08/3644/EIS	Outline planning application for residential (Class C3), employment (Class B1), health care facility (Class D1), leisure (Class A3, A4, A5, C1 and D2), ancillary retail and services (Class A1 and A2) and car dealership (sui generis) with car parking and associated landscaping and infrastructure improvements	The ecology chapter of the ES for the other development identified the potential for significant effects on fish.	The Proposed Development will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect Atlantic salmon and sea lamprey (qualifying features of the River Tweed SAC and the Tweed Estuary SAC) will be taken forward to Appropriate Assessment.	Yes - construction.
166	13/2892/EIS	Development of materials recycling facility and production of energy from waste, including demolition of the existing offices and erection of new buildings, tanks and silos with access taken from the existing access at New Road, Billingham. The main building will be portal frame, profiled steel clad with stacks at a	No effects upon European designated sites identified.	No in-combination effects identified.	No

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		maximum height of 80m and 28m. (Residual wastes will be processed through an advance thermal treatment process, gasification, to produce renewable heat and power) - related to consented planning boundary of 13-1584-RNW			
167	22/1145/SCO	Screening opinion for proposed hydrogen production plant, battery storage and hydrogen re-fuelling point.	Natural England correspondence notes the potential for adverse effects upon the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes – however there is insufficient information available to assess potential in-combination effects at this stage.	Yes
168	Stockton-on-Tees Local Plan, Policy SD4 Economic Growth Strategy	Stockton-on-Tees Local Plan, Main growth location for hazardous installations including liquid and gas processing, bio-fuels and bio-refineries, chemical processing, resource recovery, and waste treatment, energy generation, carbon capture and storage and other activities, Seal Sands.	A strategic policy document. The potential for cumulative effects on European designated sites is assessed within the local plan HRA.	Yes, however as this is a strategic document, there is insufficient information available to allow for cumulative assessment to be undertaken.	No – projects will be assessed for their potential to have in-combination effects on European designated sites when individual planning applications are submitted.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
172	R/2020/0685/ESM	South Tees Development Corporation (STDC): Outline planning application for demolition of existing redundant quay structures, capital dredging and development of new quay and associated works (PHASE 2)	The report to inform HRA identifies the potential for noise and visual disturbance to affect waterbirds during operation of the quay and effects on waterbird feeding habitat due to changes in coastal processes.	Yes – both projects have the potential for noise and visual disturbance of the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes – construction and operation and decommissioning.
173	R/2022/0773/ESM	Construction of a Lithium Hydroxide Monohydrate manufacturing plant and ancillary development	The report to inform HRA confirms no Likely Significant Effects on European designated sites.	No potential in-combination effects have been identified.	No
174	R/2014/0626/FFM	Mineral (Polyhalite) granulation and storage facility involving the construction of buildings, conveyor systems, substations, water treatment plant, internal access roads, car parking, attenuation ponds, landscaping, restoration and aftercare, and construction of a tunnel portal including the landforming of spoil and associated works.	No effects upon European designated sites are identified.	No in-combination effects identified.	No

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
178	R/2023/0291/ESM	Outline application (all matters reserved) for the development of a 3 line low-carbon lithium refinery and associated dock-side reception, handling, storage, and manufacturing facilities for the production of high-quality, battery-grade lithium hydroxide	The report to inform HRA considers potential effects upon the Teesmouth and Cleveland Coast SPA and Ramsar. The report screens in emissions to air from construction and operational activities.	Potential for in-combination effects on air quality.	Yes – construction and operation.
205	H/2023/0128	Scoping opinion in respect of Greatham North East Flood Alleviation Scheme	The scoping report indicates there is potential for effects upon designated sites.	Potential for in-combination effects upon the Teesmouth and Cleveland Coast SPA and Ramsar.	No - there is insufficient information in the Scoping Report for the other development to allow for cumulative assessment to be undertaken at this stage.
212	22/1525/EIS	Erection of an energy recovery facility and associated infrastructure for fuel receipt and storage, power generation, power export, process emissions control, maintenance,	The report to inform HRA identifies potential pathways to LSE on the Teesmouth and Cleveland coast SPA and Ramsar from noise, visual disturbance, emissions to cround,	Yes - potential for in-combination cumulative effects upon air quality affecting the qualifying	Yes – construction, operation and decomissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		offices and car parking together with associated operations.	water and air, and construction traffic movements. During operation, the potential pathways to LSE are as a result of omissions to air from the stack at the proposed Energy Recovery Facility, the traffic associated with the development and emissions to water.	features of the Teesmouth and Cleveland Coast SPA and Ramsar.	
219	23/1019/EIS	Development of Greenergy Renewable Fuels and Circular Products Facility comprising a Sustainable Aviation Fuel Plant and Tyre Plant and associated infrastructure. A temporary construction laydown area, proposed services corridor, pipe bridge, ancillary buildings and car parking	The report to inform HRA screening identifies the potential for effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from surface water runoff and pollution, changes in drainage, operational air quality, noise during construction and operation, vibration and loss of functionally linked land.	Yes – potential in-combination effects upon the Teesmouth and Cleveland Coast SPA and Ramsar including habitat loss, loss of functionally linked land, noise and visual disturbance, changes in water quality and changes in air quality.	Yes – construction, operation and decomissioning.
222	R/2024/0271/ESM	HyGreen Hydrogen Project	The ES chapter and report to inform HRA identify the potential for habitat loss, loss of functionally linked land for birds, noise and visual disturbance of birds and changes in water quality to affect	Potential for cumulative effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, loss of functionally linked land, noise and visual disturbance.	Yes – construction, operation and decommissioning.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
			the Teesmouth and Cleveland coast SPA and Ramsar.		
1	R/2014/0627/FFM	York Potash DCO. The installation of wharf/jetty facilities with two ship loaders capable of loading bulk dry material at a rate of 12m tons per annum (dry weight). Associated dredging operations to create berth. Associated storage building with conveyor to wharf/jetty. Including a materials handling facility (if not located at Wilton) served by a pipeline (the subject of a separate application) and conveyor to storage building and jetty.	The report to inform HRA identified the potential for LSE upon the Teemouth and Cleveland Coast SPA and Ramsar from the Harbour Facilities from coastal processes, habitat loss / change. Disturbance and water and sediment quality.	Habitat loss / change, disturbance, changes in water quality could have effects in combination with the Proposed Development.	Yes – construction
	EN040001	Teesside Flexible Regas Port. The project is a liquefied natural gas (LNG) importation terminal comprising a marine jetty, marine loading arms with vapor and cryogenic lines to unload LNG cargoes, an onshore regasification	The project is at pre-application stage. The scoping report scopes in potential impacts upon the Teesmouth and Cleveland Coast SPA and Ramsar.	Construction/decommissioning and operation activities could cause the loss, degradation or disturbance of terrestrial and aquatic habitats within The Teesmouth and Cleveland Coast Ramsar Site/SPA that are of	No - there is insufficient information in the Scoping Report for the other development to allow for

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL FOR IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	APPROPRIATE ASSESSMENT REQUIRED?
		plant and storage of LNG site, a high-pressure natural gas pipeline to deliver regasified LNG into the UK National Transmission System (NTS), and gas blending and nitrogen injection facilities to condition regasified LNG to meet NTS quality specifications.		importance to qualifying species. This could have in combination effects with the proposed development. In addition, the qualifying bird species may be disturbed via noise, vibration, lighting and/or visual disturbance during construction, operation and decommissioning, and potentially be displaced from suitable habitat.	cumulative assessment to be undertaken at this stage.

5.2 Summary

5.2.1 In the absence of mitigation, there is potential for a number of projects as summarised in Table 5-1 above to have LSE upon the Teesmouth and Cleveland Coast SPA and Ramsar in-combination with the Proposed Development. These projects are screened into Appropriate Assessment.

6.0 APPROPRIATE ASSESSMENT

6.1 Direct Habitat Loss due to Horizontal Direct Drilling Collapse (Construction)

6.1.1 Trenchless technologies (such as Horizontal Directional Drilling (HDD) or Micro-Bored tunnelling) are proposed for crossing of environmentally sensitive watercourses (e.g., River Tees and Greatham Creek) and major infrastructure (e.g., railways). The proposed trenchless technologies below the River Tees will be at a minimum depth of approximately 25 m for Tees crossing and 10m for Greatham Creek (at the deepest point of crossing) to prevent impacts on river channel integrity, habitats and infrastructure (including other bores and tunnels); and a maximum depth of 60 m.

6.1.2 Trenchless crossings would also be required in locations where it is not practicable to use alternative methods, where it is necessary to limit the environmental impacts and/or where suitable existing crossing infrastructure such as culverts are not available. It is envisaged that horizontal directional drilling (HDD) would be used for trenchless crossings at the following locations:

- Various pipeline crossings of the railway lines at the Redcar Bulk Terminal;
- Greatham Venator pipeline crossing of Greatham Creek;
- Greatham Offtaker A crossing of buried gas mains in the area bound by Cowpen Lane, A1185 and Railway linking Billingham and Seaton Carew; and,
- Greatham Offtaker A crossing of the railway that links Billingham and Seaton Carew.

Horizontal Directional Drilling

6.1.3 HDD involves drilling a gently curved horizontal bore from a launch site to a receiving site. The pipeline is then drawn in reverse through the bore. The HDD launch locations require the installation of sheet piles to provide anchorage for the drill rig. The number, size and depth of these sheet piles will be established by the temporary works design. The drill site will also include mud mixing plant (typically a bentonite mix), mud pumps, steering cabin, a suitable generator and a lagoon to collect drilling mud and cuttings. The stringing site is land at the other end of the bore which will be used to store sections of pipeline and for the welding and coating of the pipestring. Facilities at the stringing site will also include a crane for lifting sections of pipe and mud pump to return drill mud back to the drill site.

6.1.4 The first stage of the HDD process will be to install a mud return line offset from the proposed pipeline using the drill rig. Following this, a pilot hole will be drilled along the proposed pipeline alignment. A reamer/hole opener will then be attached to the drill and working in the reverse direction from the stringing site back to the drill site, the bore diameter will be incrementally increased. A number of reams will be required based on the required bore diameter and ground conditions encountered onsite. Cleaning runs will then be used to remove any cuttings and obstructions in the bore. The reamer/hole opener will be attached to the pipestring via a pull head will be pulled back through the HDD bore. The pipestring for each crossing will be

assembled, pre-welded and pressure tested on the stringing site. Sections of pipe will be lifted into position using a crane, welded and coated sequentially until the full length of pipe is installed. The completed pipestring will be pulled back through the HDD bore using a pull head. As the pipe is pulled back for processing, drill mud used in the HDD process will be collected in the mud pits on the drill site and then removed from site by tanker to a permitted waste disposal facility. The launch and receiving sites will then be backfilled with clean excavated material, and temporary haul roads, plant and equipment removed before the site is restored.

6.1.5 If HDD collapse / leading of drilling fluid were to occur, this could have an adverse effect upon water quality which could have an adverse effect on the following conservation objectives of the Teesmouth and Cleveland Coast SPA and Ramsar:

- maintain or restore the extent and distribution of the habitats of the qualifying features;
- maintain or restore the structure and function of the qualifying features;
- maintain or restore the population of each of the qualifying features;
- maintain or restore the distribution of the qualifying features within the site.

6.1.6 Where HDD is used to cross watercourses, risk of escape of drilling fluid arising from hydrofracturing to the surface will be minimised by the following:

- Undertaking a ground investigation
- Detailed design of the launch point or landfill of the HDD, showing geological layers and intended drill path which has sufficient depth below surface for the expected ground conditions to minimise risk of failure/collapse
- Undertaking a hydraulic fracture analysis

6.1.7 During drilling the following measures are proposed:

- Ensure drilling fluid is of sufficient viscosity and properties for the ground being drilled;
- Have lost circulation materials on site to seal any breakout;
- Use casing through weaker cohesive layers near the ground surface if necessary;
- Removal of poor ground / ground stabilisation prior to drilling;
- Monitoring of drilling fluid returns and volumes during drilling to warn of inadequate hole cleaning; and,
- Monitoring downhole annular pressure (set by fracture calculations) in real time to warn of over pressurising by drilling fluid.

6.1.8 The Framework CEMP [REP2-011] for the Proposed Development includes the following commitments:

- A commitment to producing a Code of Construction Practice which would specify measures designed to minimise the risk of collapse of any HDD crossing;

- A requirement for the contractor's drilling method statement to form the basis of contingency plans which provide details of specific clean-up and pollution control measures which would be used in the event of an accidental spillage.
- The EPC Contractor(s) will undertake analysis to identify key parameters to be monitored during installation and subsequently monitor the drilling operations;
- A review of the HDD works undertaken for Net Zero Teesside will be undertaken to assess the effectiveness of site procedures and whether any 'lessons learned' would be beneficial to HDD operations of the Proposed Development;
- A Clean-up plan (to deal with any pollution impacts arising from any HDD collapse) will be produced as part of the Final CEMP;
- Natural England would be consulted on the effectiveness of the proposed measures in reducing effects on designated sites; and
- A requirement for the contractor's drilling method statement to include pollution prevention measures that would be used to minimise the risk of accidental spillage.

6.1.9 Given these integral elements of HDD design and delivery it is not considered that an adverse effect on integrity on the Teesmouth and Cleveland Coast SPA/Ramsar due to HDD collapse / leakage of drilling fluid and associated habitat loss or degradation would arise.

Micro-Bored Tunnelling

6.1.10 Boring of an MBT also requires a launch and receiver site. However, an MBT is likely to require an area at the launch site to be prepared to allow excavation of a shaft to the required launch depth constructed by conventional civil engineering excavation techniques. The shaft will be supported by concrete rings to prevent soil slump to ensure integrity of the tunnel bore. The shaft allows for the installation and launch of the tunnel micro-boring machine. The receiver site at the opposite end of the tunnel trajectory is likely to have a sloped entry point to allow for the installation of the pre-welded and tested pipe string. The MBT head is designed to self-propel from the base of the shaft along a design trajectory surfacing at a specific point on the pre-constructed arrival ramp. The boring machine is likely to be driven by hydraulic fluid from a diesel-powered hydraulic pump system. Drill cuttings from the MBT machine will return along its own internal conveyor via slurry pumps with gravity separation in a slurry pond at the launch location. Separated solid material will be removed by HGVs by road for re-use or disposal at a suitably permitted facility. Liquid wastes (including waste drilling mud) will be removed by tanker and disposed of at a suitability permitted facility.

6.1.11 Upon completion, the MBT drill head will be removed from the tunnel. A pre-welded and tested pipe may be pulled from the exit point across its full length. Once fully installed, works at the shaft end will commence to install a single length of pre-welded and tested pipe between the pipe in the base of the shaft up to ground level. Once the weld is confirmed as good, then works to reinstate the shaft using

removed spoil and to restore the land at the exit from the tunnel will be undertaken. Following installation of the pipe strings into the tunnel, the work site will be demobilised, and the tunnel heads capped, with the surrounding land reinstated. The removal of redundant infrastructure may be required to enable construction of a tunnel.

6.1.12 Given these integral elements of MBT design and delivery it is not considered that an adverse effect on integrity on the Teesmouth and Cleveland Coast SPA/Ramsar could occur due to use of MBT.

6.2 Permanent Loss of Functionally Linked Habitat (Construction)

6.2.1 Stage 1 of the HRA process identified that habitats within and adjacent to the Proposed Development Site have the potential to be used by the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar for breeding, roosting and/or feeding.

6.2.2 This could have an adverse effect on the following conservation objectives of the Teesmouth and Cleveland Coast SPA:

- maintain or restore the extent and distribution of the habitats of the qualifying features;
- maintain or restore the population of each of the qualifying features;
- maintain or restore the distribution of the qualifying features within the site.

6.2.3 The only sectors where permanent habitat loss will occur are Sectors 9 and 12 within the Main Site. Black headed gull and herring gull were recorded within Sector 9 at high tide. A peak count of 10 black-headed gulls were recorded in November 2022, a mean frequency of 0.94. This is below 1% of the SPA / Ramsar population. A peak count of 28 herring gulls was recorded in March 2022, with a mean frequency of 2.5. This is above the 1% SPA population threshold. Although the number of gulls recorded in March was above the 1% SPA population, the Teesmouth and Cleveland coast SPA and Ramsar is designated for non-breeding rather than breeding birds. As the birds were recorded in March (outside of the wintering period), the loss of habitat is unlikely to have an adverse effect upon site integrity.

6.2.4 At low tide a peak count of 6 herring gulls was recorded in Sector 9 in January 2022 (mean frequency of 0.5). This is below 1% of the SPA / Ramsar population.

6.2.5 Herring gulls were recorded within Sector 12 at low tide with a peak count of 40 birds in April 2023 (mean frequency 5.75). This is above 1% of the SPA population. However, as the SPA and Ramsar is designated for non-breeding herring gull, and the peak count was recorded in April 2023, there will be no adverse effect on site integrity.

6.2.6 Habitats within and surrounding the main site have been subject to ongoing disturbance from industrial activities and the ornithology data shows that use of habitats within and adjacent to the main site is largely opportunistic.

6.2.7 In summary, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of permanent loss of functionally linked land for herring gull or black-headed gull.

6.3 Temporary Loss of Functionally Linked land (Construction)

The Foundry

6.3.1 There will be temporary loss of functionally linked habitat at the following locations:

- [redacted]
- Sector 15: gadwall, lapwing, herring gull and black-headed gull.
- Sector 9: herring gull and black-headed gull;
- Sector 10: herring gull;
- Sector 12: herring gull;
- Sector 13 herring gull.

6.3.2 Sector 18 comprises of Dabholm gut which is a tidal creek with associated mudflats. Although Sector 18 includes the Proposed Development Site on the northern bank of Dabholm Gut, the bird assemblage mainly uses the creek itself, which will not be affected. The Teesmouth and Cleveland Coast SPA and Ramsar are designated for [redacted] and common tern. [redacted]

6.3.3 Sector 15 is located to the south-east of the Main Site. Gadwall, lapwing, herring gull and black-headed gull were recorded at this location. Two gadwalls were recorded in May 2023 during high tide, a mean frequency of 0.13. Gadwall was not recorded within sector 15 during the low tide surveys. As the number of gadwall recorded is below 1% of the SPA / Ramsar population, there will be no adverse effect on site integrity from displacement of this species.

6.3.4 A peak count of seven lapwing were recorded within Sector 15 at low tide (mean 1.85) and a peak count of eight lapwing recorded within Sector 15 at high tide (mean 1.69). As the number of lapwing recorded is below 1% of the SPA / Ramsar population, there will be no adverse effect on site integrity from temporary loss of functionally linked land within Sector 15 for this species.

6.3.5 Sectors 9, 10, 12, 13 and 15 are all within The Foundry and it is assumed that work will be taking place within these areas concurrently. Sector 18 is Dabholm Gut. Herring gull was recorded within all sectors and black-headed gull was recorded in sectors 8, 9, 15 and 18.

6.3.6 Table 6-1 summarises the peak numbers of herring gull and black-headed gull recorded at each location. Where numbers are in bold font this denotes where 1% of the SPA qualifying population is equalled or exceeded.

Table 6-1: Records of Herring Gull and Black-headed Gull Recorded with The Foundry

SECTOR NUMBER	HERRING GULL	BLACK-HEADED GULL
9	High tide peak count – 28 (March 2022) High Tide Mean (freq) – 2.5 (3) Low tide peak count – 6 (January 2022) Low tide mean (Freq) - 0.5 (1)	High Tide Peak Count – 10 (Nov 2022) Mean (freq) – 0.94 (3) Low tide – not recorded
10	High Tide Peak Count – 20 (Jan 2022) High Tide Mean (freq) – 1.25 (1) Low tide peak count – 6 (Jan 2022) Low tide mean (freq) – 0.5 (1)	High Tide – not recorded Low tide – not recorded
12	High Tide peak count – not recorded Low tide peak count – 40 (April 2023) Low tide mean (freq) - 5.75 (2)	High Tide – not recorded Low tide – not recorded
13	High tide peak count – 5 (Jan 2022) High tide mean (freq) – 0.31 (1) Low tide peak count 1 (Jan 2022) Low tide mean (freq) – 0.08 (1)	High Tide – not recorded Low tide – not recorded
15	High tide peak count – 40 (June 23) High tide mean (freq) – 7.5 (4) Low tide peak count – 36 (March 2023) Low tide mean (freq) – 8.08 (5)	High tide peak count –14 (May 2023) High tide mean (freq) – 1.81 (3) Low tide – not recorded
18	High tide peak count – 7 (June 2023) High tide mean (freq) – 1.54 (5) Low tide peak count – 5 (March 2023) Low tide mean (freq) - 2.08	High tide peak count – 90 (Jan 2023) High tide mean (freq) – 24.46 (10) Low tide peak count – 105 (Feb 2022) Low tide mean (freq) – 44.62 (12)

6.3.7 The above table indicates that more than 1% of the SPA population of herring gull will be affected due to loss of functionally linked land within Sectors 9, 10, 12 and 15. However, the peak counts of herring gull and black-headed gull within sectors 9, 12 and 15 occurred between March and June, which is outside the wintering period. Therefore, only Sectors 8, 10 and 18 support numbers of non-breeding herring gull or black-headed gull above the 1% threshold during the wintering period.

6.3.8 Sector 10 is located to the east of the Main Site and was surveyed 16 times at high tide and 13 times at low tide. Within this sector, herring gull were recorded on one high tide count (in January 2022) when a peak count of 20 birds was recorded (this exceeds 1% of the SPA population). There were no other occurrences of this species during high tide counts, and only a single occurrence of 38 herring gull during all 13 of the low tide counts. Use of this sector by herring gull is therefore no more than occasional and likely to be curtailed by the presence of ongoing industrial activities (site clearance, vehicle movements, the presence of site staff) within South Tees Development Corporation (STDC). Therefore, temporary loss of land within this sector is considered not likely to result in a significant loss of suitable habitat for herring gull.

6.3.9 Sector 18 comprises Dabholm gut, which is a tidal creek with associated mudflats. Black – headed gulls were present within this sector on 10 of the 13 high tide surveys (peak count 90 in January 2023) and 12 of the 13 low tide survey (peak count 105 in February 2023). Roosting was recorded once in September 2022 on a spit of dry land within the eastern end of the channel. Although Sector 18 includes the terrestrial habitats that overlap the Proposed Development Site on the northern bank of Dabholm Gut, black-headed gulls mainly use the creek itself which will not be directly affected. Therefore, temporary loss of land within this sector is not considered to result in a significant loss of suitable habitat for black-headed gulls and thus no adverse effect on integrity.

Seal Sands

6.3.10 There will be temporary loss of functionally linked habitat at the following locations:

- Sector 2: redshank, lapwing and black-headed gull;
- Sector G4: gadwall, lapwing, shoveler and black-headed gull;

6.3.11 Sector 22: black-headed gull. Sector 2 is located south of Greatham Creek, and the proposed HDD launch pit and compound for pipe stringing are located within this sector. No redshank were recorded during the high tide counts and a peak count of 9 redshank were recorded during the low tide count in July 2023 (mean 0.56). As less than 1% of the redshank population was recorded within Sector 2, there will be no adverse effect on site integrity from temporary loss of functionally linked land within this sector for this species.

6.3.12 A peak count of 4 lapwings were recorded within Sector 2 at high tide in January 2023 (mean of 0.31). A peak count of 4 lapwings was also recorded within Sector 2 at low tide (mean 0.25). As less than 1% of the lapwing population was recorded within Sector 2, there will be no adverse effect on site integrity from loss of functionally linked land within this sector.

6.3.13 No black headed gulls were recorded within Sector 2 at high tide. A peak count of 2 black-headed gulls were recorded at low tide (mean 0.13). As less than 1% of the black-headed gull population was recorded within Sector 2, there will be no adverse effect on site integrity from temporary loss of functionally linked land within this sector.

6.3.14 Sector G4 is located south of Greatham Creek within the area known as the Brinefields. A peak count of 4 gadwall was recorded in May 2023 (mean 0.55) at high tide and one gadwall in May 2023 during low tide (mean 0.07). As less than 1% of the gadwall population was recorded within Sector G4, there will be no adverse effect on site integrity from temporary loss of functionally linked land within this sector.

6.3.0 A peak count of 105 lapwing were recorded within Sector G4 in January 2023 (mean 14.91). This is above 1% of the SPA population. A peak count of 15 lapwing were recorded within G4 in December 2022 (mean 1.64).

6.3.1 A peak count of 2 shoveler were recorded within G4 in May 2023 during high tide (mean 0.18). This is above 1% of the SPA population. No shoveler were recorded in G4 during low tide surveys.

6.3.2 A peak count of 42 black headed gull were recorded at G4 at high tide in March 2023 (mean frequency 3.91). This is above 1% of the SPA population. A peak count of one black-headed gull was recorded at low tide (mean 0.07). This is below 1% of the SPA population. Black headed gull will be temporarily displaced from G4.

6.3.3 Sector 22 is located to the north of Greatham Creek. One black-headed gull was recorded on one occasion at low tide in December 2023 (0.13 mean). This is below 1 % of the SPA population. Furthermore, HDD is proposed to avoid direct impacts upon this sector, and as such, habitats will remain available to black-headed gull during the construction phase.

6.3.4 To avoid disturbance of non-breeding birds within G4 during construction, works will take place between March and September (outside of the wintering bird period). With the implementation of these timings, there will be no adverse effects on the conservation objectives of the Teesmouth and Cleveland Coast SPA and Ramsar. Once work is complete, the habitat will be restored and will be available to non-breeding birds.

North Tees Marshes

6.3.5 There will be temporary loss of functionally linked habitat affecting qualifying bird species at the following locations:

- B1: gadwall, shoveler, lapwing.
- B2: wigeon.
- B4: gadwall, shoveler, lapwing.
- B5: ruff, redshank, gadwall, shoveler, wigeon, lapwing, black-headed gull.
- B6: redshank, gadwall, shoveler, wigeon, lapwing, black-headed gull.

6.3.6 Sector B1 is to the west of the A1185 and includes a proposed construction compound. A peak count of two gadwall were recorded at B1 during low tide in January 2023 (mean 0.18). This is below 1% of the SPA population. No gadwalls were recorded during the high tide surveys. A peak count of one shoveler was recorded at B1 in April 2023 during low tide (mean 0.09). This is below 1 % of the

SPA population. No shovelers were recorded during the high tide surveys. A peak count of 12 lapwings were recorded at B1 in December 2022 during low tide (mean 1.36). This is below 1% of the SPA population. No lapwings were recorded within B1 during high tide.

6.3.7 Sector B2 will only be affected if Option A is brought forward. A peak count of 20 wigeon were recorded at B2 at high tide in December 2022 (mean 1.82). This is below 1 % of the SPA population. No wigeon were recorded at B2 at low tide.

6.3.8 Sector B4 will only be affected if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. No gadwall were recorded within B4 during the high tide surveys. A peak count of one gadwall was recorded within B4 during the low tide surveys (mean 0.18). This is below 1% of the SPA population. No shovelers were recorded within B4 during the high tide surveys. A peak count of four shovelers were recorded within B4 in April 2023 (mean 0.36). This is above 1% of the SPA qualifying population. A peak count of 240 lapwing were recorded within B4 at high tide in January 2023 (mean 21.91). This is above 1% of the SPA qualifying population. A peak count of 4 lapwings were recorded at low tide in April 2023 (mean 0.36). This is below 1% of the population.

6.3.9 Sector B5 will only be affected if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. A peak count of eight ruff were recorded during high tide in September 2023 (mean 0.73). This is above 1 % of the SPA qualifying population. No ruff were recorded within B5 at low tide. A peak count of one redshank was recorded in November 2022 at high tide (mean 0.09) and three redshank in November 2022 at low tide (peak frequency 0.27). This is below 1% of the SPA qualifying population. A peak count of four gadwall were recorded at high tide in May 2023 (mean 0.36), and a peak count of two gadwall were recorded at low tide in May 2023 (mean 0.36). This is below 1% of the SPA qualifying population. A peak count of four shoveler were recorded a high tide in May 2023 (mean 0.64). This is above 1 % of the SPA qualifying population. No shovelers were recorded within B5 at low tide. A peak count of 75 wigeon were recorded at high tide in November 2022 (mean 6.82). A peak count of 64 wigeon were recorded at low tide in November 2022. Both counts are above 1 % of the SPA qualifying population. A peak count of 57 lapwing were recorded in January 2023 at high tide (mean 16.91). This is above 1 % of the SPA qualifying population. A peak count of 20 lapwing was recorded at low tide in December 2022 (mean 3.73). This is below 1% of the SPA qualifying population. A peak count of 10 black-headed gulls were recorded at high tide in May 2023 (mean 0.91). A peak count of 46 black-headed gulls were recorded at low tide in May 2023 (mean 6.27). This is above 1% of the SPA qualifying population. A peak count of 76 teal were recorded at high tide in September 2023 (mean 16.82) and a peak count of 21 teal were recorded at low tide in November 2022 (mean 2.73). Both counts are above 15 of the SPA qualifying population.

6.3.10 Sector B6 will only be affected if the Transmission and Distribution Infrastructure Connection at Cowpen Bewleyis taken forward. One redshank was recorded in December 2022 during high tide (mean 0.09) and a peak count of four redshank

were recorded in November 2022 (mean frequency 0.33). These counts are below 1 % of the SPA qualifying population. No gadwall were recorded during the high tide surveys and a peak count of two gadwalls were recorded during the low tide survey in April 2023. Both counts for gadwall are below 1% of the SPA qualifying population. A peak count of one shoveler was recorded at high tide in May 2023 (mean 0.08) and a peak count of two shovelers was recorded at low tide in April 2023. This is above 1% of the SPA qualifying population. No wigeon were recorded during the high tide surveys, however a peak count of 70 wigeon was recorded during the low tide surveys in February 2023 (mean 6.58). This is above 1% of the SPA qualifying population. A peak count of 50 lapwing were recorded during the high tide surveys in December 2022 (mean 8.33). This is above 1% of the SPA qualifying population. No lapwings were recorded during the low tide surveys. A peak count of 71 black-headed gulls were recorded during the high tide surveys in December 2022 (mean 11.83). This is above 1% of the SPA qualifying population. No black-headed gulls were recorded during the low tide surveys.

6.3.11 There is the potential for temporary loss of functionally linked land within Sectors B4, B5 and B6 during construction to affect non-breeding shoveler, lapwing, ruff, wigeon and black-headed gull. To avoid effects on these species, works to construct the Transmission and Distribution Infrastructure Connection at Cowpen Bewley will be completed between March and September. Once works are complete, the habitat will be restored and will be available to non-breeding birds. Therefore, there will be no adverse effects upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of loss of functionally linked land.

6.4 Visual Disturbance (Construction)

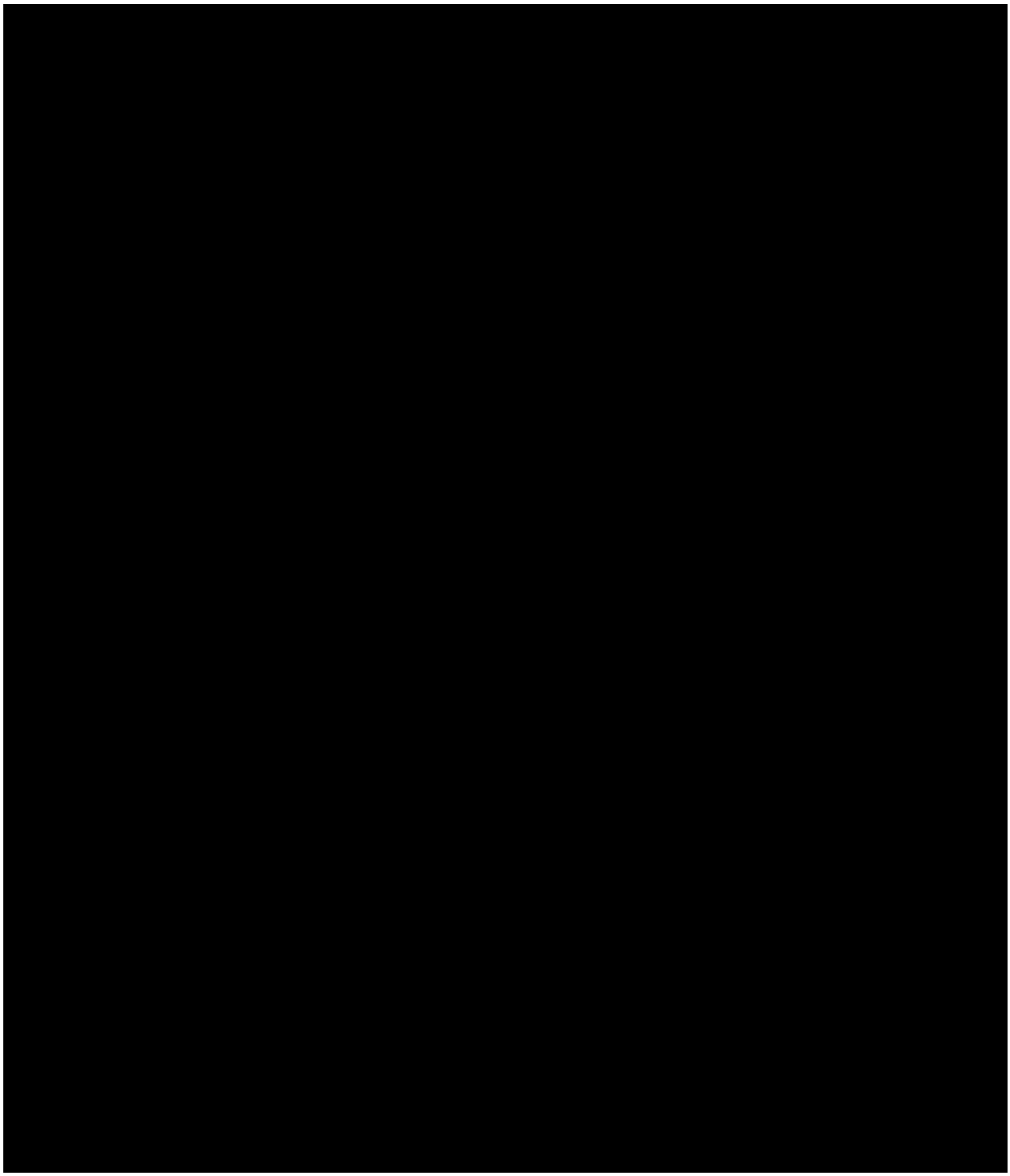
6.4.1 Stage 1 screening identified that there is the potential for visual disturbance of the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar. The areas which could be affected by visual disturbance are summarised in Table 6-2. Where the species has been recorded in numbers above 1 % of the SPA population the sector number is highlighted in bold.

Table 6-2: Qualifying Bird Species with the Potential to be Affected by Visual Disturbance During Construction

QUALIFYING BIRD SPECIES	SECTORS AFFECTED
[redacted]	[redacted]
Red knot	6, 7, 8a (Bran Sands Bay) Seal Sands 18, 19, 20, 23d North Tees Marshes G6, G7
Ruff	B5 , G2, G6 (North Tees Marshes –the Transmission and Distribution Infrastructure Connection at Cowpen Bewley)

QUALIFYING BIRD SPECIES	SECTORS AFFECTED
Common redshank	3a, 6, 7, 8a, 16, 18 (The Foundry / Bran Sands Bay) 2, 4, 25, 17, 17a, 19, 20, 21, 22b, 22c, 22d, 22f, 22e, G5 (Seal Sands). G1, B5, B6, G2, G3, G13, B12, B14, G7 (North Tees Marshes).
Sandwich tern	6, 7, 8a, 14 (The Foundry) 18 (Seal Sands) G7 (North Tees Marshes)
Common tern	7, 8a, 18 (The Foundry) Seal Sands (17, 17a, 19, 21, G5, G6) North Tees Marshes (G2, G3, G7)
Gadwall	15, 16, 18 (The Foundry) 4, 17, 21, 22a, 22c, 22d, 22e, 23b, 23d, 24, G4, G5 (Seal Sands) G1, G2, G3, G6, G7, G13, B1, B4, B5, B6, B7, B12 (North Tees Marshes)
Northern shoveler	4, 19, 24, G4, 22a, 22b, 22c, 22d, 22e (Seal Sands). G1, B1, B3, B4, B5, B6, G2, G3, B7, B12, G7, G13 (North Tees Marshes).
Sanderling	6, 7 (The Foundry) 25 (Seal Sands)
Wigeon	16, 19, 21, 24, G5, 22a, 22c, 22b, 22d, 22e, 23d (Seal Sands) G1, B2, B5, B6, G2, G3, B7, B12, G7, G13 (North Tees Marshes).
Lapwing	3a, 8a, 14, 15, 16, 18, 7 (The Foundry). 2, 25, 24, G4, G5, 22c, 19, 21, 22d (Seal Sands). G1, B1, B3, B4, B5, B6, G2, G3, B7, B12, B13, B14, G7, G13 (North Tees Marshes).
Herring gull	6, 7, 8a, 9, 10, 12, 13, 14, 15, 16 (the Foundry) 25, 19, 20, 24, 21, 17 (Seal Sands). G1, G7, G13, B12 (North Tees Marshes).
Black-headed gull	3a, 6, 7, 8, 8a, 9, 14, 15, 16, 18 (The Foundry). 2, 4, 17, 17a, 21, 22, 22c, 22d, 25, 19, 20, 24, 25, G4, G5, 22b, 22e, 23a, 23d, 23g (Seal Sands) G1, B5, B6, G2, G3, B7, B12, B14, G7, G13 (North Tees Marshes).

[redacted]



Visual Disturbance of Red Knot

6.4.7 Migratory red knot are a qualifying feature of the Teesmouth and Cleveland Coast SPA and Ramsar. Red knot were recorded in numbers greater than 1% of the SPA qualifying population in Sectors 6 and 7 and 8a at Bran Sands Bay where they forage along the shore. The majority of birds within these sectors were recorded over 300m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk

Terminal, the potential for visual disturbance is limited. Sector 8a is naturally screened from visual disturbance due to the shape of the bays. As such, There will be no adverse effects on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of disturbance of non-breeding red knot.

Visual Disturbance of Ruff

6.4.8 Non-breeding ruff are a qualifying feature of the Northumbria Coast SPA and Ramsar. Ruff was recorded within Sector B5 the Transmission and Distribution Infrastructure Connection at Cowpen Bewley). A peak count of eight ruff were recorded during high tide in September 2023 (mean frequency 0.73). This is above 1 % of the SPA qualifying population. No ruff were recorded within B5 at low tide. As discussed in Section 6.1.43, there is potential for temporary loss of functionally linked land used by ruff if Option A (of the Transmission and Distribution Infrastructure Connection at Cowpen Bewley) is brought forward. There is also potential for visual disturbance of ruff during the works at this location.

6.4.9 To avoid visual disturbance of ruff, construction of the Transmission and Distribution Infrastructure Connection at Cowpen Bewley will be completed between March and September (outside of the wintering bird period).

6.4.10 Ruff was recorded in G2 which is to the north-east of the A1185. This location is separated from the proposed works by an existing busy road. Therefore, any birds at this location are likely to be habituated to some visual disturbance. Ruff were recorded at G6 which is separated from the Proposed Development Site by Seaton Carew Road, and therefore Ruff at this location are unlikely to be affected by visual disturbance. As such, there will be no adverse effects on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of disturbance of non-breeding ruff.

Visual Disturbance of Redshank

6.4.11 Redshank are part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. At the Foundry, redshank were recorded in numbers above 1% in sectors 6, 7, 8a, 16 and 18. Sectors 6 and 7 cover Bran Sands Bay. The majority of birds foraging at Bran Sands Bay were recorded over 300 m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk Terminal, the potential for visual disturbance is limited.

6.4.12 Sector 8a is located to the west of Bran Sands Bay and to the north of the Proposed Development Site. This sector includes several small, sheltered bays which are used by foraging birds. The bays are at a lower elevation than the Proposed Development Site and are naturally screened from any visual disturbance. Therefore, disturbance of redshank at this location will be negligible.

6.4.13 Sector 16 is a lagoon located north of Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing.

6.4.14 Sector 18 is Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing.

6.4.15 Construction of the River Tees HDD crossing is estimated to take approximately 50 weeks. To minimise visual disturbance of Sector 16 and Sector 18, 360º visual screening of the HDD location is proposed. Indicative locations for screening are shown on Figure 14b.

6.4.16 Sectors 25, 4, 19 and 20 are north of the Tees in the Seal Sands area. Sector 25 comprises of the mudflats north of the River Tees at Navigator terminals. There is potential for visual disturbance at this location during HDD under the River Tees. To avoid visual disturbance at this location, screening is proposed along the east-side of the construction area (screening the mudflats along the riverbank). Indicative locations for screening are shown on Figure 14b.

6.4.17 Sector 4 is a pool to the east of the Greatham Creek HDD crossing. This sector is approximately 30 m east of the Proposed Development Site and there is potential for visual disturbance of birds during HDD and pipe stringing. The pool sits within a relatively deep depression surrounded by dense mature reedbed habitat. Immediately to the west of the pool and associated reedbed habitat is an embankment or earth bund, the summit of which is approximately 3-4m above the water level and 4-5m above the land west of the embankment. There is an intermittent band of dense mature scrub immediately to the west of the embankment. The combined effect of earth bunds/embankments and scrub effectively screens the pool from the HDD site and other working areas to the west between Brinefields and Seal Sands Bay.

6.4.18 Sectors 19 and 20 cover Seal Sands Bay. Seal Sands Bay is screened from the Proposed Development Site by an existing bund, therefore visual disturbance of birds within these sectors will be negligible.

6.4.19 With the proposed mitigation, it is considered that there would be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of visual disturbance of redshank during construction.

Visual Disturbance of Sandwich Tern

6.4.20 Non-breeding sandwich tern is a qualifying feature of the Teesmouth and Cleveland Coast SPA and Ramsar. Sandwich tern was recorded in numbers above 1% of the SPA qualifying population within Main Site count Sector 7 and Seal Sands count 18. Main Site count Sector 7 is Bran Sands Bay and Seal Sands count Sector 18 is Seal Sands Bay.

6.4.21 The majority of birds within sector seven were recorded over 300 m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk Terminal, disturbance will be negligible. Therefore, there will be no adverse effects on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of disturbance of sandwich tern.

Visual Disturbance of Common Tern

6.4.22 Breeding common tern are a qualifying feature of the Teesmouth and Cleveland Coast SPA and Ramsar. Common terns were recorded in numbers above 1% of the SPA qualifying population in Main Site count Sectors 7 and 8a (Bran Sands Bay), Seal Sands count sector 17a (Greatham Greek) and North Tees Marshes count sector G3 (Cowpen Marsh). The majority of birds foraging at Bran Sands Bay were recorded over 300 m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk Terminal, the potential for visual disturbance is limited. Sector 8a is naturally screened from visual disturbance due to the shape of the bays. Sector 17a is the waterbody immediately north of the proposed HDD and pipe-stringing site at Greatham Creek. HDD works to cross Greatham Creek will be completed between September and November to avoid disturbance of nesting birds. Furthermore, common tern occurred on only one occasion foraging and loafing within 17a in July 2023, indicating occasional opportunistic use of this location rather than regular occurrence here. Therefore, there will be no effects upon breeding common tern at this location.

6.4.23 Sector G3 is a large sector covering Cowpen Marsh. The proposed works area is separated from G3 by the A174 (Tees Road). Therefore, the area is already subject to some visual disturbance. The construction compound will be screened by existing trees minimising visual disturbance of G3, therefore effects on breeding common tern will be negligible.

6.4.24 With the above mitigation, there will be no adverse effects on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of disturbance of common tern.

Visual Disturbance of Northern Shoveler

6.4.25 Shoveler is part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. Shoveler were recorded in numbers above 1% in sectors G4, 22a, 22b, 22c, 22d, 22e, B5, G2, G3, B7, G7 and G13.

6.4.26 Sectors 22a, 22b, 22c, 22d and 22e are a series of pools within Greenabella Marsh, to the north of Greatham Creek. These pools will be screened from the HDD works to the south of Greatham Creek by the existing sea wall and embankments flanking both banks of Greatham Creek channel, which are approximately 4m above the surrounding land. Screening is proposed around the HDD site to the north of these pools minimising the risk of visual disturbance (refer to Figure 14a).

6.4.27 Sector G4 is within the Brinefields and there is potential for loss of functionally linked land and visual disturbance of shoveler at this location. To avoid visual disturbance of non-breeding birds within G4, works will be completed between March and September (outside of the wintering bird period).

6.4.28 Sector B5 will only be disturbed if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. There is potential for temporary loss of functionally linked land and visual disturbance to affect shoveler at B5. Works

at this location will also be completed between March and September (outside of the wintering bird period).

6.4.29 G2 covers Cowpen Marsh and is located to the north-east of the A1185 (Seal Sands Road). The closest areas of the Proposed Development Site to this sector are access roads. Any birds within G2 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance will be negligible.

6.4.30 G3 also covers Cowpen Marsh. The proposed works area is separated from G3 by the A174 (Tees Road). Therefore, the area is already subject to some visual disturbance. The construction compound will be screened by existing trees minimising visual disturbance of G3, therefore visual disturbance will be negligible.

6.4.31 B7 is a pool to the north-east of the A1185 (Seal Sands Road). The closest area of the Proposed Development Site to this sector is an access road. Any birds within B7 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance at this location will be negligible.

6.4.32 G7 is an area of marshland north of Greatham Creek and to the east of the A178 (Tees Road). The closest area of the Proposed Development Site to this sector is an access road and the HDD location south of Venetor. G7 is screened from the Proposed Development Site by an existing bund, therefore effects from visual disturbance at this location will be negligible.

6.4.33 G13 is located east of the A178 (Tees Road). This sector is also screened by an existing bund and therefore effects from visual disturbance will be negligible.

6.4.34 With the above timing of works and mitigation measures, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar from visual disturbance of shoveler.

Visual Disturbance of Wigeon

6.4.35 Wigeon is part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. Wigeon were recorded in numbers above the 1% of the GB non-breeding population at the following sectors: G5, G1, B5, G2, G3, B7, G7, G13.

6.4.36 Sector G5 is immediately west of the Proposed Development Site and adjacent to where HDD and pipe stringing are proposed. Wigeon were mainly using the tidal pools and channels in this sector rather than the open grassland. There is potential for visual disturbance of birds during these works. Work at this location will be temporary and completed between September and November to avoid the most sensitive period for wintering birds. Screening will be used along the western boundary of the works area to minimise visual disturbance of these pools (refer to Figure 14a).

6.4.37 Wigeon within Sector G1 has the potential to be disturbed during above ground pipeline construction and buried pipeline construction if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. To avoid disturbance of wigeon at this location, works will be completed between March and September (outside of the wintering bird period).

6.4.38 Wigeon within B5 have the potential to be affected by loss of functionally linked land during construction and visual disturbance if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. To avoid disturbance of wigeon at this location, works will be completed between March and September (outside of the wintering bird period).

6.4.39 Sector G2 covers Cowpen Marsh and is located to the north-east of the A1185 (Seal Sands Road). The closest areas of the Proposed Development Site to this sector are access roads. Any birds within G2 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance will be negligible.

6.4.40 G3 also covers Cowpen Marsh. The proposed works area is separated from G3 by the A174 (Tees Road). Therefore, the area is already subject to some visual disturbance. The construction compound will be screened by existing trees minimising visual disturbance of G3, therefore visual disturbance will be negligible.

6.4.41 B7 is a pool to the north-east of the A1185 (Seal Sands Road). The closest area of the Proposed Development Site to this sector is an access road. Any birds within B7 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance at this location will be negligible.

6.4.42 G7 is an area of marshland north of Greatham Creek and to the east of the A178 (Tees Road). The closest area of the Proposed Development Site to this sector is an access road and the HDD location south of Venetor. G7 is screened from the Proposed Development Site by an existing bund, therefore effects from visual disturbance at this location will be negligible.

6.4.43 G13 is located east of the A178 (Tees Road). This sector is also screened by an existing bund and therefore effects from visual disturbance will be negligible.

6.4.44 With the above timing of works and mitigation, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of visual disturbance of wigeon.

Visual Disturbance of Lapwing

6.4.45 Lapwing is part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. Lapwing were recorded in numbers above the 1% threshold in the following sectors: 8a, 14, 16, 18 (Foundry), 25, G4, G5, 22c, 22d (Seal Sands) and G1, B4, B5, B6, G2, G3, B14, G7, G13 (North Tees Marshes).

6.4.46 Sector 8a is located to the west of Bran Sands Bay and to the north of the Proposed Development Site. This sector includes several small, sheltered bays which are used by foraging birds. The bays are at a lower elevation than the Proposed Development Site and are naturally screened from any visual disturbance. Therefore, disturbance of lapwing at this location will be negligible.

6.4.47 Sector 14 is south-west of the Main Site. There is potential for visual disturbance at this location during construction of the Main Site. However, this location has been subject to disturbance for several years and use of this location by lapwing is likely to be opportunistic.

6.4.48 Sector 16 is a lagoon located north of Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing.

6.4.49 Sector 18 is Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing. To minimise visual disturbance within sectors 16 and 18, 360º visual screening of the HDD location is proposed (refer to Figure 14b for locations).

6.4.50 Sector 25 comprises of the mudflats north of the River Tees at Navigator terminals. There is potential for visual disturbance at this location during HDD under the River Tees. To avoid visual disturbance at this location, screening is proposed along the east-side of the construction area (screening the mudflats along the riverbank). Figure 14b shows the location of screening.

6.4.51 Sector G4 is the Brinefields. There is potential for loss of functionally linked land and visual disturbance of lapwing at this location. To avoid visual disturbance of non-breeding birds within G4, works will be completed between March and September (outside of the wintering bird period).

6.4.52 Sector G5 is immediately west of the Proposed Development Site and adjacent to where HDD and pipe stringing are proposed. There is potential for visual disturbance of birds using the pools and lagoons in this area during these works. Screening will be used along the western boundary of the works area to minimise visual disturbance of these pools (refer to Figure 14a for locations).

6.4.53 Sectors 22c and 22d are pools within Greenabella Marsh, to the north of Greatham Creek. These pools will be screened from the HDD works to the south of Greatham Creek by the existing sea wall. In addition, screening of the HDD area to the north of Greatham Creek will minimise risk of visual disturbance of these pools (refer to Figure 14a for locations).

6.4.54 Lapwing within Sector G1 have the potential to be disturbed during above ground pipeline construction and buried pipeline construction if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. To avoid disturbance of lapwing at G1, works will be completed between March and September (outside of the wintering bird period).

6.4.55 There is potential for visual disturbance of lapwing within B4, B5 and B6 if the Transmission and Distribution Infrastructure Connection at Cowpen Bewley is brought forward. To avoid disturbance of lapwing at B4, B5 and B6, works will be completed between March and September (outside of the wintering bird period).

6.4.56 Sector G2 covers Cowpen Marsh and is located to the north-east of the A1185 (Seal Sands Road). The closest areas of the Proposed Development Site to this sector are access roads. Any birds within G2 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance will be negligible.

6.4.57 G3 also covers Cowpen Marsh. The proposed works area is separated from G3 by the A174 (Tees Road). Therefore, the area is already subject to some visual

disturbance. The construction compound will be screened by existing trees minimising visual disturbance of G3, therefore visual disturbance will be negligible.

6.4.58 B14 is located to the north-east of the A1185 (Seal Sands Road). The closest areas of the Proposed Development Site to this sector are access roads. Any birds within B14 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance will be negligible.

6.4.59 G7 is an area of marshland north of Greatham Creek and to the east of the A178 (Tees Road). The closest area of the Proposed Development Site to this sector is an access road and the HDD location south of Venetor. G7 is screened from the Proposed Development Site by an existing bund, therefore effects from visual disturbance at this location will be negligible.

6.4.60 G13 is located east of the A178 (Tees Road). This sector is also screened by an existing bund and therefore effects from visual disturbance will be negligible.

6.4.61 With the above timing of works and mitigation, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of visual disturbance of lapwing.

Visual Disturbance of Herring Gull

6.4.62 Herring gull are part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. Herring gull were recorded in numbers above 1 % of the GB non-breeding population at the following sectors: 6, 7, 9, 10, 12, 14, 15, 16 (the Foundry), 19 and 20 (Seal Sands), and B12 (North Tees Marshes).

6.4.63 As discussed in section 6.1, sectors 9, 12 and 15 recorded peak counts of herring gull between March and June, therefore the works are not predicted to disturb the non-breeding population. Sector 10 supports numbers of non-breeding herring gull above the 1 % threshold during the wintering period. There is potential for loss of functionally linked land and visual disturbance within this sector during construction. Use of this sector by herring gull is no more than occasional and likely to be curtailed by the presence of ongoing industrial activities (site clearance, vehicle movements, the presence of site staff) within South Tees Development Corporation (STDC). Therefore, visual disturbance of land within this sector is considered not likely to result in a significant loss of suitable habitat for herring gull.

6.4.64 Sectors 6 and 7 cover Bran Sands Bay approximately 250 m north of the Proposed Development Site. The majority of birds foraging at Bran Sands Bay were recorded over 300 m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk Terminal, the potential for visual disturbance is limited.

6.4.65 Sector 14 is located to the south-west of the main site. There is potential for visual disturbance of this location during construction of the Main Site. This sector has also been subject to ongoing industrial activities, herring gulls have become habituated to disturbance at this location.

6.4.66 Sector 16 is a lagoon located north of Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing.

6.4.67 Sector 18 is Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing. To minimise visual disturbance within sectors 16 and 18, 360º visual screening of the HDD location is proposed (refer to Figure 14b for locations).

6.4.68 Sectors 19 and 20 cover Seal Sands Bay. Seal Sands Bay is screened from the Proposed Development Site by an existing bund, therefore visual disturbance of birds within these sectors will be negligible.

6.4.69 B12 is a waterbody located to the east of the A1185 (Seal Sands Road). The closest areas of the Proposed Development Site to this sector are access roads. Any birds within B14 will be habituated to visual disturbance from traffic and therefore effects from visual disturbance will be negligible.

6.4.70 With the above mitigation, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of visual disturbance of herring gull.

Visual Disturbance of Black-headed Gull

6.4.71 Black-headed gulls are part of the waterbird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar. Black-headed gull were recorded in numbers above 1 % of the GB non breeding population at the following sectors: 6, 7, 8, 14,16, 18 (The Foundry). 17, 20, 24, 25, G4, G5 (Seal Sands) B6, G2, G3, B12, B14, G7 (North Tees Marshes).

6.4.72 Sectors 6 and 7 cover Bran Sands Bay approximately 250 m north of the Proposed Development Site. The majority of birds foraging at Bran Sands Bay were recorded over 300 m from the Proposed Development Site. Furthermore, as the shoreline is lower than the Proposed Development Site, and separated by land at Redcar Bulk Terminal, the potential for visual disturbance is limited. The area of the Proposed Development Site closest to Bran Sands Bay has been subject to ongoing industrial activities and it is likely that black-headed gulls have become habituated to disturbance at this location.

6.4.73 Sector 8 has also been subjected to ongoing industrial activities. Habitats currently comprise of bare ground, although previously spoil heaps have been present in this area. Forty-five black-headed gull were recorded here within a mixed roost with common gull in February 2022. This number exceeds 1% of the SPA population but was the only occurrence of this species here. Therefore, it is considered that this occurrence was opportunistic and the temporary loss of this area would not have an adverse effect on the SPA.

6.4.74 Sector 14 is located to the south-west of the main site. There is potential for visual disturbance of this location during construction of the Main Site. This sector has also been subject to ongoing industrial activities, and it is likely that black-headed gulls have become habituated to disturbance at this location. It is considered

unlikely that disturbance at this location would result in an adverse effect upon the SPA / Ramsar.

6.4.75 Sector 16 is a lagoon located north of Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing.

6.4.76 Sector 18 is Dabholm Gut. There is potential for visual disturbance at this location during HDD, above ground pipeline construction and pipeline testing. To minimise visual disturbance within sectors 16 and 18, 360º visual screening of the HDD location is proposed (refer to Figure 14b for locations).

6.4.77 With the above mitigation, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of visual disturbance of black-headed gull.

6.5 Noise Disturbance (Construction)

6.5.1 The assessment of LSE concluded that there was potential for noise disturbance to affect the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar at the following locations:

Table 6-3: Sectors where Noise has the Potential to Disturb Qualifying Features of the Northumbria Coast SPA and Ramsar

AREA	SECTOR	SPECIES WITH POTENTIAL TO BE DISTURBED IN NUMBERS ≥1% OF QUALIFYING POPULATION
ROW FENCING AND PREPARATORY CONSTRUCTION WORKS		
The Foundry	9	herring gull
	10	herring gull
	12	herring gull
	14	black headed gull, herring gull, lapwing
	15	herring gull
	16	black-headed gull, herring gull, lapwing, redshank
	[redacted]	
Seal Sands	[redacted]	
	17	black-headed gull
	21	herring gull
	4	redshank, shoveler
	[redacted]	
	G4	black-headed gull, lapwing, shoveler

AREA	SECTOR	SPECIES WITH POTENTIAL TO BE DISTURBED IN NUMBERS ≥1% OF QUALIFYING POPULATION
	[redacted]	
North Tees Marshes	G1	Lapwing, wigeon
	[redacted]	
	B3	shoveler
	B4	lapwing, shoveler
	B5	black-headed gull. Lapwing, ruff, shoveler, wigeon
	B6	black-headed gull, lapwing, shoveler, wigeon
	B14	black-headed gull, lapwing
CONSTRUCTION OF THE HYDROGEN PRODUCTION FACILITY AND COMPOUNDS		
The Foundry	6	black-headed gull, herring gull, knot, redshank
	7	black-headed gull, common tern, herring gull, redshank, sandwich tern, lapwing.
	8	black-headed gull, herring gull
	8a	common tern, lapwing, redshank
	9	herring gull
	10	herring gull
	14	black-headed gull, herring gull, lapwing
	15	herring gull
Seal Sands	G4	black-headed gull, lapwing, shoveler
North Tees Marshes	G1	lapwing, wigeon
	[redacted]	
	B4	lapwing
	B14	black-headed gull, lapwing, redshank

AREA	SECTOR	SPECIES WITH POTENTIAL TO BE DISTURBED IN NUMBERS ≥1% OF QUALIFYING POPULATION
CONSTRUCTION OF THE CONNECTION CORRIDORS – ABOVE GROUND		
The Foundry	16	black-headed gull, cormorant, herring gull, lapwing, redshank
	17	black-headed gull
	[redacted]	
North Tees Marshes	G1	Lapwing, wigeon
CONSTRUCTION ON THE CONNECTION CORRIDORS – BELOW GROUND		
The Foundry	12	herring gull
	15	herring gull
Seal Sands	[redacted]	
	17	black-headed gull
	17a	common tern
	21	herring gull
	[redacted]	
	G4	black-headed gull, lapwing, shoveler
North Tees Marshes	G1	lapwing, wigeon
	B3	shoveler
	B4	lapwing, shoveler
	B5	black-headed gull, lapwing, ruff, shoveler, wigeon
	B6	black-headed gull, lapwing, shoveler, wigeon
PIPELINE TESTING		
The Foundry	8	black-headed gull, herring gull
	9	herring gull
	10	herring gull
	12	herring gull
	14	black-headed gull, herring gull, lapwing
	15	herring gull
	16	Black-headed gull, cormorant, herring gull, lapwing, redshank

AREA	SECTOR	SPECIES WITH POTENTIAL TO BE DISTURBED IN NUMBERS ≥1% OF QUALIFYING POPULATION
	[redacted]	
Seal Sands	[redacted]	
	21	herring gull
	17	black-headed gull
	25	black-headed gull, cormorant, lapwing, redshank
North-Tees Marshes	G1	lapwing, wigeon
	[redacted]	
	B3	shoveler
	B4	lapwing, shoveler
	B5	black-headed gull, lapwing, ruff, shoveler, wigeon
	B6	black-headed gull, lapwing, shoveler, wigeon
	B14	black-headed gull, lapwing
HDD		
The Foundry	14	black headed gull, herring gull, lapwing
	16	black-headed gull, , herring gull, lapwing, redshank
	[redacted]	
Seal Sands	25	Cormorant, lapwing, redshank, black-headed gull
	G4	black-headed gull, lapwing, shoveler
	[redacted]	
	4	redshank, shoveler
	22a	shoveler
	[redacted]	
	21	herring gull

AREA	SECTOR	SPECIES WITH POTENTIAL TO BE DISTURBED IN NUMBERS ≥1% OF QUALIFYING POPULATION
	17	black-headed gull
	17a	common tern
	[redacted]	
North-Tees Marshes	B3	Shoveler
	B6	black-headed gull, lapwing, shoveler, wigeon

Avoidance Measures

6.5.2 To avoid disturbance of non-breeding qualifying bird species, timing works to between March and September is proposed to avoid the non-breeding bird period. These timings are proposed for works within B1 to B6, G1 and G4. Locations are shown in Figure 14a.

6.5.3 To avoid disturbance of breeding bird species within G5 and to the north of Greatham Creek, HDD works will be completed between September and November to avoid the breeding bird season and to minimise disturbance to non-breeding birds.

Mitigation Measures to Minimise Noise During Construction

6.5.4 Mitigation measures for noise impacts are set out in Chapter 11: Noise and Vibration [APP-063]. It stipulates that the Final CEMP(s) will be prepared which will include measures to limit noise disturbance to Noise Sensitive Receptors (NSRs). While the Final CEMP(s) is not specifically designed to reduce impacts on bird species, any measures included will also mitigate noise impacts in the SPA / Ramsar by reducing noise levels. A list of relevant measures for noise mitigation in the Teesmouth and Cleveland Coast SPA / Ramsar includes:

- No construction works (other than trenchless crossings) at all within the SPA / Ramsar site;
- Applying measures to limit noise wherever possible and to achieve Best Practicable Means (BPMs) are achieved;
- Fabricating building elements off-site wherever possible;
- Applying maintenance and silencing (where possible) of all plant, equipment and machinery used;
- turning any equipment off when not in use;
- Loading / unloading machinery and dismantling equipment in less noise sensitive locations and/or providing screens to minimise disturbance of SPA / Ramsar birds;
- Routing of construction traffic along public roads and access tracks with longest potential distance to the SPA / Ramsar.

6.5.5 The Framework CEMP (EN070009/APP/5.12) (and which the Final CEMP(s) approved pursuant to a DCO Requirement must be in substantial accordance with) will be put in place, which will reduce the noise in relevant parts of the SPA / Ramsar to acceptable levels for qualifying birds.

Acoustic Barriers and Visual Screening

6.5.6 Figures 14a and 14b shows the locations where noise barriers and visual screening are proposed to minimise disturbance of birds. It has been assumed that installation of noise barriers will result in a 10 dB reduction in noise levels.

6.5.7 An ecological clerk of works will complete a walkover of the areas where mitigation measures are proposed in advance of installation and advise of appropriate micro-siting.

Lighting During Construction

6.5.8 The Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) provides information on the construction lighting requirements.

6.5.9 It is expected that a computational light modelling exercise will be undertaken prior to construction works taking place in sensitive areas, in terms of selecting and placing temporary lighting, to ensure that obtrusive light is suitably controlled during the construction phase and that effects to receptors are adequately managed. This would support the methodology and monitoring requirements set out in the Final CEMP(s). Lighting at ecological receptors will be limited to at most a zone E1 or lower.

Phasing of Works

6.5.10 The Proposed Development will be constructed in two phases as outlined in Chapter 4: Proposed Development [APP-056]. Phase 1 will consist of a single hydrogen production unit, on-site hydrogen storage and supporting utilities. Phase 2 will consist of a further hydrogen production unit and supporting utilities constructed thereafter. The majority of the Hydrogen Pipeline Corridors to facilitate transportation of hydrogen to offtakers will be constructed and completed in Phase 1 except for specified short additional spurs within the Hydrogen Pipeline Corridors, to be completed in Phase 2. Chapter 5: Construction Programme and Management [APP-057] and Table 6-4 below set out the construction programme for the Proposed Development.

Table 6-4: Indicative Construction Programme for the Proposed Development

DEVELOPMENT PHASE	2025				2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PPW Phase 1																								
Construction Phase 1																								
Phase 1 Operation Commences																								
Enabling Works Phase 2																								
Construction Phase 2																								
Phase 2 Operation Commences																								

6.5.11 Permitted Preliminary Works (PPW) for Phase 1 are expected to start in the third quarter (Q3) of 2025 (subject to the granting of the DCO), with the main civils works beginning in Q4 of 2025. Construction of Phase 1 is anticipated to last approximately 32 to 36 months and is expected to be complete in Q2 2028.

6.5.12 PPW are early works that are considered to be minor and therefore allowed to be undertaken prior to discharge of pre-commencement DCO Requirements. PPWs can include:

- environmental surveys
- geotechnical surveys;
- surveys and protection of existing infrastructure;
- other investigations for the purpose of assessing ground conditions;
- the preparation of facilities for the use of contractors;
- the provision of temporary means of enclosure and site security for construction;
- temporary access roads;
- paving;
- diversion of existing services and laying of temporary services;
- the temporary display of site notices or advertisements; and
- any other works agreed by the relevant planning authority, provided that these will not give rise to any materially new or materially different environmental effects from those assessed in this environmental statement.

6.5.13 The Contractor's PPW CEMP(s) will set out the measures required to prevent noise and visual disturbance prior to commencement of the development.

Summary

6.5.14 Considering the habituation of birds to existing noise levels within the main site and surrounding land, and the avoidance and mitigation measures proposed, it is concluded that the construction phase of the Proposed Development will not result in adverse effects on the Teesmouth and Cleveland Coast SPA / Ramsar regarding visual and noise disturbance. With the aforementioned measures included in the Framework CEMP (EN070009/APP/5.12), a conclusion of no adverse effect on integrity at this location could be drawn.

Noise and Visual Disturbance – Seals (Construction)

6.5.15 The assessment of LSE identified the potential for noise and visual disturbance of grey seals and harbour seals within functionally linked land (qualifying features of the Berwickshire and North Northumberland Coast SAC, the Humber Estuary SAC and the Wash and North Norfolk Coast SAC).

6.5.16 Marine and land-based construction activities associated with the Proposed Development will create airborne sound which has the potential to disturb seals

that are hauled-out nearby or have surfaced whilst in the water. The effects of disturbance could include a cessation of feeding, travelling, resting, breeding and / or socialising. Long-term effects of repeated disturbance could include permanent displacement and / or a decline in fitness and productivity (such as moulting and breeding success).

6.5.17 A haul-out site for breeding grey and harbour seals is located at Seal Sands. Seals are also known to haul-out along Greatham Creek and at Bailey Bridge, travelling between these locations, using the mouth of the creek as a point of migration. These sites are in close proximity to the Proposed Development Site boundary. Seal Sands supports the greatest number of seals followed by Greatham Creek and Bailey Bridge. On Seal Sands, the majority of harbour seals and grey seals are known to haul-out at haul-out sites A and D, respectively, as shown on Plate 14-7. Haul-out sites located in Greatham Creek and Seal Sands are within close proximity to several existing industrial sites which produce airborne sound, with the closest site known as the Venator Greatham Works on Tees Road, approximately 0.4 km northwest from Seal Sands.

Plate 6-1: Location of Haul-Out Sites on Seal Sands (INCA, 2023)

6.5.18 To inform the assessment of changes in the airborne soundscape, baseline ambient sound measurements have been taken from the industrial area surrounding Seal Sands, including on the Seal Sands emergency access road, next to the Venator

Greatham Works on Tees Road, and the Seal Sands Office (located northwest of Site B on Plate 6-1).

6.5.19 Indicative predictions of construction sound levels have been modelled to determine the impacts of construction activities on sensitive ecological receptors, including seals. These predictions were made at the baseline noise modelling locations conducted for the Proposed Development. These locations are labelled as Eb6 and Eb3, and are considered representative of potential effects to seals from both the location of HDD[9] near Greatham Creek, and the Main Site, respectively (see Updated Figure 14-7: Airborne Noise Modelling Locations for Seals).

6.5.20 To further assess the effect of airborne noise on seals movement at the mouth of Greatham Creek, an additional noise modelling location was added at the mouth of the creek (Updated Figure 14-7: Airborne Noise Modelling Locations for Seals).

6.5.21 Ambient noise levels are only available at the baseline noise monitoring locations, the closest to Greatham Creek being Eb3. It is not possible to provide ambient noise levels across the whole area due to the complex noise environment, which would be impractical to model. Therefore, for the purpose of this assessment the ambient noise levels at the mouth of Greatham Creek have been assumed to be the same as Eb3. Given that Eb3 is close to Seaton Carew Road crossing and other industry, and anticipated to have a higher ambient noise level in practice, this is considered to be a robust, conservative approach.

6.5.22 The free-field (A-weighted) sound level for each construction activity has been predicted. A-weighting is an adjustment that is typically applied to measurements of sound to reflect the peak sensitivity and range of the human ear (Parmanen, 2007). The predicted A-weighted sound levels have assumed a 12-hour working day for most construction activities, except for those associated with HDD, which will occur over a 24-hour working day. Construction activities likely to result in the highest airborne sound levels include vibratory sheet piling (for the HDD pit setup and anchors) and directional drilling, which are both non-impulsive sound sources (or continuous sound sources). The construction activities occurring in the vicinity of Greatham Creek (HDD 4 at the Venator Site) and their estimated sound pressure levels are outlined in Table 6-5.

Table 6-5: Sound Pressures Levels for Activities Occurring in the Vicinity of Greatham Creek (Decibels at 10 m)

ACTIVITY	EQUIPMENT	A-WEIGHTED SOUND PRESSURE LEVEL (dB AT 10 m)
HDD pit setup/anchors	Vibratory sheet piling rig	88
	Tracked excavator	77

[9] Although MBT is also considered as a potential trenchless technology for the Proposed Development, the airborne sound construction estimates are based on the use of HDD as a worst-case.

ACTIVITY	EQUIPMENT	A-WEIGHTED SOUND PRESSURE LEVEL (dB AT 10 m)
Drilling and pullback	Directional drill (generator)	77
	Tracked drilling rig	86
	Water pump	78

6.5.23 Effects to seals can comprise auditory injury (which comprise Permanent Threshold Shifts (PTS)[10] and Temporary Threshold Shifts (TTS)[11], and represent damage to the inner ear), behavioural responses, and masking. Thresholds are provided by Southall et al. (2019) for the onset of the auditory impacts of PTS and TTS in phocids (harbour and grey seals). These thresholds are weighted specifically to the phocid seal group, and reported as 134 and 154 decibels (dB) re (20 µPa) in air, respectively (Southall et al., 2019). These thresholds have been compared to Sound exposure level (SEL) weighted thresholds predicted as part of the Proposed Development.

6.5.24 The assessment submitted for the DCO application considered unweighted SEL values. However, this approach is considered to be conservative as low frequency sound, which is outside of the phocid hearing frequency range, is given greater weighting in the overall value (L_{eq} or SEL). Thus, the calculated distances to which thresholds are met were over-estimates and therefore conservative.

6.5.25 In air, the estimated auditory bandwidth for pinnipeds is 75 Hz to 60 kHz (Southall et al., 2007; Southall et al., 2019). This is comparable to the auditory bandwidth for humans which is 20 Hz to 20 kHz. The weighting used by Southall et al. (2019) reflects the peak sensitivity of the receptor group, which occurs around 10 kHz. This differs slightly from the A-weighting typically used for human receptors, which reflect peak sensitivity around 1 to 4 kHz (i.e. seals are more sensitive to high frequency sound than humans). However, the sensitivity curves for humans and seals are similar enough that it is considered reasonable to assume that the predicted human A-weighted sound pressure level (L_{Aeq}) is equivalent (and a likely worst-case) to phocid-weighted sound pressure level, particularly because the upper frequency sound range seals can hear will not be a key component of construction noise. Construction activities are expected to be dominated by low- or mid-frequency sound (see Table 6-6).

6.5.26 Based on the above, the updated modelling calculations have been presented using A-weighting (Table 6-7), to allow a better comparison with the auditory injury thresholds provided by Southall et al. (2007; 2019). These levels have been reported as 12-hour and 24-hour, for activities where the working day assumption are extended to 24-hours such as HDD.

[10] Permanent Threshold Shift (PTS) - is a permanent elevation in hearing threshold (i.e., an unrecoverable reduction in hearing sensitivity). PTS can occur from a variety of causes, but it is most often the result of intense and / or repeated noise exposures.
[11] Temporary Threshold Shift (TTS) - is a recoverable elevation in hearing threshold (i.e., a non-permanent reduction in hearing sensitivity) most commonly resulting from long-term noise exposure not high enough to cause PTS.

6.5.27 The predicted and threshold values can then be compared for determination of likely impact for phocid seals. To allow further comparison of disturbance effects compared to background levels, the predicted ambient SEL levels and total combined SEL (ambient levels plus those from the Proposed Development) are also shown in Table 6-7.

Table 6-6: Frequency Spectrum for Construction Activities Associated with Pipeline Construction and HDD next to Greatham Creek

CONSTRUCTION ACTIVITY		OCTAVE BAND FREQUENCIES (HZ)								
		63	125	250	500	1000	2000	4000	8000	TOTAL
Drilling and pullback	Unweighted L_{eq}	63	60	53	51	51	48	44	38	65
	Unweighted SEL	112	109	102	101	101	97	94	88	115
All pipeline construction	Unweighted L_{eq}	72	66	61	60	60	58	56	54	74
	Unweighted SEL	121	115	110	109	109	108	106	103	123

Table 6-7: Predictions of Airborne Sound Levels Associated with the Main Site and HDD Site During Construction (using A-weighting)

LOCATION	ACTIVITY	PREDICTED FREE-FIELD SOUND LEVEL L_{Aeq} (dB)	A-WEIGHTED SOUND EXPOSURE LEVEL FOR PROPOSED DEVELOPMENT ONLY (dB)	AMBIENT DAYTIME SOUND LEVEL L_{Aeq} (dB)	A-WEIGHTED SOUND EXPOSURE LEVEL DUE TO AMBIENT ONLY (dB)	A-WEIGHTED SOUND EXPOSURE LEVEL TOTAL (AMBIENT + PROPOSED DEVELOPMENT) (dB)
12 HOUR DAY						
Eb6 - Nearest to Main Site	Main Site Construction and Compounds	56	103	54	100	105
24 HOUR DAY						
Eb6 - Nearest to Main Site	Pipelines Construction	44	93	53	102	103
Eb3 - Nearest to HDD 4	Pipelines Construction	43	93	48	98	99
Greatham Creek - Nearest to HDD 4	Pipelines Construction	56	106	48	97	106

6.5.28 The ambient levels of noise at Seal Sands and the River Tees have been used as a baseline level of potential disturbance to seals, assuming that individuals at this location are habituated to the ambient noise levels.

6.5.29 Seals are also known to become habituated to many types of disturbance and even when disturbed, seals will often return to a haul-out site within very short timescale (i.e. less than 30 minutes), demonstrating high site fidelity (Paterson et al., 2015; SCOS, 2023). The Tees Estuary is highly industrialised, with lots of activities resulting in airborne noise, as shown by the ambient SEL weighted values in Table 6-7. In addition, the main A178 Seaton Carew Road, which crosses Greatham Creek via a bridge to the west of the proposed Hydrogen Pipeline Corridor, is expected to be stochastic and contribute considerably to the ambient noise levels at the haul out points at this location.

6.5.30 The results in Table 6-7 show that the A-weighted SELs produced at all modelling locations (for main site construction and HDD), are above the existing ambient sound level. The highest exceedances occur at Eb6 main site construction, and at the Greatham Creek location, which are predicted to result in SELs of 5 dB and 9 dB above the existing ambient sound levels, respectively. However, all A-weighted values are considerably lower than the TTS and PTS threshold levels for seals. At Greatham Creek, the A-weighted SEL values (24-hours) are 28 dB below the TTS threshold for seals.

6.5.31 Where disturbance does occur, seals are expected to move away and make use of alternative haul-out sites in Seal Sands. There will be only one HDD start-up event and seals can return once the short HDD operation is complete. Therefore, although a maximum increase of 9 dB may be detectable to seals at the mouth of Greatham Creek, it is not likely to result in significant changes at a population level.

6.5.32 The HDD is predicted to occur for a duration of 50 weeks at the River Tees crossing but only up to 10 weeks at Greatham Creek and will operate continuously over that period (rather than stopping and starting which would be more disturbing). Activities will therefore be temporary, and considering the nature of the impact, any airborne sound production and visual disturbance is not likely to affect the abundance or distribution for a significant period of time. Therefore, there will not be indirect effects to the functioning of seals, their habitats, or the condition of surrounding designated sites in place for the protection of seals (e.g., harbour seal – Teesmouth and Cleveland Coast SSSI).

6.5.33 However, due to the proximity of the HDD activities to Greatham Creek and Seal Sands, some disturbance effects cannot be discounted as a result of the 1 - 9 dB increase in SEL above ambient. To mitigate the effects of airborne sound on seals hauled-out at Seal Sands or using habitat within Greatham Creek during the use of HDD, noise abatement barriers (such as close-board acoustic fencing or other suitable solutions) will be installed to reduce the amount of perceptible sound from HDD 4 at the Venator Site (which is the activity closest to where seals may be present).

6.5.34 The placement of noise abatement barriers around the works is expected to reduce the noise levels produced by HDD by 10 dB if placed accurately and providing full coverage of the HDD plant. Thus, with accurate placement of abatement barriers (and therefore a 10 dB reduction), this would result in A-weighted SELs (24-hours) of 96 dB, 89 dB and 93 dB at the noise modelling locations, in the mouth of 'Greatham Creek', Eb3, and Eb6 respectively. There is therefore, predicted to be a considerable reduction in the noise level produced by the HDD, with noise levels to be reduced to ambient noise level. Where it is not possible to include complete screening around the HDD activity the reduction in sound is considered to be around 5 dB.

6.5.35 Noise abatement barriers will also be present along the River Tees close to the Main Site works and Navigator Terminal, further reducing overall noise propagation. The abatement barriers will be designed and constructed to meet the required standards and specifications, which are to be determined at a later stage in the design process, to ensure suitable noise reduction to ornithology and seal receptors. In addition, the elements of HDD construction which dominate the noise emissions, particularly the operation of the mud pump, will be specifically targeted with individual barriers. Therefore, the A-weighted SEL of 105 dB produced by Main Site construction at Eb6 will also be reduced below ambient if barriers are placed in full (rather than partial coverage).

6.5.36 Surveys undertaken as part of the Proposed Development, have highlighted that there is a natural mound present between the HDD 4 location (Venator Site) and Greatham Creek. This has not been accounted for within the noise modelling but is expected to form a natural barrier to the noise produced by the HDD and thus provide further reduction in sound dispersion, providing added protection.

6.5.37 As part of the mitigation proposed to prevent effects to ornithological features present in the Study Area, works will be restricted to only occur between September and November. This seasonal restriction is in place to avoid the most sensitive periods for breeding and wintering birds but has the added benefit that it will also avoid the peak pupping and moulting season for seals, which is mid-June to end of August (INCA, 2023). On rare occasions some moulting can continue into early September (INCA, 2023). However, as the works will be producing sound levels below ambient (with the addition of the noise abatement barriers), the inclusion of a shoulder month around either side of the restricted periods is not considered necessary. HDD works are expected to run for a maximum of 10 weeks, which includes mobilisation and demobilisation. The works anticipated to take place in September, which could overlap with the end of the moulting season, are expected to largely consist of mobilisation rather than the HDD drilling itself, which will not be producing significant noise. The HDD drilling itself could then commence in October.

6.5.38 Considering the very limited potential for disturbance to seals during the works, the noise from the pipeline construction is not considered to result in a barrier to seal movement between Greatham Creek and Seal Sands. It is considered that with these mitigation measures, there will be no effect on the conservation objectives of

the Berwick and North Northumberland SAC, the Humber Estuary SAC and the Wash and North Norfolk Coast SAC which are to maintain or restore the structure and function of the habitats of qualifying species. Therefore, there will be no adverse effect on site integrity as a result of noise and visual disturbance of seals.

Changes in visual Stimuli, including from artificial lighting – Seals

6.5.39 Construction activities on both the land and in the marine environment (i.e. from the use of vessels) could result in changes in visual stimuli (including artificial light). This can result in avoidance behaviour in marine organisms, affecting breeding or foraging activities, with potential for wider implications for populations.

6.5.40 It can often be very difficult to separate out the relative contribution of different stimuli causing disturbance to marine organisms. However, for larger taxa which occur in shallow or surface waters (e.g. fish and marine mammals) and those that migrate onto land (e.g. seals hauled out at Seal Sands), changes in visual cues (particularly light) are known to strongly influence behaviour.

6.5.41 The Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) has been developed as part of design measures to reduce glare and light spill into the marine environment. Measures include using warm white, LED bulbs, using a suitable mounting height for lights to reduce light spill, and ensuring the correct angle and orientation is used to reduce the contribution of light to spill, sky glow, and glare. The Venator Site is the closest construction area as part of the Proposed Development to Greatham Creek and therefore, this location is where most light spill is expected. Therefore, this site is one of the focusses within the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12).

6.5.42 With the implementation of the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12), there will be no adverse effect upon the integrity of the Berwick and North Northumberland SAC, the Humber Estuary SAC or the Wash and North Norfolk Coast SAC as a result of visual disturbance of seals.

Noise and Visual Disturbance of Migratory Fish

6.5.43 The assessment of LSE identified that the proposed connection routes will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish, Atlantic salmon and sea lamprey which are qualifying features of the River Tweed SAC Tweed Estuary SAC and Humber Estuary SAC.

6.5.44 Fish species are photoreceptive, with key activity rhythms and behavioural patterns (e.g. feeding) stimulated by light. Daytime feeders are generally attracted to light whilst nocturnal species (e.g. salmon) exhibit strong avoidance of light (Marchesan et al., 2005). Shellfish typically exhibit higher activity levels in the hours of darkness (Robson et al., 2010).

6.5.45 Previous studies have also shown that the introduction of artificial lighting associated with anthropogenic structures into an estuary can influence behaviour, with aggregations of both larger-bodied predator fish and smaller shoaling fish observed in artificially lit areas (e.g. Becker et al., 2013; McConnell et al., 2010). In

some cases, fish work against the current to maintain their position in the lit areas, resulting in negative implications to energy budgets (Becker et al., 2013).

6.5.46 Migrating salmonids such as Atlantic salmon can be particularly sensitive to changes in lighting which can interfere with diel migratory patterns. The introduction of streetlights next to an estuary, for example, has been shown to result in random timings of smolt salmon migrations (Riley et al., 2012). In comparison, without the introduction of artificial lighting, migration of smolt was significantly correlated with sunset.

6.5.47 Standard working hours will be implemented as much as possible to reduce working in hours of darkness and therefore reduce the requirement for artificial lighting. When extended working hours are required, the design measures included within the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) are to be implemented, reducing light glare or spill into the marine environment, including directing light away from the estuary (particularly at the Venator Site, close to Greatham Creek). A warm white light colour will also be used, which is considered less intrusive for ecological receptors. For example, some salmonids such as post-smolt Atlantic salmon are known to be particularly sensitive to light at the blue-green end of the visible spectrum (Becker et al., 2013).

6.5.48 Furthermore, the River Tees and Tees estuary is characterised by high levels of industrial land use, including on the banks of the estuary. Therefore, the baseline conditions of artificial lighting in close proximity to the estuary are considered to be high.

6.5.49 Any changes in artificial lighting which result in visual disturbance are expected to be localised, temporary and intermittent for the duration of the construction period. Due to the design measures proposed, there is not considered to be light spill into the marine environment, which could result in behavioural disturbance, such as changes in migratory patterns. Therefore, there will be no adverse effect on the integrity of the River Tweed River Tweed SAC and the Tweed Estuary SAC as a result of noise, vibration or lighting affecting migratory fish.

Changes in Water Quality

6.5.50 The assessment of LSE identified the potential for water quality impacts during construction / decommissioning as a result of oil, fuel and chemical spillages resulting in toxic surface run-off and leachate reaching the Teesmouth and Cleveland Coast SPA / Ramsar.

6.5.51 The Framework CEMP (EN070009/APP/5.12) sets out the key embedded measures to be employed during the Proposed Development construction phase in order to control and minimise the impacts on the environment – including the minimisation of water environment effects. A Final CEMP(s) will be prepared by the EPC Contractor(s) in accordance with the Framework CEMP prior to construction. The submission, approval, and implementation of the Final CEMP(s) will be secured by a Requirement of the draft DCO.

Surface Water

6.5.52 During Proposed Development construction, water pollution may occur directly from spillages of polluting chemical substances into water features, or indirectly by being conveyed in runoff washed off from hard standing, other sealed surfaces or from construction machinery.

6.5.53 Fine sediment may be disturbed in water features directly, wash off working areas and hard standing (including approach roads) into water features indirectly via existing drainage systems or overland or be generated by the need to dewater excavations. Due to past industrial activity, this sediment may potentially contain chemical contaminants that could cause water quality to deteriorate and be harmful to the aquatic environment. However, potential impacts to the water environment during the construction phase will tend to be temporary and short term.

6.5.54 The Final CEMP(s) will describe the principles for the protection of the water environment during construction. A Final Water Management Plan (WMP) will be annexed to the Final CEMP(s) which will outline the mitigation measures necessary to avoid, prevent and reduce adverse effects where possible upon the local surface water (and groundwater) environment during construction. An Outline WMP (EN070009/APP/5.12) is included in the Framework CEMP (EN070009/APP/5.12).

6.5.55 The Final WMP will also include an outline of responsibilities with regard to water management, required water quality monitoring, pollution prevention measures, training requirements for construction workers with regard to the water environment, an outline of likely relevant permissions and consents required, and a Pollution Incident and Response Plan.

6.5.56 The Framework CEMP (EN070009/APP/5.12) will be reviewed, revised and updated as the project progresses towards construction to ensure all potential impacts and residual effects are considered and addressed as far as practicable, in keeping with available good practice. The principles of the mitigation measures set out below are the minimum standards that the EPC Contractor(s) will implement. However, it is acknowledged that for some issues, there are multiple ways in which they may be addressed. In addition, the methods of dealing with pollutant risk will need to be continually reviewed and adapted as construction works progress in response to different types of work, weather conditions and locations of work.

6.5.57 Finally, there may be the need for a number of secondary permissions for temporary and potentially some permanent works affecting watercourses or groundwater (e.g., water activity permits, and abstraction/impoundment licences). At this stage it is reasonable to assume that all temporary works will be carried out under the necessary consents / permits and that the EPC Contractor(s) will comply with any conditions imposed by any relevant permission, or otherwise the matters covered by these secondary consents will be covered by the provisions of the DCO.

Management of Construction Site Runoff

6.5.58 Measures to manage fine sediment in surface water runoff as a result of construction activities are included in the Framework CEMP (EN070009/APP/5.12).

There are a wide range of measures that can be adopted by the EPC Contractor(s) to reduce the risk of excessive fine sediment in runoff (e.g. the timing of works, minimising earthworks and seeding or covering them), to intercept runoff to prevent uncontrolled runoff from the Proposed Development Site (e.g. by using cut off drains, fabric silt fences and matts (in channel), bunds and straw bales (that may be placed in small channels), designated areas for cleaning plant and equipment, wheel washes and road sweepers), and to treat runoff to remove excessive levels of fine sediment (e.g. settlement lagoons, sumps, spraying on to land or proprietary measures such as lamella clarifiers, flocculation etc.). It will be for the EPC Contractor(s) to continually monitor the need for measures depending on the nature of the works being undertaken, the weather conditions, and the performance of sustainable drainage systems installed. The measures chosen will be set out in the Final CEMP(s).

Management of Construction Spill Risk

6.5.59 Measures will be implemented to manage the risk of accidental spillages on the Proposed Development Site and potential conveyance to nearby water features via surface runoff or land drains. These measures relating to the control of spillages and leaks are summarised in the Framework CEMP (EN070009/APP/5.12) and adopted during the construction works. Measures will be implemented in accordance with prevailing pollution prevention legislation and following good practice guidance summarised in the Good Practice Guidance sub-section above. They will include details of how fuel and other chemicals (including cementitious products) will be stored, used on site, and equipment and plant cleaned, as well as how leaks and spillages will be prevented or remediated if needed. This will also include the implementation of a Pollution Prevention Plan and an Emergency Response Plan, secured in the DCO. In addition, any temporary construction compounds will be appropriately managed, and all foul waste disposed of by a licensed contractor to a suitably permitted facility.

Management of Construction Dewatering

6.5.60 To minimise the impact of the dewatering on groundwater and surface water receptors where pipeline construction or deep excavations are required, a Construction Dewatering Strategy will be prepared by the EPC Contractor(s) in accordance with a Groundwater Risk Assessment to be developed post-consent. The discharge of water is also likely to require a permit from the Environment Agency subject to volumes and duration of works. The purpose of the Construction Dewatering Strategy will be to:

- review GI data and estimate volume of water that may need to be dewatered and the likely quality of that water;
- consider how phasing/sequencing of excavations will influence the amount of water that may need to be managed at any given time;
- undertake a feasibility assessment of options to remove water, including undertaking appropriate ecological and hydromorphological surveys, and

hydraulic modelling (if necessary). Disposal options may include, but are not limited to:

- re-use of water on-site (e.g. for dust suppression);
- discharge to local watercourses; and
- spraying to nearby fields.

6.5.61 At this stage the preferred option is to discharge any groundwater abstracted from dewatering activities to a watercourse (where it may compensate for any reduction that might occur from localised lowering of the groundwater table temporarily).

6.5.62 When discharging water to a nearby watercourse, the rate of discharge will need to be agreed with the Environment Agency to ensure that there is no unacceptable increase in flood risk or risk of scour. Where the required rate of discharge to keep the excavations dry exceeds what may be allowed to a single watercourse, additional locations for discharging the water or storage of the water will need to be provided. Any discharge will need to be undertaken with the agreement of the relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the Final CEMP(s).

6.5.63 If groundwater contains high concentrations of suspended fine sediment, this will be filtered by using storage basins in combination with other proprietary measures (for example lamella clarifiers).

Construction of Hydrogen Pipeline Corridor – Trenchless Crossings

6.5.64 A Hydrogen Pipeline Corridor is required to connect various potential industrial off-takers across the Tees Valley to the Hydrogen Production Facility at the Main Site. This will require crossings of numerous watercourses.

6.5.65 The Hydrogen Pipeline is expected to range from 6 to 24 inches (15.24 cm to 60.96 cm) in diameter and while being primarily above ground, it would cross the Tees Estuary and Greatham Creek (and adjacent water features at Seal Sands) using trenchless technologies (HDD or MBT). The Hydrogen Pipeline Corridor is shown in Figure 4-4: Hydrogen Pipeline Corridor [APP-087].

6.5.66 The use of trenchless technologies avoids any direct impact to the estuary or creek bed, associated sediment mobilisation and scour. For the purposes of assessment, the worst-case depth below the bed is assumed to be 25 m for the Tees Crossing, 10 m for Greatham Creek. For the Tees Crossing this is expected to be in the range of 40 to 50 m depth but will be determined following the ground investigation work at the detailed design phase (maximum depth would be 60 m). This will ensure that there is no risk of exposure

6.5.67 In addition to the control and management measures for site runoff and spillage risk noted above, the methodology of the drilling, or other trenchless techniques, will include measures to minimise the risk to the environment. For HDD methods, there are risks associated with the use of drilling muds and plant close to the channel. For example, although rare, without due care there is a risk that drilling

muds can 'break out' into watercourses leading to pollution (known as 'hydraulic fracture' or 'frac-out' event).

6.5.68 Risk of hydraulic fracture will be minimised by:

- performing appropriate geotechnical investigations along the HDD alignment;
- designing the HDD profile to pass at an appropriate depth below the watercourse (minimum 25 m for Tees crossing, minimum 10m for Greatham creek);
- designing the HDD profile to pass through competent soil layers identified in geotechnical investigations;
- performing drilling fluid hydrofracture analyses for each drilling operation and maintaining downhole pressures within recommended limits;
- using appropriate downhole pressure monitoring equipment;
- designing a drilling fluid appropriate for the anticipated ground conditions;
- appropriate monitoring of drilling fluid parameters during drilling; and
- performing regular monitoring of the ground above the HDD alignment for drilling fluid leaks to the surface.

6.5.69 In addition, for HDD casing pipe to contain drilling fluid may be installed through less competent shallow ground layers at entry or exit points when considered necessary. Similarly, MBT shafts will be lined with concrete rings for stability.

6.5.70 For HDD, a site-specific Hydraulic Fracture Risk Assessment will be developed prior to construction following further investigation of specific ground conditions at the crossing locations, and appropriate mitigation developed in line with best construction practice. The drilling fluid that returns to the drilling rig is recycled within that drilling rig. Any wastewater/drilling products that are not recycled will be stored and removed by a suitable waste management contractor and disposed of at a licensed wastewater facility.

6.5.71 The sections of the Hydrogen Pipeline Corridor that will be installed via trenchless techniques will require launch and reception pits for HDD and shafts for MBT to be installed. It is assumed for the purposes of the assessment that excavations for drilling/boring will be located at least 10 m from the watercourse, as measured from the top of bank, under which they will be directional drilled.

6.5.72 The exact dimensions of the launch and receive pits for HDD will be determined by site and ground conditions but will be kept to a safe minimum in terms of length, width and depth. Such pits are typically 5 m long x 5 m wide x 3 m deep. A shoring system appropriate to the ground conditions will be used as appropriate to minimise water ingress into the pits. This may be timbers, sheet piling, or a modular system and will be chosen based on suitability for the site conditions. The ingress of any groundwater will be carefully managed through design of the launch or reception pit, shoring method, and a pumping and treatment system. Excessive

ingress of water will make the pit unsafe and thus it is important that ingress is minimised and that a suitable system of managing that water is implemented.

6.5.73 Furthermore, to reduce the works required adjacent to the Teesmouth and Cleveland Coast SPA, a pipe stringing area would be established a minimum of 30 m away from the SPA. The pipe stringing area would be used to fabricate manageable lengths of pipe string. The sections of pipe string would subsequently be carried into position along the spread and dummy spread to allow the remaining joints to be fabricated and complete the pipeline.

6.5.74 Once the Hydrogen Pipeline is installed beneath the watercourse, the HDD pits, MBT shafts and any trenches will be backfilled to the original ground level and seeded to reduce the risk of runoff and fine sediments entering watercourses. The drill fluids used within the HDD drilling machine will be water based, such as naturally occurring bentonite clay. The fluid component of the drilling mud will be mains water, obtained from a nearby supply and tankered to site when required. There will be some recycling of drilling muds by the drilling plant used.

6.5.75 The bentonite within the drilling fluid is a naturally occurring mineral and enables the fluid to have sufficient viscosity to carry the cutting chips back to the surface machine whilst lubricating and keeping cool the drilling bit. Directional drilling, or other trenchless techniques, will be undertaken by a specialist contractor and the water column above the drill path will be continuously monitored during drilling. It is noted that drill fluid leakage into a watercourse is not a common problem, particularly given the proposed depths. However, where there is an increased perceived risk (i.e. lack of drilling mud returns), the drilling/boring operation will be suspended, remediation action implemented, and subsequently the methodology for that crossing re-evaluated.

Construction of Hydrogen Pipeline Corridor – Above Ground and Open Cut Crossings

6.5.76 Various route options and construction methodologies have been considered for the remainder of the Hydrogen Pipeline Corridor (aside from the trenchless crossings discussed above). These include an option for below ground open trench (buried), installation on existing above ground pipe racks, and repurposing and reuse of existing pipelines (where possible).

6.5.77 Four watercourse crossings will use existing infrastructure and will not disturb the watercourse (e.g. pipebridge or existing culvert), as set out in Chapter 5 of the ES. In the four cases where open-cut installation of pipelines is required, the following mitigation will be implemented.

6.5.78 A pre-works morphology survey of the channel of each watercourse to be crossed will be undertaken prior to construction. The pre-works survey is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works to install cables beneath the channel. The survey is a precautionary measure so that there is a record against which any remedial action can be determined should there be any unforeseen adverse impacts.

6.5.79 At this stage it is assumed that where open-cut crossings are required, water flow will be maintained by damming and over pumping or fluming. Works will be carried out in the drier months where possible as this will reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales will be used initially to capture mobilised sediments until the watercourse has returned to a settled state. It will be a requirement that the watercourses are reinstated as found and water quality monitoring will be undertaken prior to, during, and following on from the construction activity. Regular observations of the watercourses will also be required post-works during vegetation re-establishment of the banks, especially following wet weather, to ensure that no adverse impacts have occurred. These requirements are secured via the Framework CEMP (EN070009/APP/5.12).

Water Quality Monitoring

6.5.80 During construction of the Proposed Development, it is proposed to undertake a water quality monitoring programme to ensure that mitigation measures are operating as planned and preventing pollution. This is standard practice for construction works of this type, and full details will be outlined in the Final WMP appended to the Final CEMP(s) (also refer to the Framework CEMP (EN070009/APP/5.12) for further details (EN070009/APP/5.12). The purpose of the monitoring programme will also be to ensure pollution is identified as quickly as possible and appropriate action is taken in line with the Pollution Prevention Plan (to be outlined within the WMP).

6.5.81 The water quality monitoring programme will be developed by the EPC Contractor(s) in consultation with the Environment Agency and MMO and will also reflect any requirements of secondary environmental permits / licences for works affecting, or for temporary discharges to, watercourses within the Proposed Development Site.

6.5.82 With the mitigation outlined above, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of changes in water quality during construction.

6.6 Operational Phase

Noise Disturbance - Birds

6.6.0 The assessment of LSE identified that there is potential for noise to disturb of non-breeding black-headed gull and herring gull during the operational phase of the Proposed Development. These are qualifying species of the Teesmouth and Cleveland Coast SPA / Ramsar. Figure 13 shows the predicted noise levels during operation. Outside of the main site, the predicted noise levels are under 60 dB. There is a small area of dune habitat immediately north off the Main Site which is predicted to be affected by noise between 55 and 60 dB, which with reference to Cutts *et al* (2013) is unlikely to be disturbing. This part of the dune system is heavily disturbed by recreational users and also close to an existing road, the presence of which would likely decrease bird use. Furthermore, the South Tees Development

Corporation (STDC) site has been subject to disturbance from industrial activities for a number of years, and the assemblage of birds is likely to have habituated to noise at these levels.

6.6.1 Therefore, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of noise disturbing the qualifying bird species during operation.

Atmospheric Pollution (in combination with other projects and plans)

6.6.2 Having assessed the likely significant effects of H2Teesside with reference purely to exceedance (or otherwise) of the numerical screening criteria, two in-combination impacts could not be screened out on purely mathematical grounds:

- NOx at Teesmouth & Cleveland Coast SPA/Ramsar
- Nitrogen deposition at Teesmouth & Cleveland Coast SPA/Ramsar

6.6.3 In both cases when considered alongside other plans and projects the insignificance screening thresholds were exceeded. These impacts are therefore taken forward to appropriate assessment. When undertaking the assessment the ecological sensitivity of the interest features and how nitrogen deposition or NOx may affect them is key to the interpretation.

Sensitivity of Teesmouth and Cleveland Coast SPA/Ramsar site

6.6.4 According to the Site Relevant Critical Load tool on the Air Pollution Information System (www.apis.ac.uk) the only SPA/Ramsar interest features of concern regarding stack emissions are the nesting terns (little tern, common tern and Sandwich tern) and nesting avocet. According to the same source, even the nesting terns and avocet are not sensitive to NOx, acid deposition or ammonia in atmosphere. Moreover, for avocet the impacts of nitrogen deposition are as likely to be positive (improvement in food supply) as negative (changes in broad habitat) according to APIS. Therefore, adverse effects on integrity from NOx in atmosphere can be dismissed alone and in combination with other plans and projects, and only nitrogen deposition needs to be further discussed, and only with regard to nesting terns and avocet.

[redacted]

Appropriate Assessment

6.6.7 At the nearest tern/avocet nest locations (used since 2018) operational 'in combination' nitrogen deposition is forecast to be below 1% of the critical load. Model outputs at the nearest modelled locations to the main colonies show 'in combination' nitrogen deposition rates of 0.08 kgN/ha/yr or 0.79% of the critical load. Therefore, at the nesting colonies, the 'in combination' N deposition is below 1% of the CL.

6.6.8 At South Gare (the nearest historic nesting location) nitrogen deposition due to H2Teesside is forecast to be 0.01 kgN/ha/yr, while at the closest current nesting locations nitrogen deposition due to H2Teesside is forecast to be considerably less than 0.01 kgN/ha/yr and therefore effectively zero (as nitrogen deposition is generally not reported to more than two decimal places to avoid false precision).

6.6.9 Therefore no adverse effects on the integrity of Teesmouth & Cleveland Coast SPA/Ramsar site will occur, either alone and in combination with other plans or projects.

Changes in Water Quality

6.6.10 The Hydrogen Production Facility will operate under an Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016), whilst the operator will implement and maintain an Environment Management System (EMS) aligned with International Standards Organisation (ISO) 14001 (ISO, 2015). The EMS will outline requirements and procedures required to ensure that the Proposed Development Site is operating to the appropriate standard.

6.6.11 The source of water to supply the Proposed Development will be the existing NWL raw water pipeline feed from the River Tees to the South Tees Development Corporation (STDC) site, or alternatively a new connection to the existing NWL supply either via tie in to NZT infrastructure or the installation of a new connection.

6.6.12 The effluent streams from the Proposed Development will include process water (e.g. process condensate from the reforming process, cooling tower blowdown water and demineralisation plant rejects), surface water runoff and foul effluent.

Clean stormwater could be discharged either to the NZT outfall discharging into Tees Bay or alternatively to a new outfall via the South Tees Development Corporation (STDC) drainage system into the Estuary.

Surface Water Drainage

6.6.13 A new surface water drainage network and management system will be provided for the Main Site that will provide adequate interception, conveyance, and treatment of surface water runoff from buildings and hard standing. This will be

separate to foul systems for welfare facilities and process wastewater generated by the operation of the Proposed Development Site. The Connection Corridors will not require additional drainage as they will be using existing pipe racks, pipe bridges, culverts or otherwise installed underground.

6.6.14 Surface water drainage will discharge either: 1) to the River Tees via a South Tees Development Corporation (STDC) outfall; or 2) to Tees Bay via the proposed NZT outfall.

6.6.15 The surface water discharge from the Proposed Development will be limited to the greenfield runoff rate (197 l/s (for Phase 1 and 2 combined), and water storage will be appropriately sized to accommodate the 1% Annual Exceedance Probability (AEP) event with 30% allowance for climate change. The surface water storage requirement for both phases of the Proposed Development is 9,500 m^3.

6.6.16 Due to the nature of the Proposed Development, there is a risk that a range of different diffuse pollutant types may be present in surface water runoff. However, this risk will be minimised by the fact that any process effluent will be segregated from surface water drainage and handling of chemicals on site will be regulated through the Environmental Permit.

6.6.17 A Detailed Surface Water Drainage Strategy will be defined in consultation with the Environment Agency, the LLFAs (RCBC and STBC) and other statutory agencies and will be secured under a Requirement of the DCO. The principles of the Drainage Strategy are outlined in the Indicative Surface Water Drainage Plan (EN070009/APP/2.12).

6.6.18 The main functional requirements of the drainage system are:

- to collect, contain or remove major spills to limit the effects of any fire and/ or its duration;
- to minimise exposure of personnel to harmful substances;
- to recycle or reuse effluents to reduce costs and avoid waste;
- to prevent contamination to ground and surface water systems outside the limits of the process plant;
- to collect and treat fire-water and rainwater; and
- to provide a treatment system that will meet local and national code and legislative requirements.

6.6.19 The Indicative Surface Water Drainage Plan proposes the use of SuDS where possible, to enable attenuation of surface water flows due to increases in the impermeable area as a result of the Proposed Development. SuDS will also provide treatment of surface water runoff to ensure potential adverse effects on water quality in receiving watercourses are avoided. At this stage the following SuDS have been proposed:

6.6.20 Incorporation of rainwater harvesting across suitable site buildings, with the potential for collected water to be used on-site to meet process needs. Rainwater

harvesting will reduce the volume of runoff generated and will contribute to reduced attenuation storage. An initial estimate of 145 m^3/a of rainwater could be collected from roofs. This would translate into a total tank storage volume of 10 m^3.

6.6.21 Pervious paving will be considered across car park areas, enabling rainwater to infiltrate into the sub-base and discharge in a controlled manner to the site drainage system. Pervious paving will reduce peak runoff through the provision of attenuation storage and offer filtration, adsorption, biodegradation and sedimentation within the sub-surface.

6.6.22 Where achievable the use of gravel cover will be considered. Pore spaces within the gravel matrix provide attenuation storage, reducing peak runoff rates. In additional the gravel provides a degree of pre-treatment.

6.6.23 Swales will be considered for conveyance of road run-off.

6.6.24 An attenuation pond will be present to provide storage but also will provide a degree of water quality treatment.

6.6.25 The key objectives of the site surface water drainage system are to provide a drainage system which is inherently safe and protects the local environment and the anticipated outfall from accidental discharges of oil, chemicals or run-off from fire-fighting effluent. Clean, uncontaminated storm water will be segregated from potentially contaminated water.

6.6.26 Process operations on site will require the storage and use of a range of potentially polluting chemicals. These may be associated with washdown water, tank water draw-offs, pump equipment drips and drains, draw-offs from sample connections, instruments, drain cocks and similar equipment fittings and other routinely contaminated wastewater streams.

6.6.27 An oily water drain will provide for collecting water from plant areas where oil may be present. Rotating equipment with lube oil systems which are located outdoors shall be provided with paving and be kerbed/bunded with controlled discharge to ensure that uncontrolled surface run-off is avoided and that spillage and leakages from equipment are contained. Lube oil spillages in the kerbed/bunded area will be manually cleaned up and disposed of offsite. Transformers and substations shall be located within kerbed areas. Lube-oil and transformer oil change-out shall be drained to portable drums with spillages contained by oil mats and good-practice clean-up. Used oils will be disposed of off-site. Drainage is routed by gravity via the oily water sewer to a below ground Oily Water Separator contained within the Oily Water Treatment Package. The liquids that are transferred to the Oily Water Treatment Package will be settled and filtered to remove hydrocarbons. Treated water discharged from the treatment package flows to the surface water attenuation pond. Oil removed in the treatment package is collected as waste and is disposed off-site by vacuum tankers.

6.6.28 Areas for chemical injection packages and chemical storage tanks (excluding amine solvent) shall be kerbed/bunded to ensure that spillages and leaks from chemical dosing packages and associated intermediate storage tanks are contained. Chemical spills within bunds / kerbed areas should be routed to sumps within the bund area

and from which the contents are routed to a neutralisation pit to prevent unwanted reactions. Provision will be provided to allow routing of clean neutralised fluid or storm water from chemical drainage areas to the oily water drain upon testing by the operator to confirm that the water is non contaminated. Contaminated water can be collected via vacuum truck for offsite disposal. To minimise rainwater collection where practicable and safe to do so, these chemical injection packages and intermediate storage tanks shall be located indoors or be provided with a rain shelter if outdoors. The rain shelters shall have open sides for ventilation.

6.6.29 The amine contaminated surface water drain is an independent hazardous segregated drain system. In the Hydrogen Production Facility, where there is equipment that contains amine, there is the potential for rainwater or fire water falling in this area to be contaminated with amine. To ensure that it is not released to the environment, kerbed or bunded areas shall be provided to collect this fluid which is gravity fed to an Interceptor Pit. Here a sample will be taken to confirm if the contents of the sump meet the site criteria prior to pumping the sump contents to the main non-hazardous open drain. Contaminated fluid is disposed off-site by vacuum tankers.

6.6.30 In addition to the above sources of surface water, under exceptional circumstances fire-water may be generated. Fire-fighting water may contain chemicals that can be harmful to the water environment. Therefore, the surface water drainage system will include a retention basin to intercept the first flush of potentially contaminated fire-fighting water and divert it away from the existing surface water SuDS system. The contaminated fire water would then be stored and tested. Should contamination be present, this water will be directed to an oil separator (or pumped out for appropriate off-site disposal at a licensed waste facility depending on the extent of the contamination), or if tested and confirmed to be clean, it will go to the stormwater attenuation pond. The storage requirements and the method by which fire-fighting water is diverted (i.e. an automatic or manual operated system) will be further determined in consultation with the Environment Agency, LLFAs and the Fire Service post-DCO consent during detailed design. The capacity of the fire-water catchment will be sufficient to prevent overspill to adjacent catchment areas or systems. Storage across the drainage networks will be sufficient for the 10 hours of fire-water plus leak scenario.

6.6.31 The Surface Water Drainage Strategy to be developed under a Requirement in the draft DCO will outline the consequences for the drainage system should the Proposed Development close or be decommissioned. = A Surface Water Maintenance and Management Plan will also be provided. =. This will detail the requirements of access and frequency for maintaining all drainage systems proposed on the Proposed Development Site. The maintenance regime must be properly implemented to ensure all treatment measures and processes operate as intended for the lifetime of the Proposed Development. It is anticipated that this will be prepared during the detailed design stage. Furthermore, the development of the final, detailed drainage strategy will need to be supported by an appropriate water quality risk assessment.

Process Wastewater

6.6.32 Process waste waters will be generated at the Proposed Development as follows:

- boiler blowdown – this will generally be of good quality with some residual total dissolved solids that will need removal for use as demineralisation water;
- process condensate - this has high ammonia (NH3), methanol (CH3OH), carbon dioxide (CO2), methane (CH4) and H2 that need removal before it can be discharged; and
- hazardous liquid wastes – to be taken off-site (e.g. amine).

6.6.33 Process condensate will be treated by a dedicated on-site Water Treatment Plant. The treated process condensate will be reused as makeup water in the Water Treatment Plant and so will not be discharged.

6.6.34 Other wastewater streams (cooling tower blowdown and demineralisation plant rejects) will be treated in an Effluent Treatment Plant (ETP).

6.6.35 Amine contaminated water will be contained and where possible will be recovered and recycled for use within the process, or otherwise will be taken off-site by tanker to a specialist treatment plant. Surface water runoff from uncovered external paved areas of the Proposed Development Site containing amine equipment, which during normal operation is expected to result in chemical drips, leaks and minor spill and which could be contaminated, will be located within minimised local kerbed areas and be routed to the amine drain vessel for offsite disposal.

6.6.36 Discharge of treated process effluent will be via the Net Zero Teesside project outfall at Tees Bay, then it is assumed that the wastewater discharge will meet the requirements of the Best Available Techniques (BAT) Reference Document (BREF) for Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector 2016 (European Commission, 2016).

6.6.37 For treated wastewater discharge to the Tees Bay, the indicative effluent quality is currently expected to be as shown in Table 6-8.

Table 6-8: Indicative Effluent Quality Following Treatment

DETERMINAND	CONCENTRATION	EQS
Total Suspended Solids	5-35 mg/l	-
Total Organic Carbon (TOC)	10-33 mg/l	-
Chemical Oxygen Demand	30-100	-
Chromium	5-25 µg/l	0.6 µg/l (long term mean)
Copper	5-50 µg/l	3.76 µg/l (dissolved, where DOC ≤1mg – salt water EQS, long-term mean)
Nickel	5-50 µg/l	8.6 µg/l (annual average)

DETERMINAND	CONCENTRATION	EQS
Zinc	20-300 µg/l	6.8 µg/l (plus ambient background concentration, long-term mean)
Total Nitrogen	15 mg/l (annual mean) 40 mg/l (daily maximum)	-
Total Phosphorus	0.5-3.0 mg/l	-
Adsorbable Organically Bound Halogens	0.1-0.1 mg/l	-

6.6.38 Water sampling facilities are to be provided for manual sampling of water prior to any required discharge (dependent of which 'case' is progressed). The frequency of testing and parameters to be tested will be agreed with the Environment Agency.

Foul Wastewater

6.6.39 Foul water will connect to the STDC sewage network for appropriate treatment and dischargevia Bran Sands WwTW. It is assumed given the relatively low volumes of foul effluent anticipated from the Proposed Development that NWL will treat this within their consent limits and in accordance with requirements to not cause deterioration or prevent improvement under the WFD.

6.6.40 It is considered that with the above embedded mitigation, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of changes in water quality.

Nutrient Neutrality

6.6.41 Natural England has identified the Teesmouth and Cleveland Coast Ramsar / SPA as a site that is impacted by excess nutrients. In particular, the Seal Sands area is known to be adversely impacted; excessive growth of algal mats is impacting feeding opportunities for the bird populations that the SPA is designated for. Any development in the catchment of the SPA that may lead to an increase in the nitrogen emissions into the designated site must be supported by a nutrient neutrality assessment. The conservation and WFD objectives for the estuary and Teesmouth and Cleveland Coast Ramsar / SPA sites require nitrogen loading of the estuary to be reduced.

6.6.42 The Proposed Development has the potential to release nitrogen via:

- surface water runoff;
- process water effluent discharge;
- foul water discharge; and
- atmospheric deposition.

6.6.43 Table 9B within Nutrient Neutrality Assessment [APP-047] provides a screening table summarising the nutrient output from the various streams and whether or not the potential nitrogen source will require any further assessment.

6.6.44 The screening assessment indicates that the only aspect of the Proposed Development that would potentially generate additional nutrient load to the terrestrial and inter-tidal sections of the Teesmouth & Cleveland Coast SPA / Ramsar site (notably Seal Sands) is process water discharge in the event of Case 2B being taken forward. Under this Case, a total nitrogen load of 1.1 kg/hr would discharge to Tees Bay. To determine whether this TN discharge is likely to be dispersed towards the Tees Estuary, hydrodynamic dispersion modelling has been undertaken. In the event that TN does not propagate into the estuary then process water discharge can also be screened out. The hydrodynamic dispersion modelling shows that discharging the combined process effluent and surface water discharges from the Main Site would not result in a reduction in water quality in Tees Bay at any point over a tidal cycle.

6.6.45 The conservation and WFD objectives for the estuary and Teesmouth & Cleveland Coast SPA / Ramsar site also require nitrogen loading of the estuary to be reduced. In particular, it is the intertidal and terrestrial areas of the Tees estuary that are of most concern (notably Seal Sands), and the modelling undertaken for the Proposed Development indicates that discharges from the proposed NZT outfall would not be carried into the estuary by the tides, and therefore would not contribute nutrients to the designated sites. It is also notable that given that the raw water for the Proposed Development is abstracted from the River Tees upstream, the overall load of nutrients in the Seal Sands area and intertidal sections of the Estuary would be reduced, given that the process water discharge does not return any nitrogen to the estuary.

6.6.46 On the basis of the modelling results it is also considered that process water effluent discharge under Case 2B can also be screened out of the nutrient neutrality assessment. Refer to Appendix 9B: Water Quality Modelling Report [APP-193] for the detailed modelling results.

6.6.47 Overall, the Nutrient Neutrality Assessment demonstrates that the Proposed Development will not have an adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar.

Decommissioning

Loss of functionally Linked Land

6.6.48 The Production Facility will have a design life of 25 years although the operational life could be longer. At the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above ground structures on the Main Site removed, and the ground remediated as required to facilitate future re-use. The pipelines within the connection corridors would be likely to remain in situ. As such, land will become available to the qualifying species of the Northumbria Coast SPA and Ramsar and no effects upon site integrity are anticipated.

Noise, Visual Disturbance, Changes in Air Quality and Changes in Water Quality

6.6.49 A Decommissioning Environmental Management Plan (DEMP) would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. A Decommissioning Environmental Management Plan (DEMP) would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise and visual disturbance during the construction phase of the project would be able to be incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

7.0 IN-COMBINATION ASSESSMENT

7.1.1 It is a requirement of Regulation 63(a) of the 2017 Regulations to not only assess the impacts of a development project alone, but also to investigate whether there might be 'in-combination' effects with other projects or plans. In practice, such an 'in-combination' assessment is of greatest relevance when an impact pathway relating to a project would otherwise be screened out – not because there is no impact pathway – but because its individual contribution is considered not to result in likely significant effects.

7.1.2 For the purposes of this HRA, we have identified several plans, projects and strategies proposing / aiming for development, which may act in-combination with the Proposed Development (see Table 7-1 below for a list of the plans / projects). This could arise if there are residual impacts of the Proposed Development that may be inconsequential in themselves but could become of consequence once considered alongside the impacts of the other projects. These are the projects and plans that have been identified as posing linking impact pathways to the same European sites as those identified for the Proposed Development. Other projects may be mentioned in Chapter 23: Cumulative and Combined Effects [APP-076] but no link to European sites have been identified. Note that in combination air quality assessment has been reported in the preceding section.

Table 7-1: Plans and projects with the Potential for 'in-combination' Effect with the Proposed Development

These plans and projects are at varying stages, ranging from conceptual phases to having obtained planning consent

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
2	EN010082	The Tees Combined Cycle Power Plant. A gas fired combined cycle gas turbine (CCGT) power station with a maximum generating capacity of up to 1,700 MWe (Tbc). The project will utilise existing Gas and National Grid connections.	The ecology and nature conservation chapter of the ES reported negligible ecological value for habitats and species of flora and fauna. No significant effects were predicted. There were no significant effects predicted on off-site habitats due to changes in air quality, nitrogen deposition and acid deposition. The HRA screening report concluded no significant effects on European designated sites.	Both projects have the potential to have effects on air quality during operation.	Mitigation for air quality effects is embedded for both projects.	No – refer to Sections 6.5.3 to 6.5.10 above for in-combination assessment of atmospheric pollution.
3	EN10103	Net Zero Teesside (NZT). A full chain carbon capture, utilisation and storage ('CCUS') project, comprising a CO_2 gathering network, including CO_2 pipeline connections from	The report to inform HRA identified the potential for LSE upon the Teesmouth and Cleveland Coast Cleveland Coast SPA and Ramsar from noise and visual disturbance during construction of	There will be a potential overlap of construction periods, therefore there is potential for in combination effects upon the Teesmouth and Cleveland Coast SPA and	Acoustic barriers used during construction were proposed to reduce noise to acceptable levels on the designated site. As a result, and considering this in conjunction with the	NZT is adjacent to the Proposed Development, and use of acoustic barriers is proposed for both projects to reduced noise and visual disturbance during the

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
		industrial facilities on Teesside to transport the captured CO_2 (including the connections under the tidal River Tees); a combined cycle gas turbine ('CCGT') electricity generating station with an abated capacity circa 850 gigawatts output (gross), cooling water, gas and electricity grid connections and CO_2 capture; a CO_2 gathering-booster station to receive the captured CO_2 from the gathering network and CCGT generating station; and the onshore section of a CO_2 transport pipeline for the onward transport of the captured CO_2 to a suitable offshore geological storage site in the North Sea.	breeding and non-breeding features. Changes in water quality during construction and decommissioning were screened in. Disturbance in functionally linked land affecting harbour porpoise, a qualifying feature of the Southern North Sea SAC was screened in. Atmospheric pollution during operation was screened in due to potential effects upon the Teesmouth and Cleveland Coast SPA and Ramsar.	Ramsar from noise and visual disturbance of qualifying bird species during construction and decommissioning. There is potential for changes in water quality to affect the Qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar during construction and operation. There is potential for in combination effects on air quality to affect the Teesmouth and Cleveland Coast SPA and Ramsar during operation.	habituation of birds to existing high noise levels in the wider area, it was concluded there would be no adverse effect on the integrity of the Teesmouth & Cleveland Coast SPA / Ramsar site through disturbance. The Appropriate Assessment concluded that there would be no adverse effects on avocets or terns as a result of changes in air quality. The following impact avoidance measures were proposed to enable adverse effects on the water quality in freshwater and marine habitats to be avoided, both during the construction / decommissioning and operational periods:	construction and decommissioning phases. Seasonal avoidance is also proposed for the Proposed Development, although this was not identified as being necessary for NZT. The Proposed Development mitigation will reduce its effect to an acceptable level and NZTs impact with mitigation was deemed acceptable during the DCO process. Therefore, no residual effects will exist for these two projects to result in significant disturbance. Air qualify modelling for the Proposed Development has concluded that there will be no adverse effects on integrity in combination during construction or

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
					• Compliance with industry good practice and environmental legislation during construction, decommissioning and operation; • Commitment to deliver a Final CEMP(s), detailing the environmental protection measures (e.g. safe materials storage, emergency clean-up plans for leaks and spills, etc.); • Minimisation of surface or underground water flow into the ponds of the Coatham Dunes units of the Teesmouth and Cleveland Coast SSSI during construction and decommissioning.	operation (refer to Chapter 8: Air Quality [APP-060]). Hydrodynamic dispersion modelling has been undertaken of the cumulative impact of the combined discharge from NZT and the Proposed Development, as described in Appendix 9B: Water Quality Modelling Report [APP-193]. The modelling undertaken confirmed this potential cumulative impact would be Not Significant, as reported in Appendix 23D [APP-224]. Therefore, there will be on adverse effect on integrity. Embedded mitigation and best practice measures are proposed for both projects to make sure there are no

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
						adverse effects on water quality during construction, operation and decommissioning including consideration of cumulative treated process water discharges via the proposed NZT outfall, should that option be utilised for the Proposed Development. Therefore, there will be no adverse effects on site integrity.
5	NZT Offshore Elements	Net Zero Teesside offshore elements to be consented by Marine Licence including CO_2 Export Pipeline below MHWS and geological store and associated facilities.	No significant effects upon terrestrial ecology are reported within the ES. The potential for in combination effects upon ornithology and marine ecology are discussed in ES Chapter 13: Ornithology [APP-065] and ES Chapter 14: Marine Ecology [APP-067] respectively.	There is potential for disturbance of birds during the construction period. The herring gull and cormorant may be present during their respective non-breeding seasons. During the breeding season, common tern may be found in the Development area.	Installation activities for the NZT offshore elements are intended to occur within a restricted spatial area that is unlikely to represent a significant proportion of the area available to breeding or non-breeding seabirds. [redacted]	There will be no adverse effect on the bird assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar or the from the NZT Offshore Elements so there is no potential for in-combination effects with the Proposed Development. There will be no adverse effect on

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
				Sandwich tern and arctic tern also may be present during their respective breeding seasons, although both species' density layers likely represent migratory movements. The Development will not result in long-term changes to the functioning of any marine mammal population. The risk of collision arising from the Development is expected to be greatest during the construction phase. However, vessels will likely be travelling at slow speeds, meaning the collision risk is low. Disturbance is also expected to minimal, when placed in the context of the vessels already present in the region. In addition,	[redacted]	site integrity in combination.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
				no impacts to seals at haul-out locations are expected.		
8	EN010150	'Waste-to-sustainable aviation fuel' facility with on-site generating station capacity of up to 150 MW	The scoping reports identifies the potential for effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from air and water pollution events, noise, vibration, lighting, and / or visual disturbance during construction and operation.	Potential for in-combination effects from changes in air quality, water quality, noise, vibration, lighting and visual disturbance which could affect the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	This project is at pre-application stage, so there is insufficient information available to confirm impacts or mitigation requirements. However, any proposal that does come forward for planning consent must by law be subject to its own HRA, including appropriate assessment if necessary. As such there are mechanisms in place to ensure that no proposals that are brought forward can have an adverse effect on the integrity of the SPA / Ramsar, unless they can demonstrate Imperative Reasons of Overriding	There will be no adverse effect on site integrity as a result of the proposed development alone. As the other development is at pre-application stage, there is insufficient information available to assess in combination effects. However, it is unlikely it will be constructed on the same timetable as the Proposed Development meaning no 'in combination' effects from construction disturbance or pollution would arise.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
					Public Interest and No Alternatives.	
22	R/2019/0767/OOM	Director of Regeneration & Neighbourhoods Hartlepool, outline application for the construction of an energy recovery facility (ERF) and associated development, Grangetown Prairie Land east of John Boyle Road and west of Tees Dock Road, Grangetown.	The report to inform HRA screening identified that the nitrogen nutrient baseline deposition exceeds the minimum critical level (AQAL) of 8 kg/ha/yr regardless of the operation of the Proposed Facility. The maximum Process Contribution from the Proposed Facility anywhere within the Teesmouth and Cleveland Coast ecological site is 0.75 kg/ha/yr, which is 9.4% of the AQAL. As such the potential for significant effects cannot be discounted. The Appropriate Assessment states that the Proposed Facility will be required to demonstrate that Best Available Techniques (BAT) have been implemented during the Environmental	As an updated Appropriate Assessment will be required for the other development at detailed planning stage, therefore potential cumulative effects upon air quality during operation cannot be discounted.	The air quality assessment for the proposed development concluded that there would be no adverse effect on the integrity of designated sites alone. Any proposal that does come forward for planning consent must by law be subject to its own HRA, including appropriate assessment if necessary. As such there are mechanisms in place to ensure that the other development cannot have an adverse effect on the integrity of the SPA / Ramsar, unless they can demonstrate Imperative Reasons of Overriding	In combination air quality modelling has been undertaken for this HRA. There will be no adverse effect on the integrity of the European designated sites as a result of changes in air quality from the Proposed Development alone or in combination with other plans or projects. As an updated Appropriate Assessment is required for the other development, they will need to undertake an updated assessment of in-combination effects in due course.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
			Permitting process. A further Appropriate Assessment will be required once the detailed design has been completed.		Public Interest and No Alternatives.	
33	R/2017/0906/OOM	Sirius Minerals Plc, outline planning application for an overhead conveyor and associated storage facilities in connection with the York potash project, land between Wilton International and Bran Sands, Redcar.	The shadow HRA screening report concluded that there is potential for LSE from noise and visual disturbance during construction, reduction in sightlines and overshadowing of Bran Sands lagoon. No likely significant effect is predicted for noise and visual disturbance during the operational phase.	Potential for cumulative effects on the Teesmouth and Cleveland Coast SPA and Ramsar as a result of noise and visual disturbance affecting Bran Sands Lagoon.	The Appropriate Assessment for the other development predicted that there would be some disturbance to waterbirds feeding and roosting at Bran Sands lagoon. The most significant potential effect would be noise disturbance during the construction works, particularly the works for the Storage Facilities foundations, when some disturbance to waterbirds is expected. This potential impact will be mitigated through the use of localised screening around noisy plant, which would also act as a screen (to a limited extent) to	The Appropriate Assessment for the other development concluded that the structure and function (the integrity) of the Teesmouth and Cleveland Coast SPA and Ramsar site would not be adversely affected. There is potential for both projects to affect the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar due to noise and visual disturbance, and mitigation measures are proposed for both projects. Seasonal avoidance is also proposed for the Proposed Development. The

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					personnel and vehicle movements during construction. Based on the implementation of these measures, the effects were not predicted to have the potential to have an adverse effect on the waterbird populations of the Teesmouth and Cleveland Coast SPA and Ramsar site. Visual disturbance due to lighting (in construction and operation) represents a further potential disturbance effect. However, the lighting scheme will be specifically designed to avoid adversely affecting waterbirds that feed and roost at Bran Sands lagoon. It is also noted that given the current use of the Bran Sands site, there are	Proposed Development mitigation will reduce its effect to an acceptable level. Therefore, no residual effects will exist for these two projects to result in significant disturbance. It is possible that the construction phases of the developments could overlap, however with the mitigation proposed, it is considered that birds would still be able to use the area and there would be no adverse effect on site integrity in combination with the Proposed Development.

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					several existing sources of potential disturbance.	
35	R/2014/0627/FFM	York Potash Ltd: Full planning application: The winning and working of polyhalite by underground methods including the construction of a minehead at doves nest farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between doves nest farm and land at wilton that links to the mine below, comprising 1 shaft at	The report to inform HRA identified the potential for disturbance effects and changes in lighting to affect qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	Potential for cumulative effects on the Teesmouth and Cleveland Coast SPA and Ramsar from disturbance effects and changes in lighting during construction. Areas subject to disturbance from both projects include Bran Sands Lagoon and Dabholm Gut.	As mitigation for the potential impact of noise (and visual) disturbance, it is proposed that noise attenuation barriers are positioned: • Along the embankment between Bran Sands lagoon and the proposed construction works for the Port Terminal, and; • On either side of the route of the overland conveyor should it be constructed in the southern corridor (i.e. between the lagoon and Dabholm Gut and the construction works for the conveyor); or • Between Bran Sands Lagoon and the	Both the proposed development and the other development have the potential to affect bird species within Dabholm gut and Bran Sands lagoon. Mitigation is proposed to minimise noise and visual disturbance for both projects. Seasonal avoidance is also proposed for the Proposed Development. The Proposed Development mitigation will reduce its effect to an acceptable level. Therefore, no residual effects will exist for these two projects to result in significant disturbance.

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		doves nest farm, 3 intermediate access shaft sites, each with associated landforming of associated spoil, construction of buildings, access roads and car parking, landscaping, restoration and aftercare, the construction of a tunnel portal at wilton comprising buildings, landforming of spoil and associated works			construction works for the conveyor should the conveyor be constructed in the northern corridor. • The noise attenuation barriers would most likely constitute 2 m high hoarding at ground level. • Use of a noise reduction curtain is proposed over the hammer piling rig during percussive operations. • A sensitive lighting strategy is proposed during construction. Habitat enhancement measures within Bran Sands lagoon are proposed which include the creation of feeding, roosting and nesting habitat.	It is possible that the construction phases of the developments could overlap, however with the mitigation proposed, it is considered that birds would still be able to use the area and there would be no adverse effect on site integrity in combination with the Proposed Development.

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42	R/2020/0357/OOM	South Tees Development Corporation (STDC): Outline planning application for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access	The HRA Stage 1 assessment identified the following potential impacts to the Teesmouth and Cleveland Coast SPA and Ramsar sites: i. During construction: the risk of disturbance and/or loss of habitats that support foraging and commuting activities, and/or roosting of the qualifying features, due to pollution from within The Proposed Development site; ii. During construction: the risk of noise/visual disturbance of small numbers of qualifying species utilising the adjacent SPA/Ramsar site for foraging and commuting activities, and/or roosting; and iii. During operation: the risk of disturbance and/or loss of habitats that support foraging and commuting activities, and/or roosting of the	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from noise and visual disturbance of qualifying bird species, disturbance and / or pollution.	The Framework CEMP (EN070009/APP/5.12) includes measures to control pollution, noise and visual disturbance during construction. Site hoarding will be installed to minimse visual disturbance of birds. Noise levels are predicted to be below 50 dB(A) and therefore will not result in disturbance to qualifying bird species.	Both the proposed development and the other development have the potential to disturb qualifying bird species from the Teesmouth and Cleveland Coast SPA and Ramsar. Mitigation is proposed to minimise noise and visual disturbance for both projects. Seasonal avoidance is also proposed for the Proposed Development, although this was not identified as being necessary for NZT. The Proposed Development mitigation will reduce its effect to an acceptable level. Therefore, no residual effects will exist for these two projects to result in significant disturbance.

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			qualifying features, due to pollution from within The Proposed Development site.			It is considered that with the application of mitigation to reduce noise and visual disturbance to acceptable levels, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar in combination.
51	R/2020/0819/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 139,353 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourse including realignment and associated infrastructure	A Habitats Regulations Assessment has been completed for the other development and is submitted alongside the planning application. The following impacts were identified as having the potential to have a likely significant effect at HRA Stage 1: i. Loss of supporting habitat caused by The Proposed Development; ii. Changes to flightlines or sightlines for waterbirds	Potential for in - combination effects from habitat loss, disturbance, changes in water quality and changes in air quality affecting the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	The Appropriate Assessment for the other development states that there will be no loss of supporting habitat for the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar. It also concludes that there will be no changes to flight lines of sight lines for qualifying bird species or disturbance to waterbirds. A Final CEMP(s) is proposed to prevent and	The Appropriate Assessment for the other development concludes that there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar. This means there is no potential for effects in combination as impact pathways do not in fact exist. With mitigation there will be no adverse effects on integrity from the proposed development

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		works. All matters reserved.	occasioned by The Proposed Development; iii. Disturbance caused to waterbirds caused by The Proposed Development; iv. Discharges to water caused by The Proposed Development; and v. Emissions to air caused by The Proposed Development.		control discharges to air and water.	and the other development in combination.
52	R/2020/0820/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 92,903sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	Stage 1 of the report to inform HRA identifies the potential for effects upon redshank and the waterbird assemblage which are qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar. Pathways of effect considered are loss of habitat, changes to flight lines or sight lines, disturbance to waterbirds, discharges to water and discharges to air.	There is potential for cumulative effects from disturbance to waterbirds, discharges to water and discharges to air.	The Appropriate Assessment for the other development states that there will be no loss of supporting habitat for the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar. It also concludes that there will be no changes to flight lines of sign lines for qualifying bird species or disturbance to waterbirds. The Framework CEMP (EN070009/APP/5.12) is	The Appropriate Assessment for the other development concludes that there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar. This means there is no potential for effects in combination as impact pathways do not in fact exist. With mitigation there will be no adverse effects on integrity from the

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					proposed to prevent and control discharges to air and water.	proposed development and the other development in combination.
53	R/2020/0821/ESM	South Tees Development Corporation (STDC): Outline planning application for development of up to 464,515 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	The Teesmouth and Cleveland Coast SPA and Ramsar site is within 100m of the site at its closest point, which is Bran Sands Lagoon. A HRA has been completed and the following impacts were identified as having the potential to have LSE at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development;	This application overlaps with the proposed development site. Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	The Appropriate Assessment states that there will be no loss of supporting habitats caused by the development as existing built infrastructure renders the site unsuitable for waterbirds. There will be no changes to flight lines or sight lines as these are already significant impeded by stockpiles of materials and other tall structures. Disturbance to waterbirds will be limited as the South Gare Access Road already provides an effective buffer between the northern boundary of the development site and the	The Proposed Development overlaps with ID53. Where the overlaps occur, the Proposed Development will be brought forward in place of that permission and so there would be no in-combination effects.

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			iv Discharges to water caused by The Proposed Development; v Emissions to air caused by The Proposed Development; and vi Reduced groundwater infiltration caused by The Proposed Development.		Coatham Quarries and Lagoons. While the proximity of the development site to the Bran Sands Lagoon component of the SPA could in theory generate noise and visual disturbance, it is considered that the operation of large vehicles and plant associated with the Redcar Bulk Terminal site has very little impact on waterbirds using the Lagoon. Given this body of evidence, coupled with the fact that the red line boundary of the development barely reaches the Lagoon at the latter's north-eastern extremity, it is concluded that disturbance to waterbirds caused by the development will not have	

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					an adverse effect on the integrity of the SPA. A Final CEMP(s) is proposed to prevent discharges to water and air during construction and a Groundwater Management Plan will be prepared and submitted to the LPA to avoid any adverse impacts on SPA / SSSI / Ramsar designations.	
54	R/2020/0822/ESM	South Tees Development Corporation (STDC): Outline planning application for the development of up to 185,806 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourses	A HRA has been completed and the following impacts were identified as having the potential to have a likely significant effect at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development;	This application overlaps with the Proposed Development Site. Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	There is potential for hydrological changes to habitats caused by the diversion of watercourses. Diversion or other modifications to the Fleet have the potential to affect water levels on the Coatham Marsh component of the SPA, which lies upstream. This in turn may have deleterious impacts upon	The proposed development will use existing infrastructure to cross the Fleet so no in-combination effects upon this watercourse are anticipated. There will be no loss of flight lines or sight lines as a result of either development, and no loss

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		including realignment and associated infrastructure works. All matters reserved.	iii Disturbance caused to waterbirds caused by The Proposed Development; iv Discharges to water caused by The Proposed Development; v Emissions to air caused by The Proposed Development; and vi Reduced groundwater infiltration caused by the development.		the waterbird assemblage using Coatham Marsh, and consequently adverse effect on SPA integrity cannot be ruled out. The proposed development includes the statement that, "the hydrology of Coatham Marsh will not be affected by any works to The Fleet. A method statement for assessing works to alter or realign the on site watercourses demonstrating this shall be submitted and approved by the Local Planning Authority prior to the approval of any detailed scheme if works to the watercourses. There would therefore be no adverse effect on the SPA subject to the implementation of the embedded mitigation. The Appropriate	of habitat for qualifying bird species. The existing topography would screen the works for both projects limiting visual disturbance. Final CEMP(s) are proposed for both projects to control potential air and water pollution during construction. As such, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar in combination.

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					Assessment concludes that there will be no loss of supporting habitat for qualifying bird species lost as a result of the development. There will be no loss of flight lines or sight lines as although the distance between the development site and the SPA is minimal, at the closest point, the mounded topography in combination with the existing infrastructure (embankments, railway lines etc) already constrain sightlines to a significant extent, so as a consequence of the proposed development there will be little alteration to existing sightlines for SPA waterbirds.	

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					It is considered that the screening effect of the existing topography towards the eastern periphery of the development site will prevent noise and visual disturbance from impacting upon waterbirds within the SPA boundaries at Coatham Marsh. At a minimum distance of 400m to the north of the site boundary, the Quarries and Lagoons SPA component is sufficiently remote to be unaffected by these factors. It can therefore be assumed that disturbance to waterbirds caused by the development will not have an adverse effect on the integrity of the SPA. A Final CEMP(s) is proposed to prevent	

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					discharges to water and air during construction and a Groundwater Management Plan will be prepared and submitted to the LPA to avoid any adverse impacts on SPA / SSSI/Ramsar designations.	
55	R/2020/0823/ESM	South Tees Development Corporation (STDC): Outline planning application for the development of up to 15,794sqm (gross) of office accommodation (Use Class E) and car parking and associated infrastructure works. All matters reserved.	HRA has been completed and the following impacts were identified as having the potential to have a likely significant effect at Stage 1: i Loss of supporting habitat caused by The Proposed Development; ii Changes to flightlines or sightlines for waterbirds occasioned by The Proposed Development; iii Disturbance caused to waterbirds caused by The Proposed Development;	Potential for in-combination effects on the Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, disturbance, changes in water quality and changes in air quality.	The Appropriate Assessment for the other development concluded that there was no suitable habitat within the site for waterbirds, with the exception of steel house lake which will be retained. The Appropriate Assessment states that "*while there is likely to be some interchange of waterbirds (particularly duck species) between Steel House Lake and Coatham Marsh, flight lines are likely to follow existing corridors along the*	There will be no loss of flight lines or sight lines as a result of either development, and no loss of habitat for qualifying bird species. The existing topography would screen the works for both projects limiting visual disturbance. Final CEMP(s) are proposed for both projects to control potential air and water pollution during construction. As such, there will be no adverse effect on the

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			iv Discharges to water caused by The Proposed Development; v Emissions to air caused by the development; and vi Reduced groundwater infiltration caused by The Proposed Development.		*northern and southern boundaries of the development site, thereby avoiding the relatively tall structure of Steel House. Furthermore, since no supporting habitat known to harbour SPA waterbirds exists in the hinterland of the development site, it follows that there will be no impact upon established flight lines in a southerly direction. There is therefore no potential for these factors to have an adverse effect on the integrity of the SPA*." The Appropriate Assessment states: "I*t is considered that the screening effect of both the existing topography and the Middlesbrough-Redcar railway line will prevent noise and visual*	integrity of the Teesmouth and Cleveland Coast SPA and Ramsar in combination.

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					disturbance from impacting upon waterbirds within the SPA boundaries at Coatham Marsh. Given that Steel House Lake and its surrounding woodland, scrub and marginal vegetation are to be retained it can be concluded that disturbance impacts at that location will be minimal, especially given the screening effect provided by the Steel House complex itself. It can therefore be assumed that disturbance to waterbirds caused by the development will not have an adverse effect on the integrity of the SPA" A Final CEMP(s) is proposed to prevent discharges to water and air during construction and a Groundwater	

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					Management Plan will be prepared and submitted to the LPA to avoid any adverse impacts on SPA / SSSI/Ramsar designations.	
76	H/2022/0181	Outline planning application for the erection of up to 1400no. dwellings and up to 750sqm of non-residential floorspace (comprising Use Class E and Sui Generis) with associated parking, landscaping and infrastructure with all matters reserved except access.	The ES chapter notes that the site is within the same catchment of the Teesmouth and Cleveland Coast Ramsar and Special Protection Area. As such there is the potential for the development to development to add nitrogen and phosphate pollution to this site which is in unfavourable condition.	Potential for changes in water quality.	Correspondence from Natural England confirms that the other development will not have likely significant effects on the Teesmouth and Cleveland Coast Special Protection Area and Ramsar and has no objection to the development. Natural England notes that information has been provided by the applicant to demonstrate that the development will not result in addition nitrogen entering the catchment of the Teesmouth and Cleveland Coast Special	Neither the proposed development or the other development will have an adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar alone, therefore there will be no adverse effects on integrity in-combination..

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					Protection Area and Ramsar.	
91	H/2014/0428	Erection of 570 dwellings and provision of a new roundabout and associated infrastructure	HRA screening identified the potential for recreational disturbance to affect the qualifying species of the Teesmouth and Cleveland Coast SPA and Ramsar.	Yes – both projects have the potential for disturbance of qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	The following mitigation measures are proposed to remove adverse effects on integrity: • Strategic guidance via the Hartlepool Local Plan • Developer contributions – Suitable Alternative Natural Green Space (SANGS), financial contribution, etc.) • Local Plan Mitigation Strategy and Delivery Plan & monitoring plan • Hartlepool BC and Durham CC coastal management and foreshore services provision	Both the proposed development and the other development have the potential to result in disturbance of the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar. However, with the application of mitigation there will be no adverse effect on site integrity alone or in combination. The Proposed Development will reduce its construction noise disturbance to an acceptable level. Provided the other project delivers the recreational pressure mitigation identified there would be no in combination effect.

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131	22/2386/SOR	Scoping opinion for Green Hydrogen Production Facility and Wind Turbine	The scoping report identifies the potential for effects on the Teesmouth and Cleveland Coast SSSI, bats and habitats.	Potential for cumulative effects on designated sites from habitat loss, noise and visual disturbance, changes in lighting and loss of functionally linked land.	This project is at pre-application stage, so there is insufficient information available to confirm impacts or mitigation requirements. However, any proposal that does come forward for planning consent must by law be subject to its own HRA, including appropriate assessment if necessary. As such there are mechanisms in place to ensure that no proposals that are brought forward can have an adverse effect on the integrity of the SPA / Ramsar, unless they can demonstrate Imperative Reasons of Overriding Public Interest and No Alternatives.	There will be no adverse effect on the European designated sites as a result of the proposed development alone. As the other development is not yet consented, there is insufficient information available to assess in combination effects. . However, given it is at the scoping stage it is unlikely it will be constructed on the same timescale as the Proposed Development and may never emerge as an actual planning application.

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135	23/0090/EIS	Carbon capture facility for existing Energy from Waste site	Natural England correspondence states that there are potential significant effects on Teesmouth and Cleveland Coast Special Protection Area (SPA) and Ramsar Site from nitrogen. Natural England require further details to demonstrate if the proposed wastewater discharge will result in additional Total Nitrogen and other pollutants being discharged to the Tees catchment. A mitigation strategy may be required to prevent additional Total Nitrogen reaching the SPA.	This application is pending. There is potential for cumulative effects on designated sites from nitrogen if this were to reach the SPA.	Natural England have requested further details to demonstrate if the proposed wastewater discharge will result in additional Total Nitrogen and other pollutants being discharged to the Tees catchment. They have advised that a mitigation strategy may be required to prevent additional Total Nitrogen reaching the Teesmouth and Cleveland SPA.	There will be no adverse effect on the Teesmouth and Cleveland Coast SPA and Ramsar as a result of Nitrogen and other pollutants alone. The other development will need to confirm nutrient neutrality alone and in combination as part of the consenting process, therefore it is unlikely that an adverse effect on integrity would occur in combination. ..
157	08/3644/EIS	Outline planning application for residential (Class C3), employment (Class B1), health care facility (Class D1), leisure (Class A3, A4, A5, C1 and D2), ancillary retail and	The ecology chapter of the ES for the other development identified the potential for significant effects on fish.	The Proposed Development will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect	Mitigation is proposed for both projects to prevent adverse effects on fish / aquatic ecology.	There will be no adverse effects upon the integrity of the River Tweed SAC or the Tweed Estuary SAC alone or in combination since the mitigation proposed for both projects

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		services (Class A1 and A2) and car dealership (sui generis) with car parking and associated landscaping and infrastructure improvements		migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect Atlantic salmon and sea lamprey (qualifying features of the River Tweed SAC and the Tweed Estuary SAC) will be taken forward to Appropriate Assessment.		would ensure no residual effects remained. The mitigation for the Proposed Development would address its contribution to any in combination effect.
167	22/1145/SCO	Screening opinion for proposed hydrogen production plant, battery storage and hydrogen re-fuelling point.	Natural England correspondence notes the potential for adverse effects upon the Teesmouth and Cleveland Coast SPA and Ramsar.	There is insufficient information available to assess potential in-combination effects at this stage.	This project is at pre-application stage, so there is insufficient information available to confirm impacts or mitigation requirements. However, any proposal that does come forward for planning consent must by law be subject to its own HRA, including appropriate assessment if necessary. As such there are mechanisms in place to ensure that no proposals	There will be no adverse effect on the integrity of the European designated sites as a result of the proposed development alone. As the other development is not yet consented, there is insufficient information available to confirm no adverse effects in combination. However, since the project is at the screening opinion stage it is unlikely it will be

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					that are brought forward can have an adverse effect on the integrity of the SPA / Ramsar, unless they can demonstrate Imperative Reasons of Overriding Public Interest and No Alternatives.	constructed on the same timescale and may not result in an application. The mitigation associated with the Proposed Development will ensure that its contribution to any in combination effect is acceptable.
172	R/2020/0685/ESM	South Tees Development Corporation (STDC): Outline planning application for demolition of existing redundant quay structures, capital dredging and development of new quay and associated works (PHASE 2)	The report to inform HRA identifies the potential for noise and visual disturbance to affect waterbirds during operation of the quay and effects on waterbird feeding habitat due to changes in coastal processes.	Both projects have the potential for noise and visual disturbance of the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar.	The Appropriate Assessment for the other development confirms that there will be no adverse effects from noise and visual disturbance of the qualifying bird species of the Teesmouth and Cleveland Coast SPA and Ramsar.	There will be no adverse effects on the integrity of the European designated sites alone or in combination due to an absence of impact pathways from the other development to Euroepan sites following appropriate assessment for that application.
178	R/2023/0291/ESM	Outline application (all matters reserved) for the development of a 3 line low-carbon lithium refinery and associated	The report to inform HRA considers potential effects upon the Teesmouth and Cleveland Coast SPA and Ramsar. The report screens in	Potential for in-combination effects on air quality.	The Appropriate Assessment states that measures will be implemented to control dust during construction.	Both projects propose measures to minimise air quality effects during construction.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
		dock-side reception, handling, storage, and manufacturing facilities for the production of high-quality, battery-grade lithium hydroxide	emissions to air from construction and operational activities.		Based on the information provided in the air quality assessment, it was concluded that there would be no adverse effect on site integrity from emissions to air during operational activities.	Chapter 8: Air Quality [APP-060] confirms that there will be no adverse effects on air quality during operation in combination.
212	22/1525/EIS	Erection of an energy recovery facility and associated infrastructure for fuel receipt and storage, power generation, power export, process emissions control, maintenance, offices and car parking together with associated operations.	The report to inform HRA identifies potential pathways to LSE on the Teesmouth and Cleveland coast SPA and Ramsar from noise, visual disturbance, emissions to cround, water and air, and construction traffic movements. During operation, the potential pathways to LSE are as a result of omissions to air from the stack at the proposed Energy Recovery Facility, the traffic associated with the development and emissions to water.	This application is pending. Potential for in-combination cumulative effects upon air quality affecting the qualifying features of the Teesmouth and Cleveland Coast SPA and Ramsar.	The report to inform HRA for the other development concludes that there will be no adverse effects on the integrity of the European designated sites.	There will be no adverse effect on the integrity of the European designated sites as a result of the proposed development alone. There are no identified residual effects that would potentially be significant cumulatively. Assuming Natural England agree with the conclusions of the HRA for the other development, there will be no adverse effects on integrity in combination.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
219	23/1019/EIS	Development of Greenergy Renewable Fuels and Circular Products Facility comprising a Sustainable Aviation Fuel Plant and Tyre Plant and associated infrastructure. A temporary construction laydown area, proposed services corridor, pipe bridge, ancillary buildings and car parking	The report to inform HRA screening identifies the potential for effects upon the Teesmouth and Cleveland Coast SPA and Ramsar from surface water runoff and pollution, changes in drainage, operational air quality, noise during construction and operation, vibration and loss of functionally linked land.	Potential in-combination effects upon the Teesmouth and Cleveland Coast SPA and Ramsar including habitat loss, loss of functionally linked land, noise and visual disturbance, changes in water quality and changes in air quality.	The Framework CEMP (EN070009/APP/5.12) is proposed to control surface water runoff and pollution during the construction phase. A Flood Risk Assessment has been prepared which includes a conceptual drainage strategy design. This is to include a SUDS treatment plan and associated management and maintenance scheme to minimise the risk of any pollution and changes in water chemistry during the operation of the development to a negligible level. The applicant has set out a strategy whereby the process-related waste waters will be collected on site and sent to a treatment works that	With the implementation of mitigation proposed for the Proposed Development and the other development, there will be no adverse effects on the integrity of the European designated sites alone or in combination. Measures exist that would reduce the impact of both projects to an acceptable level. Therefore no residual effects would remain.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
					discharges outside of the Tees catchment and this approach will be secured for the lifetime of the proposal. The Construction Noise Assessment identifies a set of best practice measures to be adhered to in order to minimise the individual low effect on qualifying birds to a negligible level. The Appropriate Assessment did not identify any risk of significant impact on qualifying bird species via potential habitat degradation from air quality emissions, considering both the project alone and in-combination.	
222	R/2023/0179/SCP	HyGreen Hydrogen Project	The ES chapter and report to inform HRA identify the	Potential for cumulative effects upon the	Mitigation including visual screening and use of noise	As mitigation is proposed for both projects, there

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
			potential for habitat loss, loss of functionally linked land for birds, noise and visual disturbance of birds and changes in water quality to affect the Teesmouth and Cleveland coast SPA and Ramsar.	Teesmouth and Cleveland Coast SPA and Ramsar from habitat loss, loss of functionally linked land, noise and visual disturbance.	abatement / reduction measures (such as close-board acoustic fencing or other barriers) is proposed to control noise and visual disturbance during construction. These measures will be secured by a CEMP which will also include measures to control pollution during construction. A sensitive lighting strategy during construction and operation is proposed for both projects. Timing of works is proposed for H2Teesside to avoid or minimise disturbance of breeding / non-breeding birds within functionally linked land. A DEMP is also proposed for H2Teesside and will outline measures to avoid noise, visual disturbance, dust	will be no adverse effect on the integrity of the European designated sites as a result of the proposed development alone or in combination. That is because the mitigation would reduce the impact of both projects to an acceptable level ensuring no residual effects remain.

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
					and changes in water quality.	
1	R/2014/0627/FFM	York Potash DCO. The installation of wharf/jetty facilities with two ship loaders capable of loading bulk dry material at a rate of 12m tons per annum (dry weight). Associated dredging operations to create berth. Associated storage building with conveyor to wharf/jetty. Including a materials handling facility (if not located at Wilton) served by a pipeline (the subject of a separate application (this project also involves ID33 and ID35)) and conveyor to storage building and jetty	In the absence of mitigation there is potential for habitat loss / change, disturbance, changes in water quality could have effects in combination with the Proposed Development	Initially, it was planned that the implementation of the York Potash DCO would be delivered in two phases. Their Planning Statement said "It is assumed that the construction of the harbour facilities would commence in January 2017, with completion of the Phase 1 works expected in July 2018. Phase 2 works are programmed to commence within 6 years of completion of the Phase 1 works. It is the intention that all works would be completed, and the Harbour Facilities will be operating at full capacity by 2024." In 2022, Anglo American submitted an	Acoustic barriers are proposed for both projects along the embankment that forms the seaward end of Bran Sands lagoon. This will mitigate potential noise and visual disturbance. Mitigated noise levels for the York Potash project are predicted to be 50 dB or under at sensitive receptor locations. Sensitive lighting is proposed in the vicinity of the lagoon and Dabholm gut. Habitat enhancement measures were proposed as part of the York Potash project including the creation of a series of islands in Bran Sands lagoon to create roosting, loafing and nesting	It is not known if the habitat enhancements proposed in Bran Sands Lagoon have been implemented. The habitat enhancement works were proposed to be implemented in parallel with the capital dredging works. Measures to reduce noise and visual disturbance to acceptable levels are proposed for both projects. It is possible that the construction phases of the developments could overlap, however with the mitigation proposed, it is considered that birds would still be able to use the area and there would be no adverse effect on

ID	APPLICATION REFERENCE	DEVELOPMENT NAME AND DETAILS	REPORTED EFFECTS OF OTHER DEVELOPMENT	POTENTIAL IN-COMBINATION EFFECTS WITH PROPOSED DEVELOPMENT	MITIGATION PROPOSED	RESIDUAL IN-COMBINATION EFFECTS
				update to their DCO, titled York Potash Harbour Facilities (Amendment) Order 2022. The predicted duration on the construction works remains as originally submitted. Phase 1 will last 19 months and Phase 2 will last 17 months, with Phase 2 commencing within 6 years of completion of the Phase 1 works. There is uncertainty as to when the construction works will commence, and as such there is now potential for an overlap in construction schedules. This could result in displacement and noise and visual disturbance of qualifying bird species.	opportunities for waterbirds. The creation of this habitat would occur several years in advance of the loss of the NWL jetty and loss of roosting habitat along the whole of the port terminal frontage; which would occur during the construction of Phase 2 of the proposed Harbour facilities. A detailed plan for the jetty had not been submitted at the time of writing.	site integrity in combination with the Proposed Development.

8.0 CONCLUSION

8.1.1 Stage 1 of this HRA identified that there was the potential for adverse effects upon European designated sites as a result of the Proposed Development.

8.1.2 Avoidance and mitigation measures are proposed at Stage 2 and it is considered that with this mitigation, there will be no adverse effect on site integrity alone or in-combination with other plans or projects.

8.1.3 It is anticipated that the provided information is sufficient to demonstrate that the requirements of Regulations 63 and 64 of the Habitats Regulations have been fully considered, and will allow the competent authority to undertake an HRA Screening exercise and Appropriate Assessment, and reach the same conclusion as detailed within this report i.e. no significant residual effect upon any statutory designated site/qualifying feature.

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ANNEX A FIGURES

Figure 1 – Proposed Development Site

Figure 2 – European Des Sites Screened into the Assessment of LSE within 15 km

Figure 3 – European Des Sites Screened into the Assessment of LSE

Figure 4 – Bird Survey Sectors

Figure 5 – Areas with Potential for Visual Disturbance of Qualifying Bird Species

Figure 6 – Baseline Noise Monitoring Locations

Figure 7 – Predicted Noise from ROW Fencing and Preparatory Construction Works

Figure 8 - Predicted Noise from the Main Site and Construction Compounds

Figure 9 – Predicted Noise and Construction of Above Ground Connection Corridors

Figure 10 – Predicted Noise and Construction of Below Ground Connection Corridors

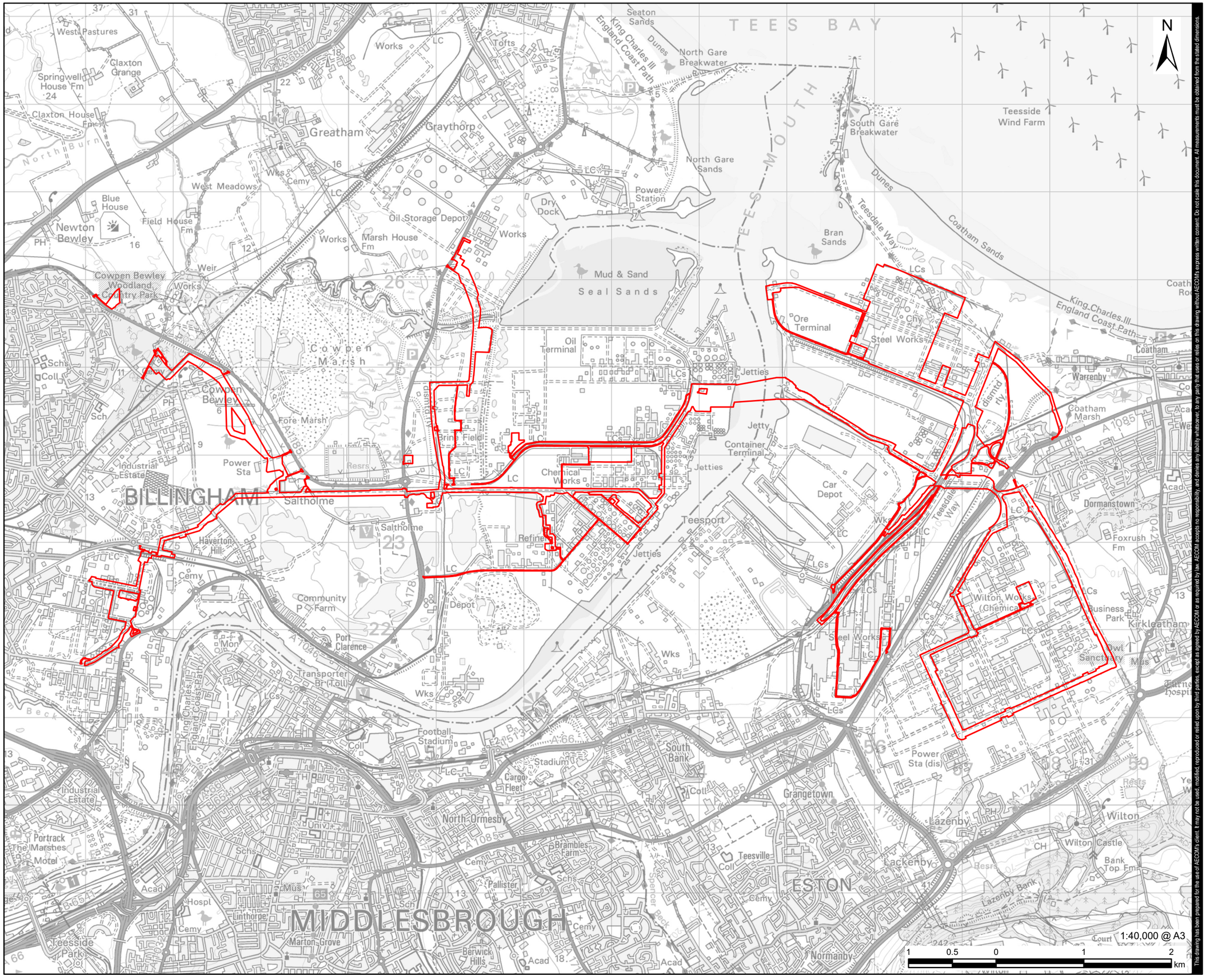
Figure 11 - Predicted Noise from Pipeline Testing

Figure 12 - Predicted Noise from HDD during Construction

Figure 13 – Predicted Noise during Operation

Figure 14a – HRA Avoidance and Mitigation

Figure 14b – HRA Avoidance and Mitigation



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LEGEND

Proposed Development Site

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Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Proposed Development Site

FIGURE NUMBER

Figure 1

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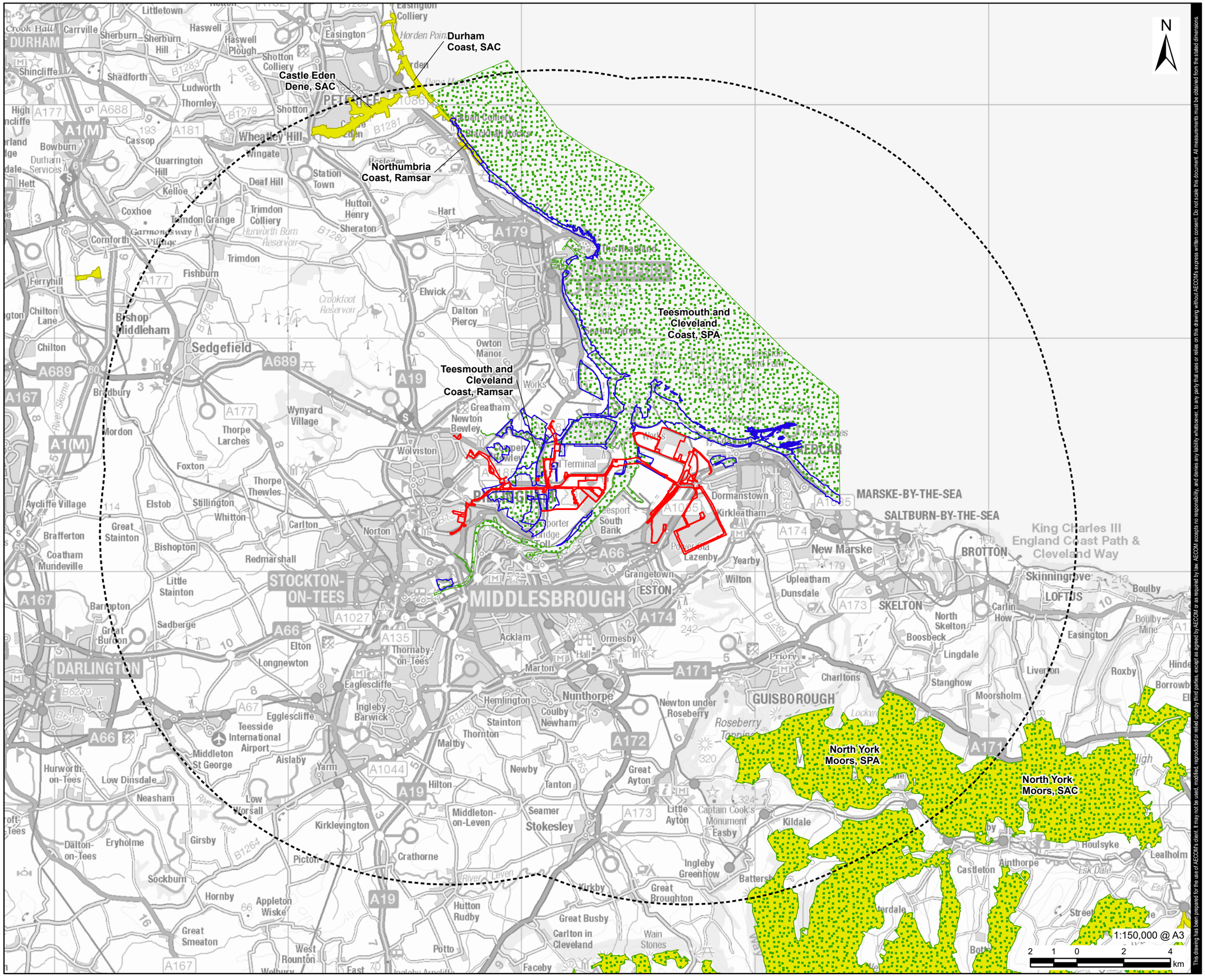

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LEGEND

- Proposed Development Site
- Proposed Development Site - 15 km Buffer
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

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FIGURE TITLE

European Designated Sites Screened into the Assessment of LSE within 15 km

FIGURE NUMBER

Figure 2

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LEGEND

- Proposed Development Site
- Special Area of Conservation (SAC)

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Habitats Regulation Assessment

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FIGURE TITLE

European Designated Sites Screened into the Assessment of LSE

FIGURE NUMBER

Figure 3

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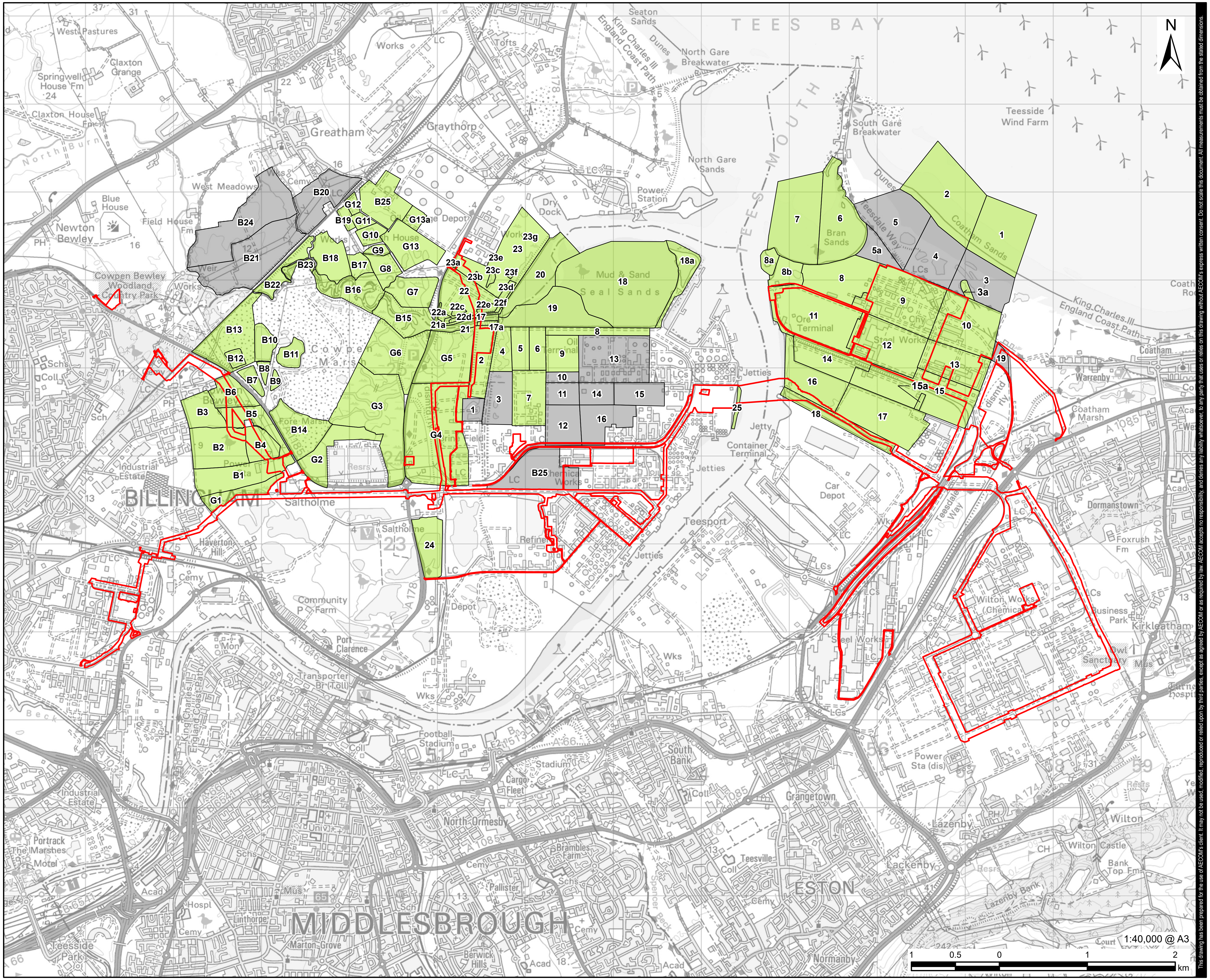

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LEGEND

Proposed Development Site

AECOM Bird Count Sector

Status

Active

Inactive

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Habitats Regulation Assessment

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FIGURE TITLE

Bird Survey Sectors

FIGURE NUMBER

Figure 4

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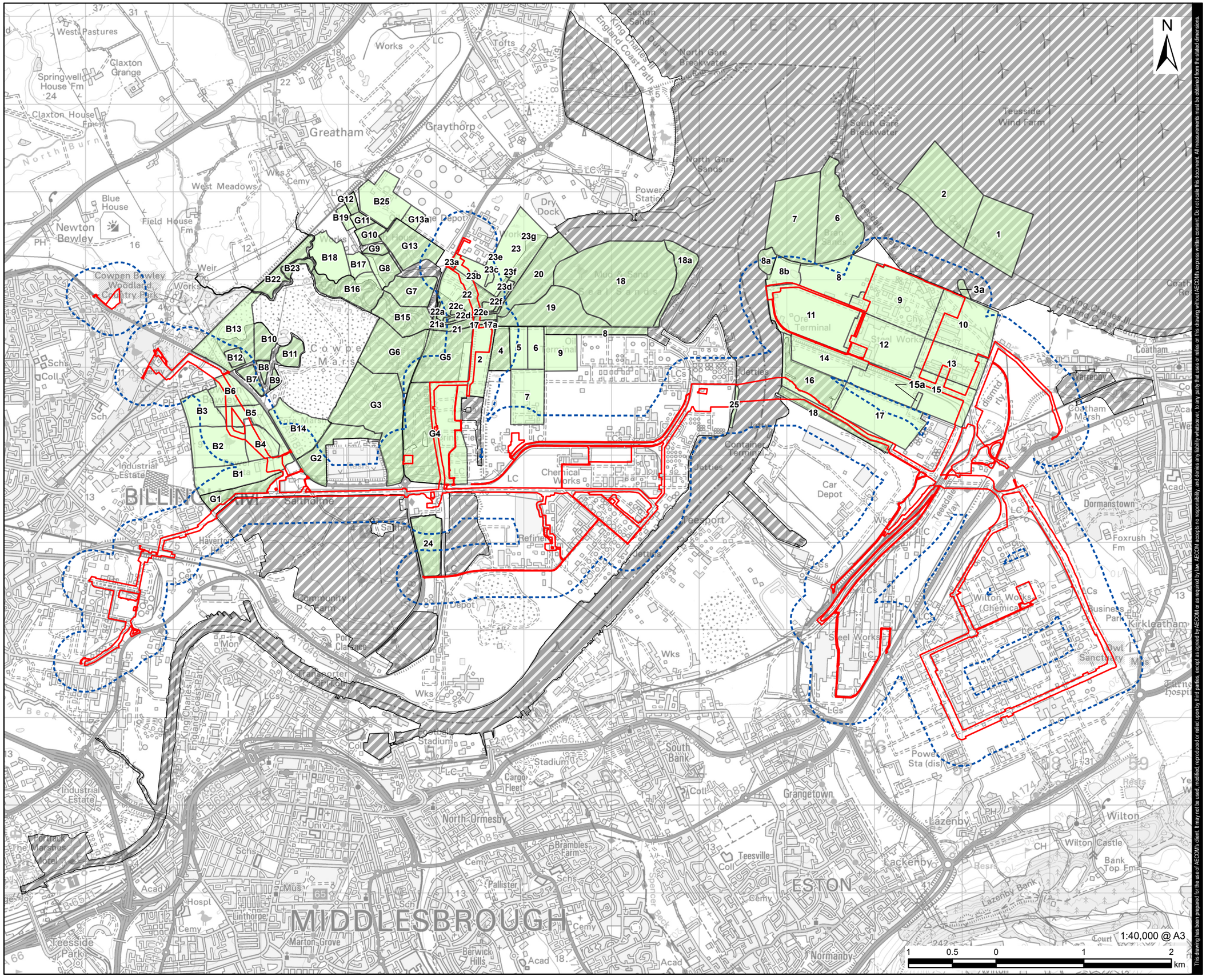

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LEGEND

- Proposed Development Site
- Proposed Development Site - 300 m Buffer
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

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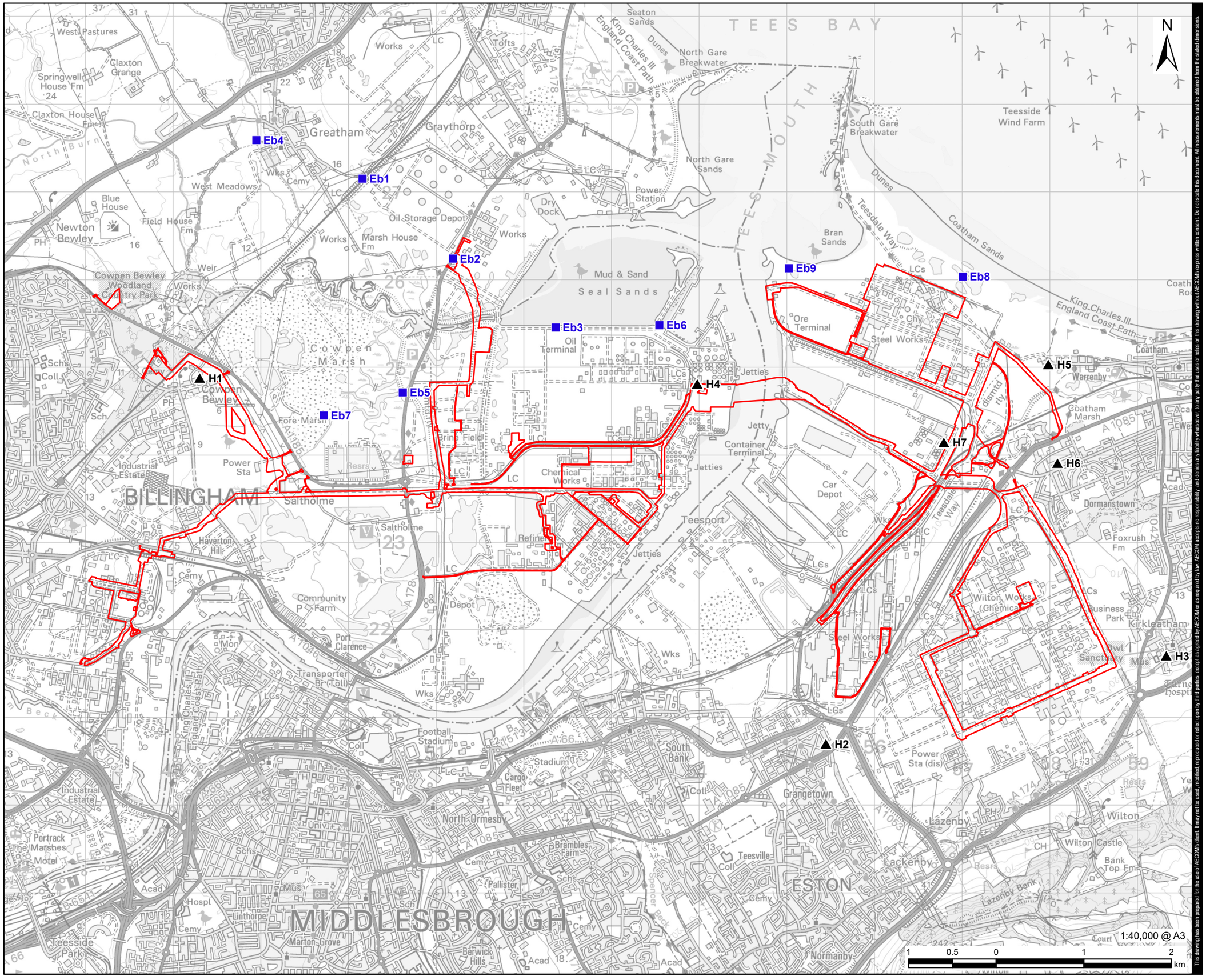
FIGURE TITLE

Areas with Potential for Visual Disturbance of Qualifying Bird Species

FIGURE NUMBER

Figure 5



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LEGEND

- Proposed Development Site
- H2Teesside Noise Sensitive Receptor - Ecological
- H2Teesside Noise Sensitive Receptor - Human

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FIGURE TITLE

Baseline Noise Monitoring Locations

FIGURE NUMBER

Figure 6

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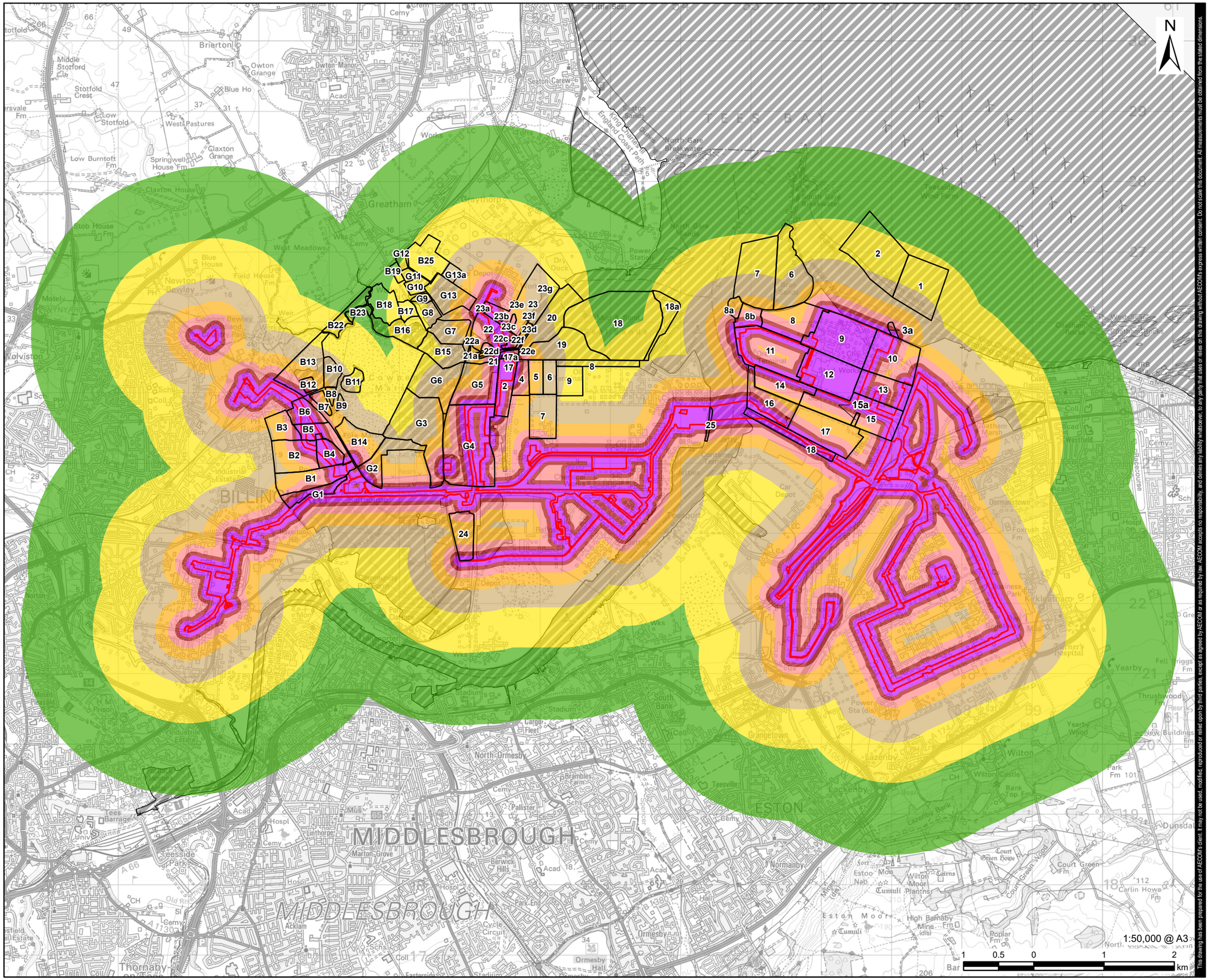

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

ROW Fencing and Prep Construction Works Noise Level $L_{Aeq,\,T}$ (dB)

- 40
- 45
- 50
- 55
- 60
- 65
- 70

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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from ROW Fencing and Preparatory Construction Work in the absence of mitigation

FIGURE NUMBER

Figure 7

Revision: 01 Drawn: CL Checked: MAB Approved: KA Date: 2024-08-28

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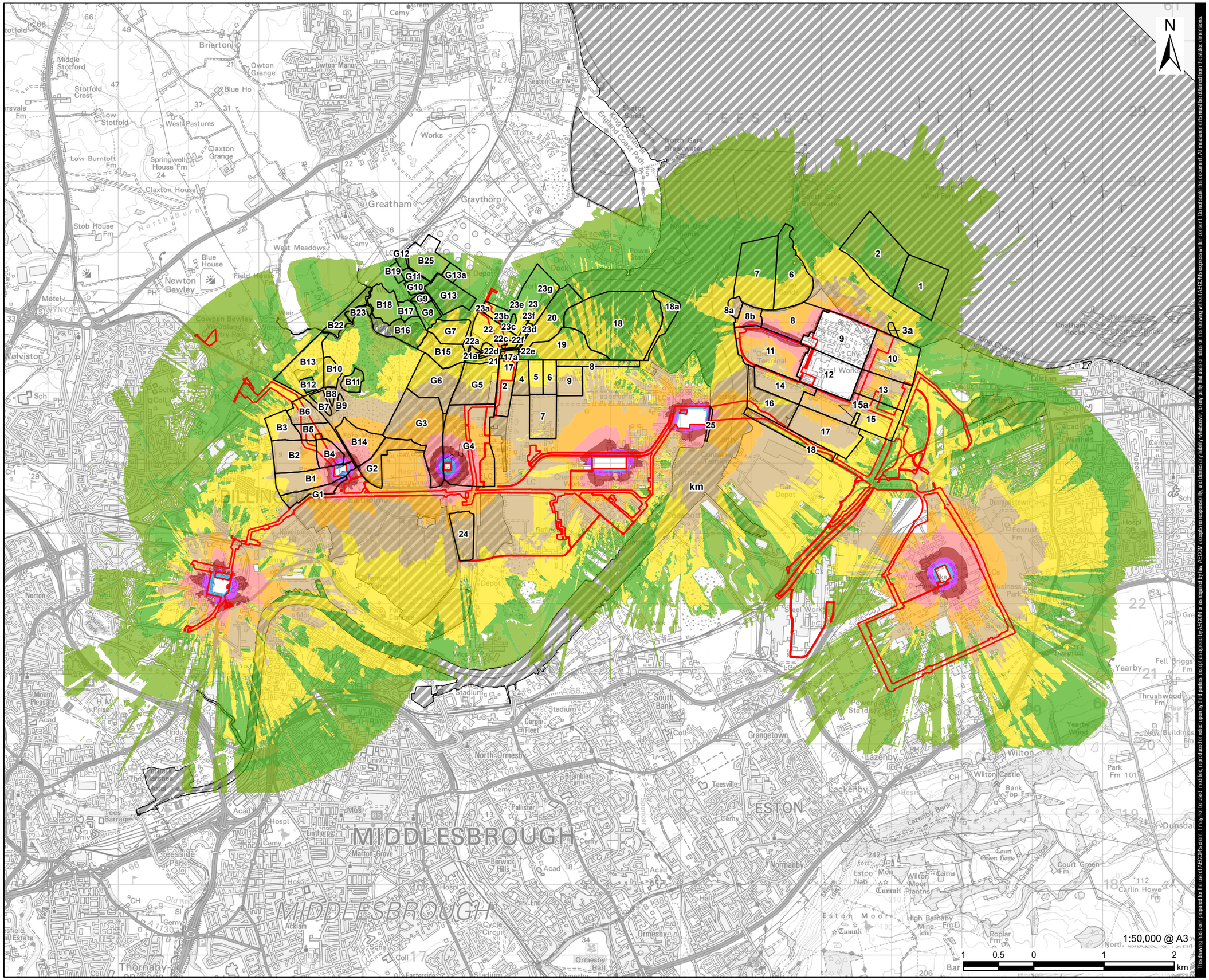

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PROJECT

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APPLICANT

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

Main Site and Compounds Construction Noise Level $L_{Aeq,\ T}$ Contour (dB)

- >=35
- >=40
- >=45
- >=50
- >=55
- >=60
- >=65
- >=70
- >=75
- >=80
- >=85

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ISSUE PURPOSE

Change Report

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from the Main Site and Construction Compound in the absence of mitigation

FIGURE NUMBER

Figure 8

Revision: 01 Drawn: CL Checked: MAB Approved: KT Date: 2024-09-06

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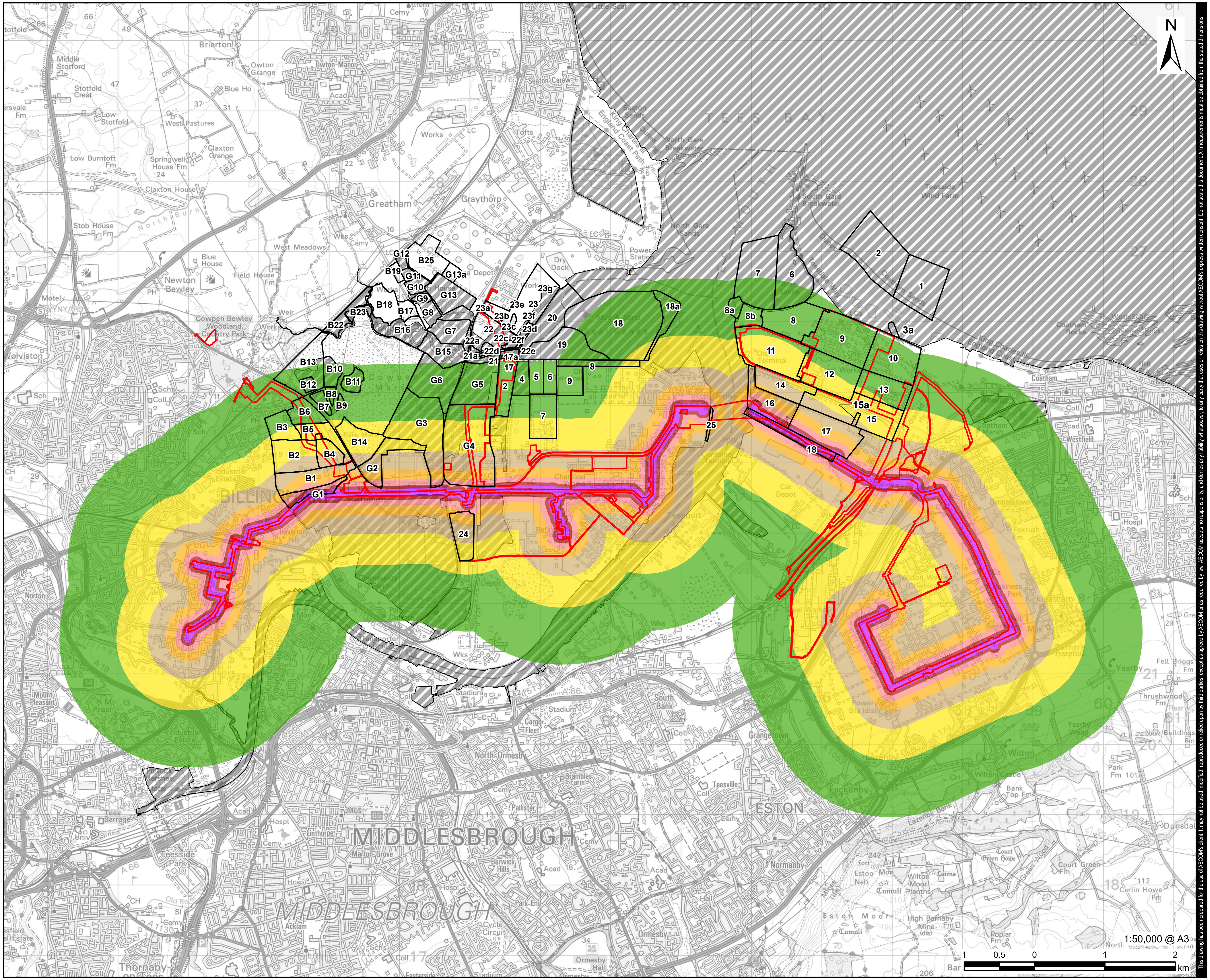

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

Above-Ground Pipeline Construction Noise Level $L_{Aeq,T}$ (dB)

- 40
- 45
- 50
- 55
- 60
- 65
- 70

NOTES

ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from Construction of Above Ground Connection Corridors in the absence of mitigation

FIGURE NUMBER

Figure 9

Revision: 01 Drawn: CL Checked: MAB Approved: KT Date: 2024-09-06

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

Buried Pipeline Construction Noise Level $L_{Aeq,\,T}$ (dB)

- 40
- 45
- 50
- 55
- 60
- 65
- 70

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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from Construction of Below Ground Connection Corridors in the absence of mitigation

FIGURE NUMBER

Figure 10

Revision: 01 Drawn: CL Checked: MAB Approved: KT Date: 2024-09-06

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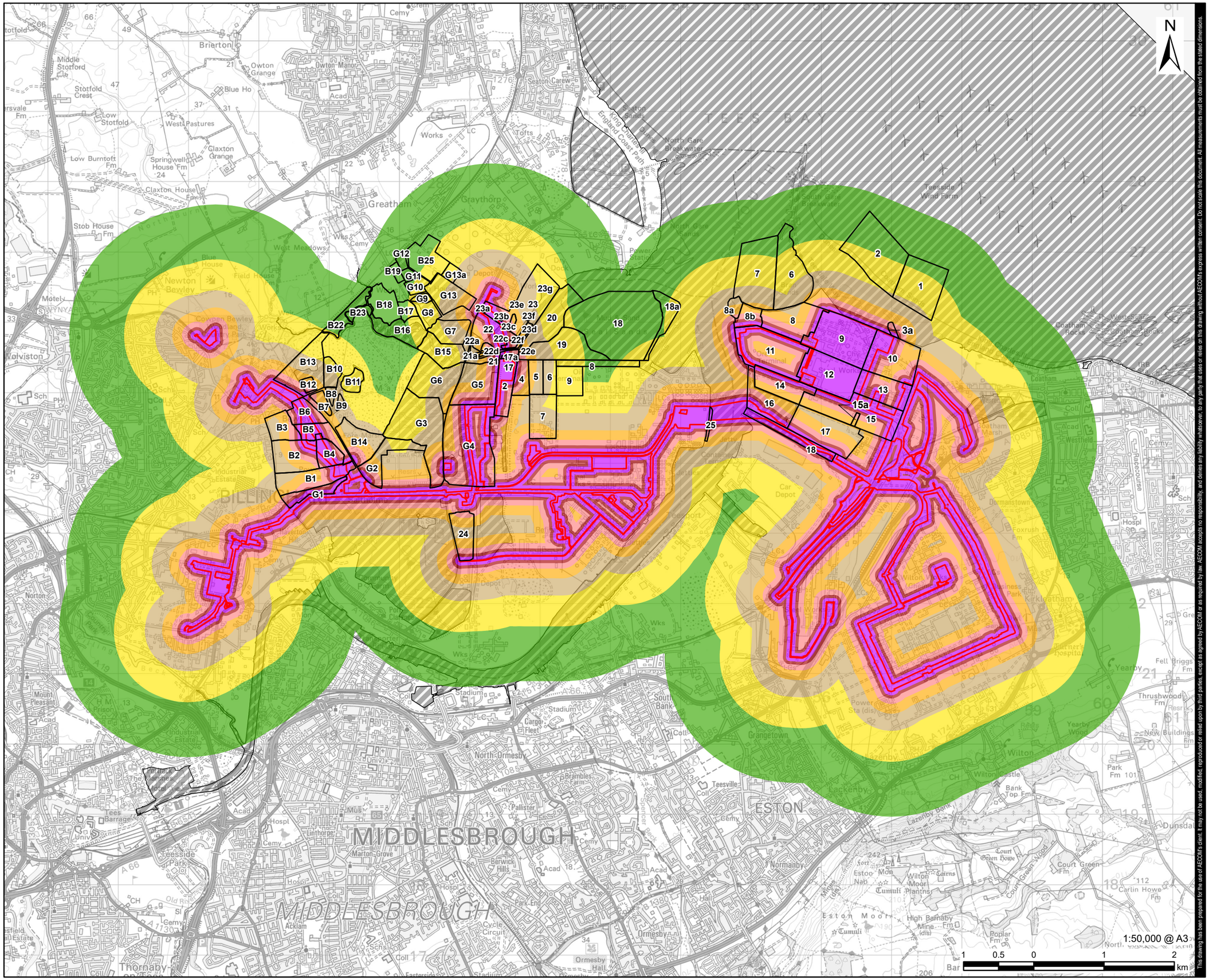

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

Pipeline Testing Noise Level $L_{Aeq,\,T}$ (dB)

- 40
- 45
- 50
- 55
- 60
- 65
- 70

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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from Pipeline Testing in the absence of mitigation

FIGURE NUMBER

Figure 11

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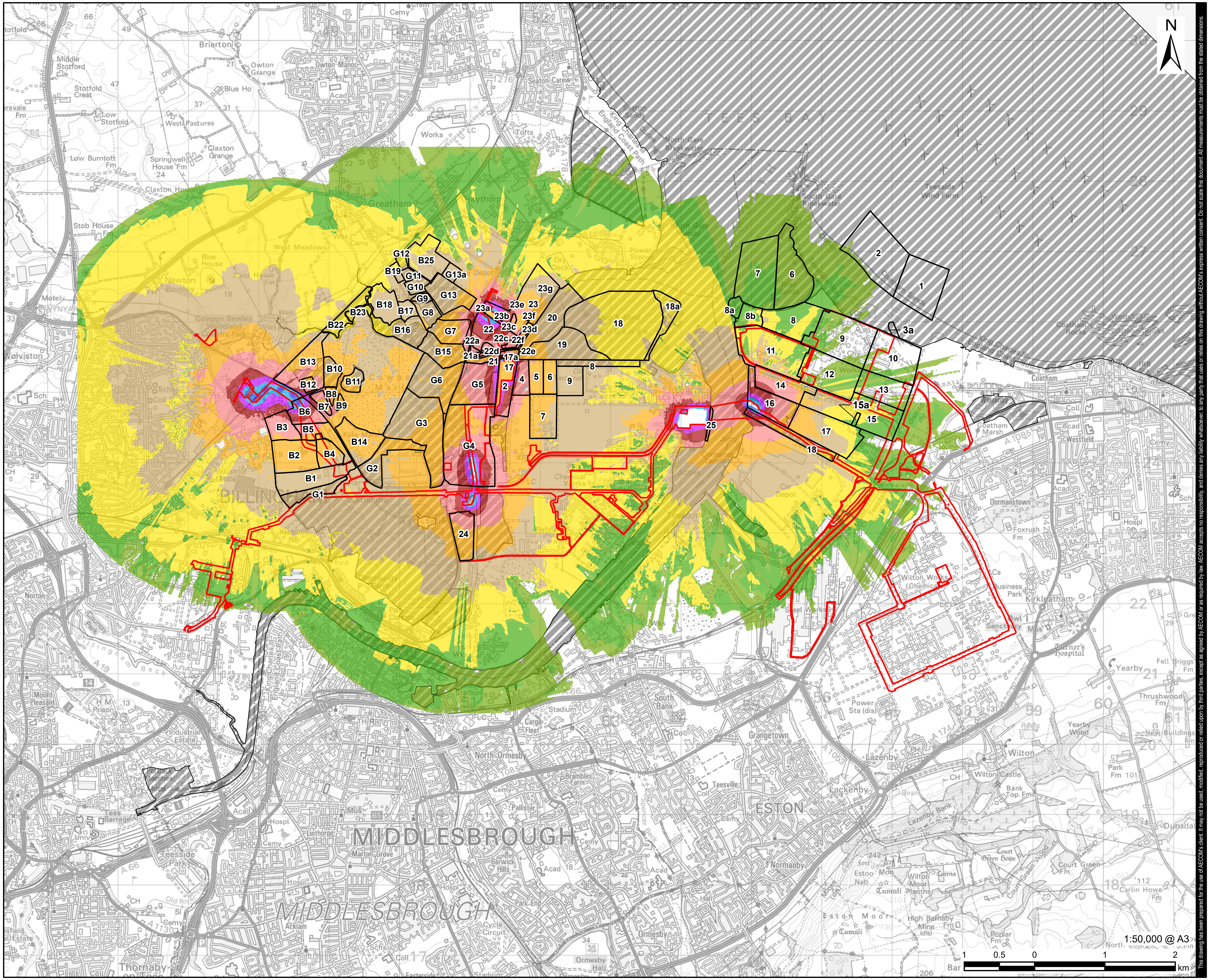

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

All HDDs and Auger Sites Construction Noise Level $L_{Aeq,T}$ Contour (dB)

- >=35
- >=40
- >=45
- >=50
- >=55
- >=60
- >=65
- >=70
- >=75
- >=80
- >=85

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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise from HDD during Construction

FIGURE NUMBER

Figure 12

Revision: 0 Drawn: CL Checked: MAB Approved: KA Date: 2024-08-28

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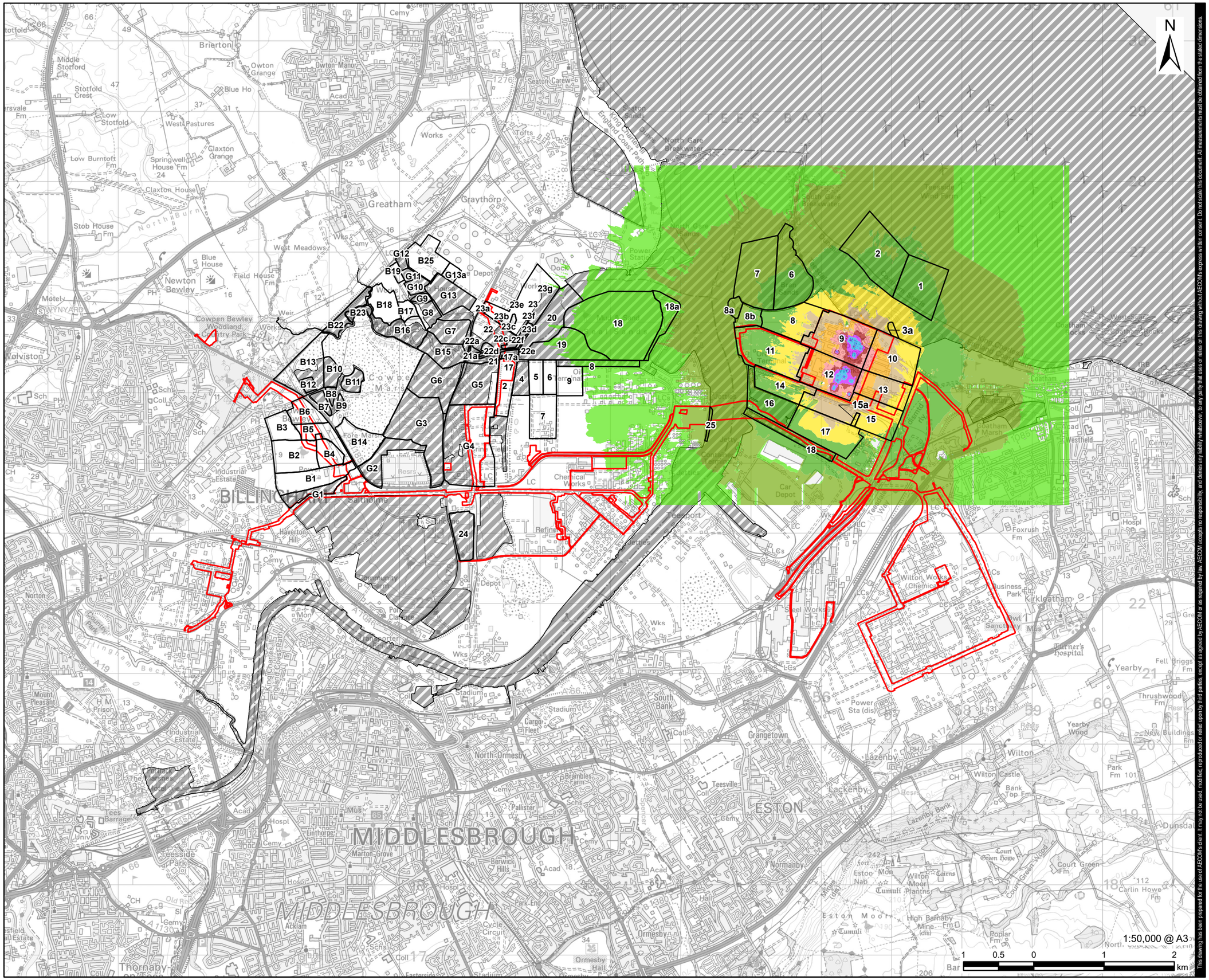

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LEGEND

- Proposed Development Site
- AECOM Bird Count Active Sector
- Teesmouth and Cleveland Coast SPA or RAMSAR

Main Site Operational Noise Level $L_{Aeq,\,T}$ (dB)

- >=30
- >=35
- >=40
- >=45
- >=50
- >=55
- >=60
- >=65
- >=70
- >=75
- >=80
- >=85
- >=90

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Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

Predicted Noise during Operation

FIGURE NUMBER

Figure 13

Revision: 01 Drawn: CL Checked: MAB Approved: KA Date: 2024-08-28

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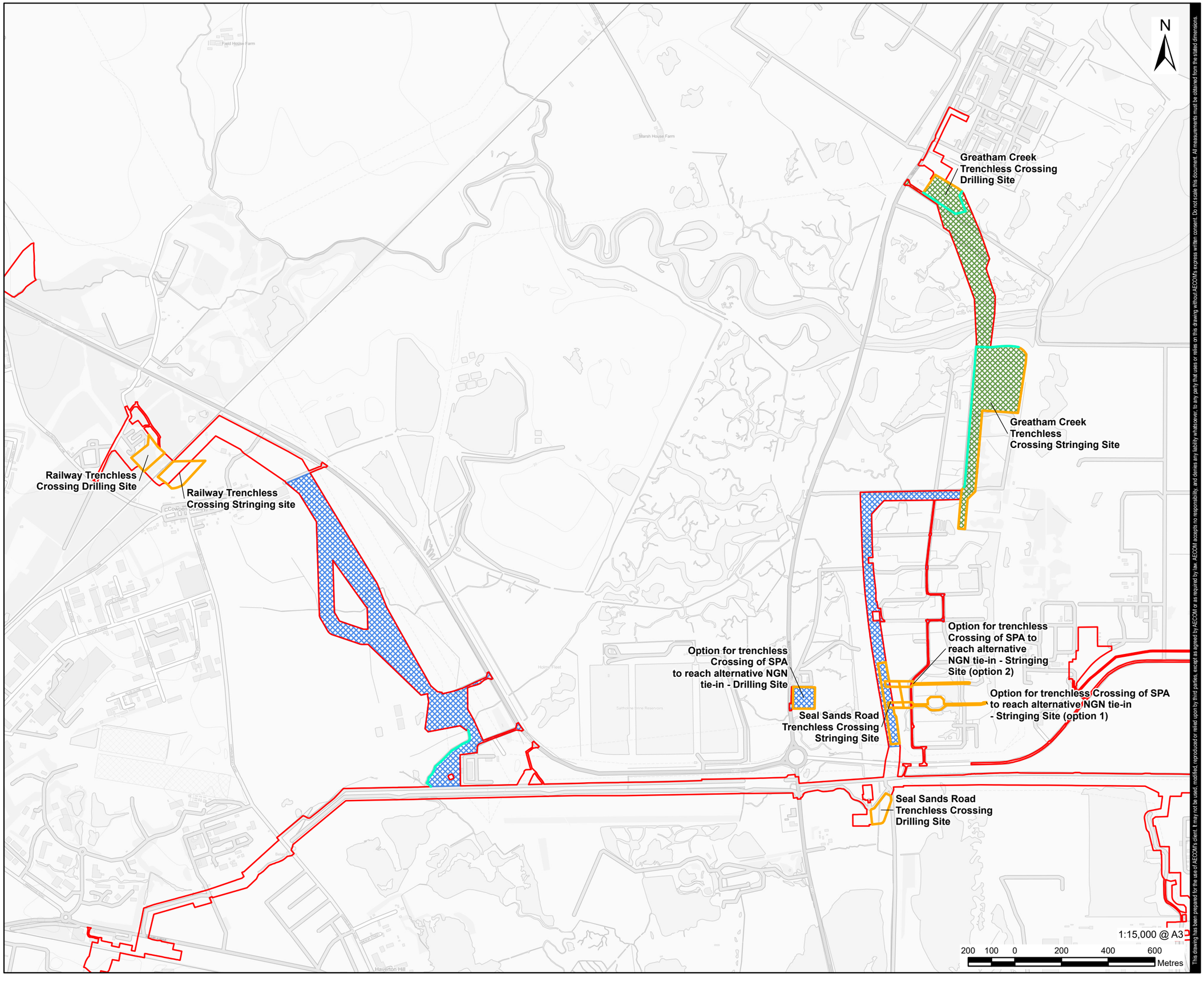

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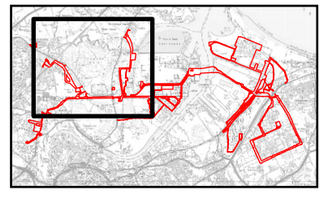
LEGEND

- Proposed Development Site
- Trenchless Crossing Area/HDD Exit
- Indicative Location of Noise and Visual Screening Mitigation

Areas of Time Limited Works

- Between March and September
- Between September and November



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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

HRA Avoidance and Mitigation

FIGURE NUMBER

Figure 14a

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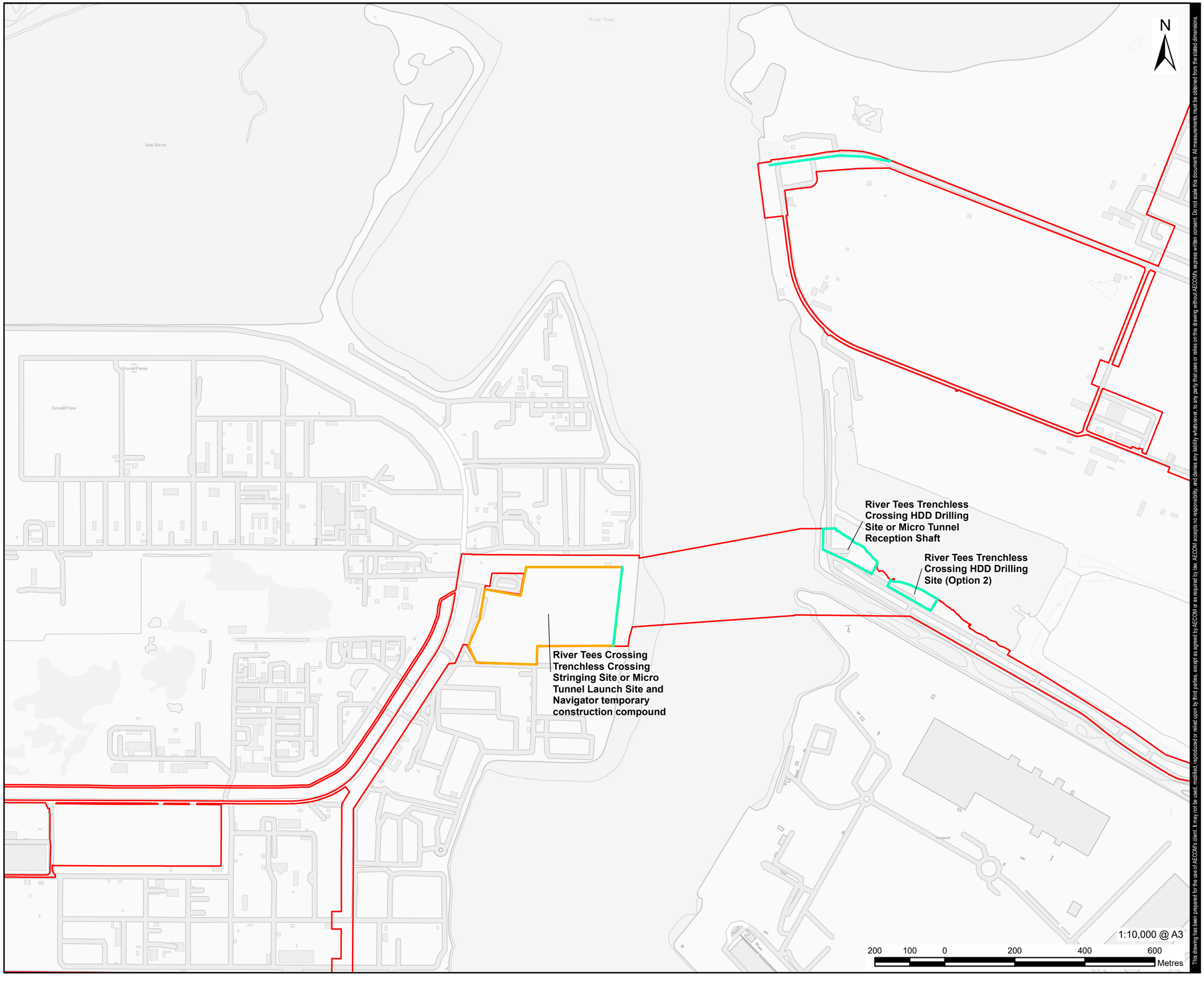

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LEGEND

- Proposed Development Site
- Trenchless Crossing Area/HDD Exit
- Indicative Location of Noise and Visual Screening Mitigation

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ISSUE PURPOSE

Habitats Regulation Assessment

PROJECT NUMBER

60689030

FIGURE TITLE

HRA Avoidance and Mitigation

FIGURE NUMBER

Figure 14b

ANNEX B BIRD SURVEY RESULTS

Annex B.

Bird Survey Results for Qualifying Species of the Northumbria Coast SPA and Ramsar. Figures in bold font denote where 1% of the SPA qualifying **population is equalled or exceeded.**

Table 1. Summary count data for The Foundry count sectors (1-8a) – High Tide

Species	Count Sector													
	1		2		3a		6		7		8		8a	
	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**	Peak (month)	**Mean (freq)**
Number of Surveys	**18**		**18**		**17**		**16**		**17**		**15**		**15**	
Black-headed Gull (*Chroicocephalus ridibundus*)	0	N/A	3 (Aug 23)	0.17 (1)	1 (Jan 22)	0.06 (1)	110 (Jan 23)	16.44 (8)	200 (Feb 22)	16.41 (7)	45 (Feb 22)	3 (1)	7 (Feb 22)	1.6 (5)
Common Tern (*Sterna hirundo*)	0	N/A	0	N/A	0	N/A	0	N/A	16 (Jul 23)	1.71 (3)	0	N/A	28 (Aug 23)	1.87 (1)
Cormorant (*Phalacrocorax carbo*)	0	N/A	3 (Oct 22)	0.5 (4)	0	N/A	1 (Nov 22)	0.06 (1)	35 (Mar 22)	5.94 (11)	0	N/A	0	N/A
Herring Gull (*Larus argentatus*)	19 (Aug 23)	2.17 (5)	16 (Jun 23)	1.72 (4)	0	N/A	36 (Feb 22)	7.56 (8)	133 (Feb 22)	15.71 (11)	18 (Sep 22)	2.73 (3)	3 (Mar 22)	0.67 (5)
Knot (*Calidris canutus*)	0	N/A	0	N/A	0	N/A	10 (Sep 22)	1.69 (5)	55 (Feb 22)	11.12 (9)	0	N/A	2 (Feb 22)	0.13 (1)
Lapwing (*Vanellus vanellus*)	0	N/A	0	N/A	2 (Jul 23)	0.12 (1)	0	N/A	0	N/A	0	N/A	56 (Nov 22)	8.13 (4)
Redshank (*Tringa totanus*)	0	N/A	5 (Feb 22)	0.28 (1)	13 (Nov 22)	0.76 (1)	140 (Jan 23)	53.25 (13)	17 (Feb 22)	3.71 (6)	0	N/A	45 (Sep 22)	12.47 (11)
Sanderling (*Calidris alba*)	22 (May 23)	4.72 (8)	17 (Aug 23)	2.5 (5)	0	N/A	1 (Sep 22)	0.19 (3)	2 (Feb 22)	0.12 (1)	0	N/A	0	N/A
Sandwich Tern (*Thalasseus sandvicensis*)	0	N/A	4 (May 23)	0.22 (1)	0	N/A	0	N/A	60 (Jul 23)	4.53 (4)	0	N/A	8 (Aug 23)	0.53 (1)
Wigeon (*Anas penelope*)	0	N/A	2 (Feb 23)	0.11 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A

Table 2. Summary count data for The Foundry count sectors (9-15) – High Tide

Species	Count Sector													
	9		10		11		12		13		14		15	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	16		16		15		16		16		15		16	
Black-headed Gull	10 (Nov 22)	0.94 (3)	0	N/A	0	N/A	0	N/A	0	N/A	170 (Aug 23)	15.4 (6)	14 (May 23)	1.81 (3)
Gadwall	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (May 23)	0.13 (1)
Herring Gull	28 (Mar 22)	2.5 (3)	20 (Jan 22)	1.25 (1)	0	N/A	0	N/A	5 (Jan 22)	0.31 (1)	152 (Jul 23)	21.27 (10)	40 (Jun 23)	7.5 (4)
Lapwing	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	234 (Aug 23)	15.6 (1)	8 (Mar 22)	1.69 (5)
Sandwich Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	14 (Aug 23)	0.93 (1)	0	N/A

Table 3. Summary count data for The Foundry count sectors (15a-18) – High Tide

Species	Count Sector							
	15a		16		17		18	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	16		16		5		13	
Black-headed Gull	0	N/A	84 (Jun 23)	26.06 (12)	0	N/A	90 (Jan 23)	24.46 (10)
Common Tern	0	N/A	0	N/A	0	N/A	2 (May 23)	0.15 (1)
Cormorant	1 (Sep 22)	0.06 (1)	2 (Feb 22)	0.31 (3)	0	N/A	2 (Feb 22)	0.54 (5)
Gadwall	0	N/A	5 (Mar 22)	0.56 (2)	0	N/A	25 (Sep 23)	7.54 (10)
Herring Gull	0	N/A	62 (Dec 22)	11.63 (8)	0	N/A	7 (Jun 23)	1.54 (5)
Lapwing	0	N/A	77 (Sep 22)	9 (7)	0	N/A	12 (Aug 23)	2.23 (5)
Redshank	0	N/A	92 (Mar 22)	8.5 (8)	0	N/A	120 (Mar 23)	29.46 (9)
Shelduck	0	N/A	46 (Mar 22)	9.25 (9)	0	N/A	26 (Feb 23)	10.92 (10)

Table 4. Summary count data for The Foundry count sectors (1-8a) – Low Tide

Species	Count Sector													
	1		2		3a		6		7		8		8a	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	13		13		12		13		17		13		13	
Black-headed Gull	50 (Dec 22)	7.31 (4)	40 (Dec 22)	5.69 (4)	1 (Feb 22)	0.08 (1)	96 (Sep 22)	16.77 (9)	130 (Feb 23)	27.47 (13)	0	N/A	4 (Dec 22)	1.62 (8)
Common Tern	0	N/A	0	N/A	0	N/A	0	N/A	54 (Aug 23)	3.47 (2)	0	N/A	0	N/A
Cormorant	5 (Sep 22)	0.46 (2)	30 (Sep 22)	3.54 (5)	0	N/A	1 (Oct 22)	0.08 (1)	130 (Feb 22)	16.65 (12)	0	N/A	0	N/A
Herring Gull	31 (Dec 22)	5 (7)	65 (Sep 22)	15.85 (8)	0	N/A	56 (Mar 22)	23.54 (12)	92 (Feb 23)	45 (18)	0	N/A	3 (Feb 23)	0.77 (5)
Knot	0	N/A	0	N/A	0	N/A	20 (Sep 22)	2.85 (3)	21 (Sep 22)	1.88 (4)	0	N/A	0	N/A
Lapwing	0	N/A	0	N/A	2 (Jun 23)	0.33 (2)	0	N/A	86 (Nov 22)	5.06 (1)	0	N/A	42 (Aug 23)	3.23 (1)
Redshank	0	N/A	0	N/A	0	N/A	75 (Mar 22)	22.69 (12)	36 (Mar 22)	9.06 (12)	0	N/A	4 (Oct 22)	1.31 (10)
Sanderling	62 (Aug 23)	5.38 (3)	62 (Sep 22)	8.08 (5)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Sandwich Tern	0	N/A	0	N/A	0	N/A	1 (Sep 22)	0.08 (1)	66 (Aug 23)	4 (2)	0	N/A	0	N/A

Table 5. Summary count data for The Foundry count sectors (9-15) – Low Tide

Species	Count Sector													
	9		10		11		12		13		14		15	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	12		13		12		12		13		12		13	
Black-headed Gull**	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	34 (Jul 23)	4.17 (3)	0	N/A
Herring Gull	6 (Jan 22)	0.5 (1)	2.92 (1)	38 (1)	0	N/A	40 (Apr 23)	5.75 (2)	1 (Jan 22)	0.08 (1)	28 (Nov 22)	7.5 (6)	36 (Mar 23)	8.08 (5)
Lapwing	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	21 (Jul 23)	4.42 (3)	7 (Mar 23)	1.85 (5)

Table 6. Summary count data for The Foundry count sectors (15a-18) – Low Tide

Species	Count Sector							
	15a		16		17		18	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	13		12		6		13	
[redacted]								
Black-headed Gull	0	N/A	128 (Feb 23)	33.83 (12)	0	N/A	105 (Feb 23)	44.62 (12)
Cormorant	1 (Feb 23)	0.08 (1)	3 (Sep 22)	0.42 (3)	0	N/A	5 (May 23)	0.38 (1)
Gadwall	0	N/A	0	N/A	0	N/A	20 (Sep 23)	7 (9)
Herring Gull	0	N/A	43 (Dec 22)	7.92 (4)	0	N/A	5 (Mar 23)	2.08 (9)
Lapwing	0	N/A	83 (Sep 22)	6.92 (1)	0	N/A	48 (Aug 23)	10.31 (7)
Redshank	0	N/A	5 (Mar 22)	1 (4)	0	N/A	105 (Feb 23)	27.77 (9)
Wigeon	0	N/A	6 (Mar 22)	0.5 (1)	0	N/A	0	N/A

Table 7. Summary count data for Seal Sands count sectors (2-9, 25) – High Tide

Species	Count Sector															
	2		4		5		6		7		8		9		25	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	13		16		10		10		4		9		8		9	
Black-headed Gull	0	N/A	2 (Jul 23)	0.25 (3)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (Oct 23)	0.22 (2)
Cormorant	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	7 (Oct 23)	0.78 (1)
Gadwall	0	N/A	3 (Jan 23)	0.19 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Herring Gull	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (Feb 22)	0.22 (1)	0	N/A	3 (Oct 23)	0.44 (2)
Lapwing	4 (Jan 23)	0.31 (1)	0	N/A	0	N/A	7 (Jan 23)	0.7 (1)	0	N/A	0	N/A	0	N/A	43 (Oct 23)	7.89 (3)
Redshank	0	N/A	50 (Mar 23)	11.38 (12)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	20 (Dec 23)	3.56 (4)
Sanderling	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (Dec 23)	0.11 (1)
Shoveler	0	N/A	30 (Jan 23)	2.13 (3)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A

Table 8. Summary count data for Seal Sands count sectors (18-20, 24, G4, G5) – High Tide

Species	Count Sector													
	18		18a		19		20		24		G4		G5	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		9		18		18		8		11		11	
[redacted]														
Black-headed Gull	15 (Feb 22)	3.18 (3)	35 (Jul 23)	4.11 (2)	5 (Feb 22)	0.44 (3)	19 (Aug 23)	2.72 (7)	25 (Jan 23)	5.13 (4)	42 (Mar 23)	3.91 (2)	200 (Oct 22)	24.91 (8)
Common Tern	4 (Aug 23)	0.36 (1)	10 (Jul 23)	1.11 (1)	1 (Jul 23)	0.06 (1)	0	N/A	0	N/A	0	N/A	0	N/A
Cormorant	0	N/A	10 (Jun 23)	1.11 (1)	1 (Mar 22)	0.17 (3)	2 (Jan 23)	0.28 (3)	0	N/A	0	N/A	0	N/A
Gadwall	0	N/A	0	N/A	0	N/A	0	N/A	185 (Aug 23)	23.13 (1)	4 (May 23)	0.55 (2)	16 (Dec 22)	1.45 (1)
Herring Gull	5 (Mar 22)	0.64 (2)	29 (Feb 23)	5.89 (3)	3 (Jul 23)	0.17 (1)	23 (Aug 23)	1.56 (2)	3 (Dec 22)	0.5 (2)	0	N/A	0	N/A
Knot	0	N/A	14 (Feb 23)	1.56 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Lapwing	0	N/A	333 (Feb 22)	45.56 (4)	0	N/A	0	N/A	15 (Jan 23)	3.13 (3)	105 (Jan 23)	14.91 (3)	150 (Oct 22)	37.64 (8)
Redshank	3 (Mar 22)	0.27 (1)	202 (Jan 23)	48.67 (6)	30 (Sep 22)	1.83 (3)	20 (Feb 23)	2.28 (3)	0	N/A	0	N/A	11 (Feb 23)	4.64 (10)
Sandwich Tern	2 (Aug 23)	0.18 (1)	28 (Jul 23)	3.89 (2)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	5 (Aug 23)	0.63 (1)	2 (May 23)	0.18 (1)	0	N/A
Wigeon	4 (Jan 23)	0.36 (1)	28 (Jan 23)	3.11 (1)	8 (Jan 23)	0.44 (1)	0	N/A	9 (Aug 23)	2.88 (4)	0	N/A	166 (Dec 22)	19.45 (6)

Table 9. Summary count data for Seal Sands count sectors (17, 17a, 21-22b) – High Tide

Species	Count Sector											
	17		17a		21		22		22a		22b	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	13		13		13		8		8		8	
[redacted]												
Black-headed Gull	0	N/A	0	N/A	2 (Mar 23)	0.31 (3)	0	N/A	0	N/A	6 (Feb 22)	0.88 (2)
Common Tern	0	N/A	4 (Jul 23)	0.31 (1)	2 (Jul 23)	0.15 (1)	0	N/A	0	N/A	0	N/A
Cormorant	1 (Oct 22)	0.08 (1)	0	N/A	1 (Oct 22)	0.08 (1)	0	N/A	0	N/A	0	N/A
Gadwall	0	N/A	0	N/A	7 (Jan 23)	0.54 (1)	0	N/A	34 (Nov 23)	8.5 (5)	0	N/A
Herring Gull	0	N/A	0	N/A	3 (Aug 23)	0.31 (2)	0	N/A	0	N/A	0	N/A
Redshank	0	N/A	2 (Oct 22)	0.31 (3)	6 (Sep 22)	1.38 (9)	0	N/A	0	N/A	0	N/A
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	49 (Nov 23)	11.13 (5)	18 (Feb 22)	2.25 (1)
Wigeon	0	N/A	0	N/A	7 (Dec 22)	0.85 (3)	0	N/A	0	N/A	6 (Feb 22)	0.75 (1)

Table 10. Summary count data for Seal Sands count sectors (22c-23b) – High Tide

Species	Count Sector													
	22c		22d		22e		22f		23		23a		23b	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	8		8		8		7		14		9		9	
[redacted]														
Black-headed Gull	0	N/A	0	N/A	11 (Dec 22)	1.75 (2)	0	N/A	0	N/A	9 (Feb 23)	1 (1)	0	N/A
Gadwall	22 (Sep 23)	2.75 (1)	0	N/A	10 (Mar 22)	2.38 (2)	0	N/A	0	N/A	0	N/A	2 (Apr 23)	0.22 (1)
Lapwing	38 (Aug 23)	4.75 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Redshank	1 (Mar 22)	0.13 (1)	3 (Sep 23)	0.88 (3)	1 (Mar 22)	0.5 (4)	0	N/A	0	N/A	0	N/A	0	N/A
Shoveler	2 (Feb 22)	0.25 (1)	3 (Feb 22)	0.38 (1)	10 (Mar 22)	2.5 (2)	0	N/A	0	N/A	0	N/A	0	N/A

Table 11. Summary count data for Seal Sands count sectors (23c-24) – High Tide

Species	Count Sector											
	23c		23d		23e		23f		23g		24	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	9		15		9		9		9		8	
[redacted]												
Black-headed Gull	0	N/A	1 (Jun 23)	0.07 (1)	0	N/A	0	N/A	2 (Jun 23)	0.22 (1)	25 (Jan 23)	5.13 (4)
Gadwall	0	N/A	3 (Feb 23)	0.33 (2)	0	N/A	0	N/A	0	N/A	185 (Aug 23)	23.13 (1)
Herring Gull	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	3 (Dec 22)	0.5 (2)
Knot	0	N/A	1 (Sep 23)	0.07 (1)	0	N/A	0	N/A	0	N/A	0	N/A
Lapwing	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	15 (Jan 23)	3.13 (3)
Redshank	0	N/A	9 (Aug 23)	2.4 (6)	0	N/A	0	N/A	0	N/A	0	N/A
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	5 (Aug 23)	0.63 (1)
Wigeon	0	N/A	5 (Sep 23)	0.47 (2)	0	N/A	0	N/A	0	N/A	9 (Aug 23)	2.88 (4)

Table 12. Summary count data for Seal Sands count sectors (2-9, 25) – Low Tide

Species	Count Sector															
	2		4		5		6		7		8		9		25	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	16		19		11		11		7		10		11		10	
Black-headed Gull	2 (Jul 23)	0.13 (1)	1 (Nov 22)	0.11 (2)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	54 (Aug 23)	8.7 (9)
Cormorant	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	16 (Aug 23)	2 (4)
Herring Gull	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	8 (Aug 23)	3.2 (7)
Lapwing	4 (Jul 23)	0.25 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	35 (Dec 23)	4.9 (3)
Redshank	9 (Jul 23)	0.56 (1)	35 (Mar 22)	3.32 (8)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	20 (Nov 23)	4.6 (6)
Turnstone	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (Dec 23)	0.1 (1)

Table 13. Summary count data for Seal Sands count sectors (18-20, 24, G4, G5) – Low Tide

Species	Count Sector													
	18		18a		19		20		24		G4		G5	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	14		12		21		21		9		14		13	
[redacted]														
Black-headed Gull	54 (Feb 22)	8.71 (10)	9 (Jul 23)	1.58 (4)	31 (Aug 23)	6.95 (16)	54 (Aug 23)	12.43 (12)	3 (Apr 23)	0.67 (3)	1 (May 23)	0.07 (1)	9 (Sep 22)	2.31 (9)
Common Tern	2 (Aug 23)	0.14 (1)	7 (Aug 23)	0.92 (2)	2 (May 23)	0.1 (1)	0	N/A	0	N/A	0	N/A	2 (May 23)	0.23 (2)
Cormorant	51 (Feb 22)	3.86 (3)	15 (Jun 23)	1.75 (3)	5 (Jul 23)	0.48 (3)	6 (Feb 22)	1.05 (5)	1 (May 23)	0.11 (1)	0	N/A	0	N/A
Gadwall	0	N/A	0	N/A	0	N/A	0	N/A	86 (Aug 23)	10.44 (4)	1 (May 23)	0.07 (1)	14 (Nov 22)	2.31 (4)
Herring Gull	274 (Mar 22)	46.93 (9)	78 (Feb 23)	17.08 (6)	30 (Feb 23)	8.33 (16)	70 (Jun 23)	17.71 (15)	0	N/A	0	N/A	0	N/A
Knot	5 (Feb 22)	1 (3)	2 (Aug 23)	0.17 (1)	44 (Jan 23)	4.24 (7)	77 (Mar 23)	12.38 (7)	0	N/A	0	N/A	0	N/A
Lapwing	0	N/A	220 (Jan 23)	29.33 (5)	4 (Dec 22)	0.19 (1)	0	N/A	35 (Jan 23)	5.11 (4)	15 (Dec 22)	1.64 (4)	28 (Dec 22)	6 (5)
Redshank	60 (Mar 22)	10.29 (8)	139 (Mar 22)	15 (7)	141 (Dec 22)	41.86 (18)	127 (Nov 22)	33.48 (16)	0	N/A	1 (May 23)	0.07 (1)	7 (Mar 23)	1.92 (6)
Sandwich Tern	29 (Jun 23)	2.07 (1)	29 (Aug 23)	3.83 (2)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Shelduck	206 (Mar 22)	85.64 (13)	102 (Feb 23)	9.17 (3)	45 (Feb 23)	18.19 (18)	12 (Mar 22)	3.86 (14)	0	N/A	2 (Mar 23)	0.14 (1)	4 (May 23)	0.69 (3)
Shoveler	0	N/A	0	N/A	15 (Dec 22)	1.29 (2)	0	N/A	7 (Jul 23)	1.22 (3)	0	N/A	0	N/A
Wigeon	0	N/A	0	N/A	67 (Oct 22)	3.52 (2)	0	N/A	26 (Jul 23)	4.44 (3)	0	N/A	76 (Oct 22)	9.69 (3)

Table 14. Summary count data for Seal Sands count sectors (17, 17a, 21-22b) – Low Tide

Species	Count Sector											
	17		17a		21		22		22a		22b	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	17		18		18		8		8		8	
Black-headed Gull	30 (Nov 22)	3.47 (7)	2 (Mar 22)	0.39 (5)	9 (Mar 22)	1.11 (8)	1 (Dec 23)	0.13 (1)	0	N/A	0	N/A
Common Tern	1 (Jun 23)	0.12 (2)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Cormorant	1 (Nov 22)	0.12 (2)	0	N/A	1 (Dec 22)	0.11 (2)	0	N/A	0	N/A	0	N/A
Gadwall	4 (Dec 22)	0.24 (1)	0	N/A	0	N/A	0	N/A	26 (Nov 23)	4.88 (5)	0	N/A
Herring Gull	4 (Aug 23)	0.71 (7)	0	N/A	21 (Sep 22)	3.44 (13)	0	N/A	0	N/A	0	N/A
Lapwing	0	N/A	0	N/A	1 (Dec 22)	0.11 (2)	0	N/A	0	N/A	0	N/A
Redshank	2 (Nov 22)	0.29 (3)	6 (Jan 23)	1.22 (10)	5 (Mar 22)	2.11 (12)	0	N/A	0	N/A	1 (Mar 22)	0.13 (1)
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	12 (Oct 23)	1.75 (2)	4 (Feb 22)	0.5 (1)
Wigeon	0	N/A	0	N/A	12 (Sep 22)	1.56 (5)	0	N/A	1 (Sep 23)	0.13 (1)	2 (Feb 22)	0.25 (1)

Table 15. Summary count data for Seal Sands count sectors (22c-23b) – Low Tide

Species	Count Sector													
	22c		22d		22e		22f		23		23a		23b	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	8		8		7		7		16		11		11	
[redacted]														
Black-headed Gull	3 (Mar 22)	1 (4)	1 (Sep 23)	0.25 (2)	2 (Oct 23)	0.71 (4)	0	N/A	0	N/A	0	N/A	0	N/A
Gadwall	14 (Oct 23)	1.75 (1)	8 (Feb 22)	1 (1)	12 (Feb 22)	1.71 (1)	0	N/A	0	N/A	0	N/A	0	N/A
Lapwing	24 (Aug 23)	3 (1)	53 (Aug 23)	6.63 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Redshank	0	N/A	2 (Oct 23)	0.63 (3)	1 (Mar 22)	0.14 (1)	0	N/A	0	N/A	0	N/A	0	N/A
Shoveler	26 (Feb 22)	3.75 (2)	0	N/A	17 (Mar 22)	2.86 (2)	0	N/A	0	N/A	0	N/A	0	N/A
Wigeon	35 (Oct 23)	8.38 (4)	5 (Feb 22)	0.63 (1)	3 (Feb 22)	0.71 (2)	0	N/A	0	N/A	0	N/A	0	N/A

Table 16. Summary count data for Seal Sands count sectors (23c-24) – Low Tide

Species	Count Sector											
	23c		23d		23e		23f		23g		24	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		17		11		11		11		9	
[redacted]												
Black-headed Gull	0	N/A	2 (Feb 22)	0.12 (1)	0	N/A	0	N/A	15 (Feb 22)	2.09 (3)	3 (Apr 23)	0.67 (3)
Cormorant	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (May 23)	0.11 (1)
Gadwall	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	86 (Aug 23)	10.44 (4)
Lapwing	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	35 (Jan 23)	5.11 (4)
Redshank	0	N/A	6 (Feb 22)	0.47 (3)	0	N/A	0	N/A	0	N/A	0	N/A
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	7 (Jul 23)	1.22 (3)
Wigeon	0	N/A	4 (Feb 22)	0.24 (1)	0	N/A	0	N/A	0	N/A	26 (Jul 23)	4.44 (3)

Table 17. Summary count data for North Tees Marshes count sectors (Cowpen Bewley) – High Tide

Species	Count Sector													
	G1		B1		B2		B3		B4		B5		B6	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	12		11		11		11		11		11		12	
Black-headed Gull	2 (May 23)	0.33 (3)	0	N/A	0	N/A	0	N/A	0	N/A	10 (May 23)	0.91 (1)	71 (Dec 22)	11.83 (2)
Gadwall	4 (Mar 23)	0.33 (1)	0	N/A	0	N/A	0	N/A	0	N/A	4 (May 23)	0.36 (1)	0	N/A
Lapwing	58 (Sep 23)	6.58 (6)	0	N/A	0	N/A	0	N/A	240 (Jan 23)	21.91 (2)	57 (Jan 23)	16.91 (8)	50 (Dec 22)	8.33 (2)
Redshank	1 (Dec 22)	0.17 (2)	0	N/A	0	N/A	0	N/A	0	N/A	1 (Nov 22)	0.09 (1)	1 (Dec 22)	0.17 (2)
Ruff	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	8 (Sep 23)	0.73 (1)	0	N/A
Shelduck	0	N/A	0	N/A	2 (Mar 23)	0.18 (1)	0	N/A	0	N/A	2 (May 23)	0.18 (1)	0	N/A
Shoveler	1 (May 23)	0.08 (1)	0	N/A	0	N/A	0	N/A	0	N/A	4 (May 23)	0.64 (2)	1 (May 23)	0.08 (1)
Wigeon	70 (Dec 22)	5.83 (1)	0	N/A	20 (Dec 22)	1.82 (1)	0	N/A	0	N/A	75 (Nov 22)	6.82 (1)	0	N/A

Table 18. Summary count data for North Tees Marshes count sectors (G2, G6, B7, B8) – High Tide

Species	Count Sector									
	G2		G3		G6		B7		B8	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	13		12		12		10		10	
[redacted]										
Black-headed Gull	58 (Mar 23)	6.54 (5)	31 (Apr 23)	4.75 (5)	24 (Jul 23)	3.75 (9)	5 (Apr 23)	0.6 (2)	0	N/A
Common Tern	2 (May 23)	0.15 (1)	18 (May 23)	1.5 (1)	2 (Jun 23)	0.25 (2)	0	N/A	0	N/A
Cormorant	2 (Dec 22)	0.15 (1)	20 (Apr 23)	1.67 (1)	0	N/A	0	N/A	0	N/A
Gadwall	20 (May 23)	1.85 (2)	28 (Feb 23)	4.25 (5)	2 (Nov 22)	0.17 (1)	14 (Jul 23)	4 (6)	7 (Nov 22)	0.9 (2)
Herring Gull	0	N/A	0	N/A	2 (Apr 23)	0.42 (4)	0	N/A	1 (Apr 23)	0.1 (1)
Lapwing	200 (Jan 23)	20.77 (5)	183 (Oct 22)	30.92 (10)	172 (Aug 23)	16.83 (4)	4 (Apr 23)	0.9 (3)	0	N/A
Redshank	4 (May 23)	0.38 (2)	2 (Dec 22)	0.42 (3)	40 (Sep 22)	15.08 (9)	0	N/A	0	N/A
Ruff	3 (May 23)	0.23 (1)	0	N/A	3 (Sep 22)	0.25 (1)	0	N/A	0	N/A
Shoveler	27 (Feb 23)	6.31 (6)	10 (May 23)	1 (2)	0	N/A	2 (May 23)	0.2 (1)	2 (May 23)	0.3 (2)
Wigeon	222 (Feb 23)	17.54 (2)	110 (Feb 23)	15 (2)	188 (Dec 22)	27.75 (5)	59 (Dec 22)	10.7 (3)	4 (Feb 23)	0.4 (1)

Table 19. Summary count data for North Tees Marshes count sectors (B9-B15) – High Tide

Species	Count Sector													
	B9		B10		B11		B12		B13		B14		B15	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	10		11		10		10		11		10		11	
[redacted]														
Black-headed Gull	1 (May 23)	0.1 (1)	31 (Nov 22)	4.55 (4)	36 (Aug 23)	7.3 (6)	61 (Mar 23)	11.6 (6)	0	N/A	36 (Mar 23)	3.9 (2)	60 (Jul 23)	13.64 (9)
Common Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (May 23)	0.18 (1)
Cormorant	0	N/A	0	N/A	4 (Jun 23)	0.6 (2)	0	N/A	0	N/A	0	N/A	3 (Aug 23)	0.64 (4)
Gadwall	0	N/A	8 (Sep 22)	1.91 (5)	4 (Jan 23)	0.4 (1)	7 (Aug 23)	1.2 (2)	0	N/A	0	N/A	0	N/A
Herring Gull	0	N/A	0	N/A	0	N/A	37 (Jun 23)	9.2 (4)	0	N/A	0	N/A	53 (Jun 23)	19.18 (11)
Lapwing	0	N/A	21 (Jun 23)	1.91 (1)	23 (Aug 23)	4.2 (4)	4 (Jun 23)	0.6 (2)	2 (Mar 23)	0.36 (2)	118 (Dec 22)	11.9 (2)	221 (Nov 22)	43.18 (5)
Redshank	0	N/A	2 (Mar 23)	0.27 (2)	1 (Nov 22)	0.2 (2)	3 (Feb 23)	0.6 (4)	0	N/A	2 (May 23)	0.2 (1)	48 (Sep 22)	19.82 (9)
Sandwich Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	21 (Jul 23)	1.91 (1)
Shoveler	0	N/A	26 (Nov 22)	3.27 (2)	2 (May 23)	0.2 (1)	1 (Apr 23)	0.1 (1)	0	N/A	0	N/A	8 (Jan 23)	0.73 (1)
Wigeon	2 (Mar 23)	0.2 (1)	32 (Nov 22)	3.64 (4)	46 (Jan 23)	4.6 (1)	26 (Feb 23)	3 (2)	0	N/A	0	N/A	100 (Jan 23)	12.64 (5)

Table 20. Summary count data for North Tees Marshes count sectors (B16-B19, B22-B23, G7) – High Tide

Species	Count Sector													
	B16		B17		B18		B19		B22		B23		G7	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	10		4		9		6		10		11		12	
[redacted]														
Black-headed Gull	16 (May 23)	1.6 (1)	0	N/A	2 (Mar 23)	0.22 (1)	0	N/A	0	N/A	0	N/A	32 (Jul 23)	5.33 (4)
Common Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (Aug 23)	0.08 (1)
Cormorant	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	3 (Aug 23)	0.25 (1)
Gadwall	3 (Feb 23)	0.6 (3)	0	N/A	0	N/A	0	N/A	17 (Aug 23)	1.7 (1)	2 (Apr 23)	0.18 (1)	1 (Sep 22)	0.08 (1)
Herring Gull	4 (Jun 23)	0.4 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	4 (Jun 23)	0.58 (3)
Knot	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (Jul 23)	0.17 (1)
Lapwing	0	N/A	3 (Jan 23)	0.75 (1)	28 (Jan 23)	3.11 (1)	0	N/A	0	N/A	0	N/A	78 (Aug 23)	15 (4)
Redshank	5 (Jan 23)	1.8 (4)	3 (Dec 22)	1.75 (3)	1 (Jan 23)	0.11 (1)	0	N/A	2 (Oct 22)	0.4 (3)	8 (Dec 22)	2.27 (7)	143 (Jan 23)	39.67 (10)
Sandwich Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	1 (Jul 23)	0.08 (1)
Shoveler	4 (Aug 23)	0.4 (1)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	20 (Dec 22)	2.33 (2)
Wigeon	36 (Nov 22)	4.6 (2)	150 (Dec 22)	38.5 (3)	0	N/A	0	N/A	0	N/A	97 (Jan 23)	10.36 (4)	605 (Jan 23)	117 (5)

Table 21. Summary count data for North Tees Marshes count sectors (G8-G13a, B25) – High Tide

Species	Count Sector															
	G8		G9		G10		G11		G12		G13		G13a		B25	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		7		7		6		6		9		8		0	
[redacted]																
Black-headed Gull	62 (Jul 23)	13.09 (8)	0	N/A	0	N/A	30 (Feb 23)	10 (4)	0	N/A	2 (Feb 23)	0.22 (1)	20 (Dec 22)	6.38 (6)	0	N/A
Gadwall	0	N/A	0	N/A	0	N/A	8 (Oct 22)	2.5 (2)	0	N/A	3 (Mar 23)	0.33 (1)	1 (Aug 23)	0.13 (1)	0	N/A
Herring Gull	2 (Feb 23)	0.18 (1)	0	N/A	1 (Feb 23)	0.14 (1)	0	N/A	0	N/A	0	N/A	100 (Dec 22)	27.5 (4)	0	N/A
Lapwing	0	N/A	0	N/A	10 (Jan 23)	1.57 (2)	17 (Sep 22)	2.83 (1)	0	N/A	38 (Jan 23)	4.22 (1)	8 (Mar 23)	1 (1)	0	N/A
Redshank	85 (Oct 22)	33.64 (8)	2 (Mar 23)	0.29 (1)	0	N/A	0	N/A	1 (Oct 22)	0.17 (1)	2 (Dec 22)	0.33 (2)	0	N/A	0	N/A
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	6 (Dec 22)	0.67 (1)	4 (Aug 23)	1.13 (4)	0	N/A
Wigeon	50 (Dec 22)	7 (3)	0	N/A	0	N/A	0	N/A	0	N/A	30 (Dec 22)	4.11 (2)	0	N/A	0	N/A

Table 22. Summary count data for North Tees Marshes count sectors (Cowpen Bewley) – Low Tide

Species	Count Sector													
	G1		B1		B2		B3		B4		B5		B6	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		11		11		11		11		11		12	
Black-headed Gull	1 (Mar 23)	0.18 (2)	0	N/A	0	N/A	0	N/A	0	N/A	46 (May 23)	6.27 (3)	0	N/A
Gadwall	5 (Aug 23)	0.45 (1)	2 (Jan 23)	0.18 (1)	0	N/A	0	N/A	1 (Apr 23)	0.18 (2)	2 (May 23)	0.36 (2)	2 (Apr 23)	0.17 (1)
Herring Gull	1 (Mar 23)	0.18 (2)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Lapwing	2 (Dec 22)	0.45 (3)	12 (Dec 22)	1.36 (2)	0	N/A	6 (Dec 22)	0.55 (1)	4 (Apr 23)	0.36 (1)	20 (Dec 22)	3.73 (6)	0	N/A
Redshank	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	3 (Nov 22)	0.27 (1)	4 (Nov 22)	0.33 (1)
Shelduck	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (May 23)	0.18 (1)	0	N/A
Shoveler	1 (Apr 23)	0.18 (2)	1 (Apr 23)	0.09 (1)	0	N/A	2 (Apr 23)	0.18 (1)	4 (Apr 23)	0.36 (1)	0	N/A	2 (Apr 23)	0.17 (1)
Wigeon	62 (Feb 23)	5.91 (3)	0	N/A	0	N/A	0	N/A	0	N/A	64 (Nov 22)	7 (2)	70 (Feb 23)	6.58 (2)

Table 23. Summary count data for North Tees Marshes count sectors (G2, G6, B7, B8) – Low Tide

Species	Count Sector									
	G2		G3		G6		B7		B8	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	14		13		13		11		11	
[redacted]										
Black-headed Gull	26 (Jun 23)	3.14 (2)	14 (Apr 23)	1.77 (3)	18 (Jul 23)	2.85 (7)	2 (Jan 23)	0.36 (2)	0	N/A
Common Tern	0	N/A	35 (May 23)	3.23 (3)	0	N/A	0	N/A	0	N/A
Cormorant	0	N/A	1 (Mar 23)	0.08 (1)	0	N/A	2 (Dec 22)	0.18 (1)	1 (Mar 23)	0.09 (1)
Gadwall	2 (May 23)	0.21 (2)	26 (Feb 23)	4.92 (6)	0	N/A	19 (Aug 23)	5.18 (8)	3 (Dec 22)	0.73 (4)
Herring Gull	0	N/A	0	N/A	3 (Mar 23)	0.92 (6)	0	N/A	0	N/A
Knot	0	N/A	0	N/A	2 (Sep 22)	0.15 (1)	0	N/A	0	N/A
Lapwing	35 (Mar 23)	5.5 (5)	65 (Oct 22)	11.77 (8)	250 (Nov 22)	27.08 (7)	2 (Feb 23)	0.73 (4)	0	N/A
Redshank	21 (Jan 23)	2.07 (3)	0	N/A	47 (Mar 23)	15.62 (11)	0	N/A	1 (Dec 22)	0.18 (2)
Shoveler	28 (Mar 23)	7.07 (6)	2 (May 23)	0.15 (1)	0	N/A	2 (Jul 23)	0.18 (1)	0	N/A
Wigeon	526 (Jan 23)	60.86 (3)	200 (Mar 23)	26.92 (2)	70 (Jan 23)	15.69 (5)	100 (Oct 22)	22.18 (4)	0	N/A

Table 24. Summary count data for North Tees Marshes count sectors (B9-B15) – Low Tide

Species	Count Sector													
	B9		B10		B11		B12		B13		B14		B15	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		12		11		11		12		11		12	
Black-headed Gull	1 (Jul 23)	0.09 (1)	16 (May 23)	3.75 (6)	23 (Jul 23)	2.91 (5)	22 (Feb 23)	3.55 (6)	0	N/A	0	N/A	22 (Aug 23)	8.42 (10)
Common Tern	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (May 23)	0.25 (2)
Cormorant	0	N/A	0	N/A	3 (Jun 23)	0.91 (6)	0	N/A	0	N/A	0	N/A	1 (Sep 22)	0.17 (2)
Gadwall	1 (May 23)	0.09 (1)	39 (Aug 23)	5.92 (6)	6 (Dec 22)	0.55 (1)	4 (Jul 23)	0.91 (4)	0	N/A	0	N/A	0	N/A
Herring Gull	0	N/A	3 (Dec 22)	0.25 (1)	0	N/A	53 (May 23)	10.45 (5)	0	N/A	0	N/A	25 (Mar 23)	7.42 (12)
Lapwing	0	N/A	2 (May 23)	0.17 (1)	34 (Jul 23)	4.55 (3)	74 (Aug 23)	11.09 (4)	4 (Apr 23)	0.5 (2)	0	N/A	255 (Oct 22)	44.83 (4)
Redshank	1 (Aug 23)	0.09 (1)	1 (Oct 22)	0.08 (1)	1 (Dec 22)	0.09 (1)	2 (Oct 22)	0.36 (3)	0	N/A	0	N/A	210 (Mar 23)	40.17 (10)
Shelduck	2 (Jun 23)	0.36 (2)	18 (Apr 23)	4.75 (6)	8 (Apr 23)	1.18 (2)	2 (Mar 23)	0.45 (3)	0	N/A	0	N/A	7 (May 23)	1.08 (3)
Shoveler	0	N/A	35 (Oct 22)	7.08 (8)	4 (Apr 23)	0.36 (1)	0	N/A	0	N/A	0	N/A	24 (Dec 22)	4.33 (3)
Wigeon	0	N/A	45 (Jan 23)	5.33 (3)	5 (Dec 22)	0.45 (1)	0	N/A	0	N/A	0	N/A	1000 (Nov 22)	226.25 (8)

Table 25. Summary count data for North Tees Marshes count sectors (B16-B19, B22-B23, G7) – Low Tide

Species	Count Sector													
	B16		B17		B18		B19		B22		B23		G7	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	11		6		9		6		10		12		12	
[redacted]														
Black-headed Gull	16 (Jul 23)	1.45 (1)	1 (Apr 23)	0.17 (1)	2 (Mar 23)	0.22 (1)	0	N/A	1 (Nov 22)	0.1 (1)	2 (May 23)	0.42 (3)	3 (Jul 23)	0.67 (4)
Herring Gull	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (Jun 23)	0.42 (4)
Lapwing	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	32 (Dec 22)	2.67 (1)
Redshank	3 (Nov 22)	0.27 (1)	1 (Nov 22)	0.33 (2)	0	N/A	0	N/A	12 (Nov 22)	1.7 (2)	4 (Feb 23)	1 (5)	76 (Dec 22)	13.92 (7)
Shelduck	10 (Mar 23)	2.36 (6)	3 (Feb 23)	1.17 (3)	0	N/A	0	N/A	0	N/A	4 (Jun 23)	0.67 (3)	18 (Jun 23)	6.08 (7)
Shoveler	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	2 (Apr 23)	0.17 (1)	0	N/A
Teal	200 (Nov 22)	18.36 (2)	0	N/A	0	N/A	0	N/A	0	N/A	25 (Mar 23)	2.25 (2)	42 (Dec 22)	3.5 (1)
Wigeon	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	28 (Dec 22)	2.75 (2)	21 (Dec 22)	2.67 (2)

Table 26. Summary count data for North Tees Marshes count sectors (G8-G13a, B25) – Low Tide

Species	Count Sector															
	G8		G9		G10		G11		G12		G13		G13a		B25	
	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)	Peak (month)	Mean (freq)
Number of Surveys	12		8		8		8		8		10		7		0	
[redacted]																
Black-headed Gull	21 (Aug 23)	2.67 (4)	0	N/A	1 (Apr 23)	0.13 (1)	17 (Feb 23)	3.63 (3)	0	N/A	6 (Mar 23)	0.6 (1)	10 (Dec 22)	1.71 (2)	0	N/A
Gadwall	0	N/A	0	N/A	0	N/A	7 (Nov 22)	1.13 (2)	0	N/A	0	N/A	12 (Aug 23)	1.71 (1)	0	N/A
Herring Gull	2 (Dec 22)	0.17 (1)	0	N/A	0	N/A	0	N/A	0	N/A	2 (Jan 23)	0.2 (1)	100 (Dec 22)	24.14 (4)	0	N/A
Lapwing	17 (Dec 22)	1.67 (2)	0	N/A	1 (Mar 23)	0.13 (1)	7 (Sep 22)	1.63 (2)	0	N/A	60 (Dec 22)	6.1 (2)	6 (Mar 23)	1.43 (2)	0	N/A
Redshank	40 (Nov 22)	7.92 (6)	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
Shelduck	13 (Feb 23)	4.25 (6)	0	N/A	0	N/A	0	N/A	0	N/A	6 (Feb 23)	1 (2)	1 (Jul 23)	0.14 (1)	0	N/A
Shoveler	0	N/A	0	N/A	1 (Apr 23)	0.13 (1)	7 (Nov 22)	1 (2)	0	N/A	4 (Mar 23)	0.7 (2)	11 (Aug 23)	3 (3)	0	N/A
Wigeon	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	42 (Jan 23)	4.6 (2)	0	N/A	0	N/A

ANNEX C SUMMARY OF IMPACT PATHWAYS REFERRED TO IN THE DETAILED SCREENING MATRICES.

DESIGNATION	IMPACT PATHWAYS IDENTIFIED USING THE CURRENT EVIDENCE BASE.	PRESENTED IN SCREENING MATRICES AS
Teesmouth and Cleveland Coast SPA / Ramsar	Habitat loss or damage as a result of HDD collapse during construction. Loss of Functionally linked land during construction, or decommissioning Visual and noise disturbance during construction, operation and decommissioning Atmospheric pollution during construction operation and decommissioning Changes in water quality during construction, operation and decommissioning Coastal squeeze upon completion of the project	HDD collapse Visual and noise disturbance Atmospheric pollution Water quality Coastal squeeze
North York Moors SAC	Atmospheric pollution during operation	Atmospheric pollution
North York Moors SPA	Atmospheric pollution during operation	Atmospheric pollution
Durham Coast SAC	Atmospheric pollution during operation	Atmospheric pollution
Northumbria Coast SPA / Ramsar	Atmospheric pollution during operation	Atmospheric pollution
Berwickshire and North Northumberland Coast SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat
Southern North Sea SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat

DESIGNATION	IMPACT PATHWAYS IDENTIFIED USING THE CURRENT EVIDENCE BASE.	PRESENTED IN SCREENING MATRICES AS
The Wash and North Norfolk Coast SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat
Humber Estuary SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat
River Tweed SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat
Tweed Estuary SAC	Disturbance of functionally linked habitat during construction and decommissioning	Disturbance of functionally linked habitat
Castle Eden Dene SAC	Atmospheric pollution during operation	Atmospheric pollution

General matrix key:

✓ = Likely significant effect cannot be excluded

✖ = Likely significant effect can be excluded

C = Construction

O = Operation

D = Decommissioning

ANNEX D SCREENING MATRICES

Table D-1: Detailed screening matrix assessing the qualifying features of the Teesmouth and Cleveland Coast SPA / Ramsar against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns)

EFFECT	HDD COLLAPSE	LOSS OF FUNCTIONALLY LINKED LAND		VISUAL DISTURBANCE			NOISE DISTURBANCE			ATMOSPHERIC POLLUTION			WATER QUALITY			COASTAL SQUEEZE	IN COMBINATION EFFECTS		
Stage of Proposed Development	C	C	D	C	O	D	C	O	D	C	O	D	C	O	D	O	C	O	D
[redacted]																			
Common tern *Sterna hirundo*	✓ a	✓ b	✓ d	✓e	×f	✓g	✓ h	× i	✓ h	× j	×k	× j	✓ l	✓m	✓ l	×n	✓o	✓o	✓o
Sandwich tern *Sterna sandvicensis*	✓ a	× c	× c	✓e	×f	✓g	✓ h	× i	✓ h	× j	×k	× j	✓ l	✓m	✓ l	×n	✓o	✓o	✓o
[redacted]																			
Knot *Calidris canutus*	✓ a	× c	× c	✓e	×f	✓g	✓ h	× i	✓ h	× j	× k	× j	✓ l	✓m	✓ l	×n	✓o	✓o	✓o
Ruff *Calidris pugnax*	✓ a	✓ b	✓ d	✓e	×f	✓g	✓ h	× i	✓ h	× j	× k	× j	✓ l	✓m	✓ l	×n	✓o	✓o	✓o

EFFECT	HDD COLLAPSE	LOSS OF FUNCTIONALLY LINKED LAND		VISUAL DISTURBANCE			NOISE DISTURBANCE			ATMOSPHERIC POLLUTION			WATER QUALITY			COASTAL SQUEEZE	IN COMBINATION EFFECTS		
Redshank *Tringa totanus*	✓ a	✓ b	✓ d	✓e	✕f	✓g	✓ h	✕ i	✓ h	✕ j	✕ k	✕ j	✓ l	✓m	✓ l	✕n	✓o	✓o	✓o
Waterbird assemblage	✓ a	✓ b	✓ d	✓e	✕f	✓g	✓ h	✓i	✓ h	✕ j	✕ k	✕ j	✓ l	✓m	✓ l	✕n	✓o	✓o	✓o

a. Paragraphs 4.2.1 to 4.2.4 discuss the risk of HDD collapse. Various construction methodologies will be used including Horizontal Direct Drilling (HDD), below ground open-trench, installation on existing above ground pipe racks, and repurposing and reuse of existing pipelines. The Teesmouth and Cleveland Coast SPA and Ramsar are within the boundary of the Proposed Development Site. The Proposed Development has been designed to avoid the direct loss of habitat within the SPA and Ramsar site boundaries through use of HDD. However, direct habitat loss could occur in the event of HDD collapse. Therefore, direct habitat loss within the Teesmouth and Cleveland Coast SPA and Ramsar due to HDD collapse is screened into Appropriate Assessment.
b. Paragraph 4.2.7 states that where qualifying bird species have been recorded within count sectors which overlap the Proposed Development Site they have been screened into Appropriate Assessment. Therefore, loss of functionally linked habitat for [redacted] ruff, redshank, common tern, gadwall, shoveler, wigeon, lapwing, herring gull and black-headed gull are screened into Appropriate Assessment.
c. Paragraph 4.2.8 states that knot, [redacted] and sanderling were not recorded within the Proposed Development Site and can be screened out.
d. Paragraph 4.4.1 states that at the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above ground structures on the Main Site removed, and the ground remediated as required to facilitate future re-use. The Applicant will assess at that time whether any infrastructure should be retained for future use. The same timescales would apply for the hydrogen pipeline and utility connections. Therefore, loss of functionally lined land during decommissioning is screened onto Appropriate Assessment.
e. Paragraph 4.2.18 states that visual disturbance of [redacted] knot, ruff, redshank, sandwich tern, common tern, gadwall, shoveler, sanderling, wigeon, lapwing, herring gull, and black-headed gull are screened into Appropriate Assessment. [redacted]
f. Paragraph 4.3.1 states that once complete, the Proposed Development will be operational 24 hours a day. It is considered that activity within the Main Site options would not result in significant visual disturbance of qualifying birds in the Teesmouth and Cleveland Coast SPA / Ramsar because the Site of has a long history of industrial use and the overwintering birds in this SPA / Ramsar have traditionally been used to activity from site staff even though numbers of people in the area have been low in recent years. Overall, visual disturbance of Teesmouth and Cleveland Coast SPA / Ramsar during operation is screened out from Appropriate Assessment due to habituation which will not interfere with the ability of the SPA to achieve its Conservation Objectives.
g. Paragraph 4.4.1 states that at the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above ground structures on the Main Site removed, and the ground remediated as required to facilitate future re-use. The Applicant will assess at that time whether any infrastructure should be retained for future use. The same timescales would apply for the hydrogen pipeline and utility connections. Therefore, visual disturbance during decommissioning is screened onto Appropriate Assessment.
h. Paragraph 4.2.58 states that the Teesmouth and Cleveland Coast SPA/Ramsar site harbours qualifying species throughout the entire year, and visual and noise disturbance associated with construction / decommissioning work is thus not a seasonal issue. It requires consideration throughout the entire year. However, only some parts of the SPA / Ramsar are used for nesting by the breeding species. [redacted]

EFFECT	HDD COLLAPSE	LOSS OF FUNCTIONALLY LINKED LAND	VISUAL DISTURBANCE	NOISE DISTURBANCE	ATMOSPHERIC POLLUTION	WATER QUALITY	COASTAL SQUEEZE	IN COMBINATION EFFECTS
[redacted]								

i. Paragraph 4.3.5 states that outside the Main Site, the highest noise levels occur immediately north of the site boundary. These areas comprise of dune habitat are unsuitable for the qualifying bird species. Habitats within sectors 9 and 12 will be lost during the construction phase of the Proposed Development. Habitats within Sectors 8, 10, 11, 13, 14, 15 will be available to the qualifying bird species during operation. Black-headed gull and herring gull were recorded within these sectors. Therefore, LSE on black-headed gull and herring gull which are qualifying species of the Teesmouth and Cleveland Coast SPA / Ramsar are screened into Appropriate Assessment for operational noise.

j. An assessment of construction traffic upon designated sites is provided in Chapter 8: Air Quality [APP-060]. For all ecological receptors but RE008 (part of the Teesmouth and Cleveland Coast SPA north of the River Tees), the model predicts that the magnitude of impacts associated with emissions from the Proposed Development do not exceed the first stage screening threshold of 1% of the environmental standard for annual mean NOx concentrations. At no point will the critical level (30 µg/m-3) be exceeded. Nutrient nitrogen deposition impacts do not exceed 1% of the environmental standards at any ecological receptors. Moreover, there are no tern [redacted] esting locations within 200m of the affected roads. Therefore, there will be no LSE associated with emissions from construction traffic and this pathway of effect can be screened out for both construction and decomissioning.

k. Paragraphs 4.3.6 to 4.3.15 discuss air quality effects during operation. NOx impacts can be considered Not Significant both alone and in combination, given that the Predicted Environmental Concentration (PEC) is forecast to remain below the relevant critical level for both short-term (24hr) and long-term (annual average) NOx, notwithstanding the fact that the 1% of the critical level criterion for annual NOx and 10% of the critical level criterion for 24hr NOx is exceeded. The change in nitrogen deposition from the project alone is predicted to be less than 1% of the relevant critical load at the designated sites assessed and is thus considered to be Not Significant. However, in combination with other projects and plans nitrogen deposition is forecast to exceed 1% of the critical load at Coatham Sands/Dunes (receptors OE_1, OE_2, OE_3, OE_6) whether the lower critical load of 10 kgN/ha/yr ([redacted] or the higher critical load of 20 kgN/ha/yr (applicable to avocet) are used. Therefore 'in combination' air quality effects upon the Teesmouth and Cleveland Coast SPA and Ramsar are taken forward to appropriate assessment.

l. The Teesmouth and Cleveland Coast SPA / Ramsar (and SPA / Ramsar) is sensitive to negative changes in the water quality during the construction period. Section 4.2.104 confirms that the Proposed Development is screened in for Appropriate Assessment due to potential water quality impacts during construction / decommissioning as a result of oil, fuel and chemical spillages resulting in toxic surface run-off and leachate into the Teesmouth and Cleveland Coast SPA / Ramsar.

m. Paragraphs 4.3.16 to 4.3.24 discuss changes in water quality during operation. Surface water drainage and the discharge of Process Wastewater affecting the Teesmouth and Cleveland Coast SPA and Ramsar are screened into Appropriate Assessment

n. Paragraph 4.3.26 states that the main site will be located on brownfield land in a coastal landscape. As such, the project will not result in any loss of greenfield land adjacent to the coast. Overall, it is considered that LSEs can be excluded, and coastal squeeze as a result of the Proposed Development is screened out from Appropriate Assessment as it will not arise.

o. Section 5.0 identifies plans and projects with the potential to act in combination with the Proposed Development. Since likely significant effects will arise from construction and decommissioning noise on all SPA/Ramsar features, from operational air quality impacts (on nesting terns [redacted] and from construction and operational period water quality impacts on all SPA/Ramsar features, these can also operate in combination with other plans and projects. No 'in combination' coastal squeeze effect will occur as this impact pathway has been dismissed.

Table D-2: Detailed screening matrix assessing the qualifying features of the North York Moors SAC against the identified impact pathway during operation (O column) and decommissioning (D column)

Name of European site and Designation: North York Moors SAC		
EU Code: UK0030228		
Proximity to Main Site: 12.1 km		
Effect	Atmospheric pollution	In Combination Effects
Stage of Proposed Development	O	O
Northern Atlantic wet heaths with *Erica tetralix*	✕a	✕a
European dry heaths	✕a	✕a
Blanket bogs	✕a	✕a

a. Paragraphs 3.3.11 to 3.3.13 state that the North York Moors SAC is designated for blanket bogs (nitrogen Critical Load of 5-10 kg N/ha/yr) and two types of heathland communities (nitrogen Critical Load of 5-10 kg N/ha/yr). Sections 4.3.6 to 4.3.15 discuss atmospheric pollution. A review of habitat mapping in MAGIC indicates that the north-western section of the SAC comprises only heathland and the critical Load of 5-10 kg N/ha/yr applicable to heathland is therefore to be used and there will be no impact on bogs. Air quality modelling has confirmed there will be no LSE upon the North York Moors SAC and potential effects from air pollution can be screened out because at receptor OE_7 in the SAC/SPA the contribution of the Proposed Development is imperceptible (i.e. is less than 0.00 kgN/ha/yr).

Table D-3: Detailed screening matrix assessing the qualifying features of the North York Moors SPA against the identified impact pathway during operation (O column)

Name of European site and Designation: North York Moors SPA		
EU Code: UK9006161		
Proximity to Main Site: 12.1 km		
Effect	Atmospheric pollution	In Combination Effects
Stage of Proposed Development	O	O
Merlin *Falco columbianus*	✕a	✕a
Golden plover *Pluvialis apricaria*	✕a	✕a

a. In the breeding season merlin mainly rely on dwarf shrub heath as may golden plover to a lesser extent. Paragraphs 3.3.11 to 3.3.13 state that the North York Moors SAC is designated for blanket bogs (nitrogen Critical Load of 5-10 kg N/ha/yr) and two types of heathland communities (nitrogen Critical Load of 5-10 kg N/ha/yr). According to the Site Relevant Critical Load page on APIS for the SPA these are not only the reasons for SAC designation but also the key habitats on which the SPA species rely within the SPA boundary. A review of habitat mapping in MAGIC indicates that the north-western section of the SAC comprises only heathland and the critical Load of 5-10 kg N/ha/yr applicable to heathland is therefore to be used and there will be no impact on bogs. Paragraphs 4.3.6 to 4.3.15 discuss atmospheric pollution. Air quality modelling has confirmed there will be no LSE upon the North York Moors SPA or SAC and potential effects from air pollution can be screened out because at receptor OE_7 in the SAC/SPA the contribution of the Proposed Development is imperceptible (i.e. is less than 0.00 kgN/ha/yr).

Table D-4: Detailed screening matrix assessing the qualifying features of the Durham Coast SAC against the identified impact pathways during operation (O column)

Name of European site and Designation: Durham Coast SAC		
EU Code: UK0030140		
Proximity to Main Site: 13.7 km		
Effect	Atmospheric pollution	In Combination Effects
Stage of Proposed Development	O	O
Vegetated sea cliffs of the Atlantic and Baltic Coasts	✕a	✕b

a. The qualifying feature of the Durham Coast SAC is not sensitive to atmospheric nitrogen or acid deposition. The site is therefore screened out from Appropriate Assessment.

b. Since the qualifying feature is not vulnerable to atmospheric pollution no in combination effect will arise

Table D-5: Detailed screening matrix assessing the qualifying features of the Northumbria Coast SPA / Ramsar against the identified impact pathways during construction (C) and decommissioning (D).

Name of European site and Designation: Northumbria Coast SPA/Ramsar						
EU Code: UK9006131						
Proximity to Main Site: 7.6 km						
Effect	Atmospheric pollution			In Combination Effects		
Stage of Proposed Development	C	O	D	C	O	D
Purple sandpiper *Calidris maritima*	✕a	✕a	✕a	✕b	✕b	✕b
Ruddy turnstone *Arenaria interpres*	✕a	✕a	✕a	✕b	✕b	✕b
[redacted]						

Table D-6: Detailed screening matrix assessing the qualifying features of the Berwickshire and North Northumberland Coast SAC against the identified impact pathways during construction (C column) and decommissioning (D column).

Name of European site and Designation: Berwickshire & North Northumberland Coast SAC				
EU Code: UK0017072				
Distance to Proposed Development: 87 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	In Combination Effects
Stage of Proposed Development	C	D	C	D
Mudflats and sandflats not covered by seawater at low tide	N/A	N/A	N/A	N/A
Large shallow inlets and bays	N/A	N/A	N/A	N/A
Reefs	N/A	N/A	N/A	N/A
Submerged or partially submerged sea caves	N/A	N/A	N/A	N/A
Grey seal *Halichoerus grypus*	✓a	✓a	✓b	✓b

a. Paragraphs 4.2.72 to 4.2.80 discuss that grey seal use functionally linked habitat beyond designated site boundaries. Marine and land-based construction activities associated with the Proposed Development will create airborne sound and changes in visual cues which have the potential to disturb seals that are hauled-out nearby or have surfaced. The effects of disturbance could include a cessation of feeding, travelling, resting, breeding and/or socialising. Long-term effects of repeated disturbance could include a permanent displacement and/or a decline in fitness and productivity (such as moulting and breeding success). Noise and visual disturbance of grey seals within functionally linked land are taken forward to Appropriate assessment.

b. Section 5.0 identifies plans and projects with the potential to act in combination with the Proposed Development. Since likely significant effects may arise from construction and decommissioning there is the potential in combination effects will be considered in more detail at Appropriate Assessment.

Table D-7: Detailed screening matrix assessing the qualifying features of the Humber Estuary SAC against the identified impact pathway during construction (C column) and decommissioning (D column).

Name of European site and Designation: Humber Estuary SAC				
EU Code: UK0030170				
Distance to Proposed Development: 110 km				
Effect	Disturbance of functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Estuaries	N/A	N/A	N/A	N/A
Mudflats and sandflats not covered by seawater at low tide	N/A	N/A	N/A	N/A
Sandbanks which are slightly covered by sea water all the time	N/A	N/A	N/A	N/A
Coastal lagoons	N/A	N/A	N/A	N/A
Salicornia and other annuals colonizing mud and sand	N/A	N/A	N/A	N/A
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	N/A	N/A	N/A	N/A
Embryonic shifting dunes	N/A	N/A	N/A	N/A

Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	N/A	N/A	N/A	N/A
Fixed coastal dunes with herbaceous vegetation ("grey dune")	N/A	N/A	N/A	N/A
Dunes with *Hippopha rhamnoides*	N/A	N/A	N/A	N/A
Sea lamprey *Petromyzon marinus*	✓a	✕a	✕d	✕d
River lamprey *Lampetra fluviatilis*	✕b	✕b	✕d	✕d
Grey seal *Halichoerus grypus*	✓c	✓c	✓d	✓d

a. Paragraphs 4.2.82 to 4.2.84 discuss potential effects on migratory fish. The proposed connection routes will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect sea lamprey will be taken forward to Appropriate Assessment.

b. While river lamprey might use functionally linked habitat beyond the designated site boundary, they are not migratory and there will not be Likely Significant Effects of the Proposed Development due to its long distance to the Humber Estuary SAC.

c. Paragraphs 4.2.72 to 4.2.80 discuss that grey seal use functionally linked habitat beyond designated site boundaries. Marine and land-based construction activities associated with the Proposed Development will create airborne sound and changes in visual cues which have the potential to disturb seals that are hauled-out nearby or have surfaced. The effects of disturbance could include a cessation of feeding, travelling, resting, breeding and/or socialising. Long-term effects of repeated disturbance could include a permanent displacement and/or a decline in fitness and productivity (such as moulting and breeding success). Noise and visual disturbance of grey seals within functionally linked land are taken forward to Appropriate assessment.

d. Section 5.0 identifies plans and projects with the potential to act in combination with the Proposed Development. Since likely significant effects may arise from construction and decommissioning there is the potential in combination effects will be considered in more detail at Appropriate Assessment.

Table D-8: Detailed screening matrix assessing the qualifying features of the Southern North Sea SAC against the identified impact pathway during construction (C column) and decommissioning (D column).

Name of European site and Designation: Southern North Sea SAC				
EU Code: UK0030395				
Distance to Proposed Development: 102km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Harbour porpoise *Phocoena phocoena*	✕a	✕a	✕b	✕b

a. The Southern North Sea SAC, which is designated for harbour porpoise, is located over 100 km away from the Proposed Development Site. The Planning Inspectorate have agreed that effects upon the Southern North Sea SAC can be scoped out of the ES as there are no impact pathways from underwater sound arising from the proposals (The Planning Inspectorate, 2023). As such, LSE upon harbour porpoise is also screened out.

b. As there will be no LSE alone, there will be no LSE 'in-combination'.

Table D-9: Detailed screening matrix assessing the qualifying features of The Wash and North Norfolk Coast SAC against the identified impact pathway during construction (C column) and decommissioning (D column).

Name of European site and Designation: The Wash and North Norfolk Coast SAC				
EU Code: UK0017075				
Distance to Proposed Development: 174 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Sandbanks which are slightly covered by sea water all the time	N/A	N/A	N/A	N/A
Mudflats and sandflats not covered by seawater at low tide	N/A	N/A	N/A	N/A
Large shallow inlets and bays	N/A	N/A	N/A	N/A
Reefs	N/A	N/A	N/A	N/A
Salicornia and other annuals colonizing mud and sand	N/A	N/A	N/A	N/A
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	N/A	N/A	N/A	N/A
Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticose*)	N/A	N/A	N/A	N/A
Coastal lagoons	N/A	N/A	N/A	N/A
Harbour seal *Phoca vitulina*	✕a	✕a	✕c	✕c

Otter *Lutra lutra*	✕b	✕b	✕c	✕c

a. Paragraphs 4.2.66 to 4.2.71 discuss how harbour seal use functionally linked habitat beyond designated site boundaries. Seal Sands is a known haul-out site for a breeding colony of harbour seal, which use the intertidal mudflats in this area. Greatham Creek is also known to be frequented by small numbers of individuals, which haul-out at multiple locations along the creek, particularly at Bailey Bridge. Seals Sands and its population in the River Tees, is the only significant haul-out site within the NE England MU (Natural Environment Research Council Special Committee on Seals, 2021), which also includes harbour seals found at Holy Island, situated off the north-east coast of England, south of Berwick-upon-Tweed. Although harbour seals are present within the vicinity of the Proposed Development Site and are likely to use the adjacent sea area for foraging, in the context of wider populations in the North Sea, the immediate Study Area is not considered to be heavily used by this species compared to other areas around the UK coast (refer to ES Chapter 14: Marine Ecology for further detail). Therefore, LSE upon harbour seal can be screened out.

b. While otter might use functionally linked habitat beyond the designated site boundary, there will not be LSE from the Proposed Development due to its long distance to The Wash and North Norfolk Coast SAC.

c. As there will be no LSE alone, there will be no LSE 'in-combination'.

Table D-10: Detailed screening matrix assessing the qualifying features of the River Tweed SAC against the identified impact pathway during construction (C column) and decommissioning (D column).

Name of European site and Designation: River Tweed SAC				
EU Code: UK0012691				
Distance to Proposed Development: 138 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	N/A	N/A	N/A	N/A
Atlantic salmon *Salmo salar*	✓a	✓a	✓c	✓c
Otter *Lutra lutra*	✕b	✕b	✕c	✕c
Sea lamprey *Petromyzon marinus*	✓a	✓a	✓c	✓c
Brook lamprey *Lampetra planeri*	✕b	✕b	✕c	✕c
River lamprey *Lampetra fluviatilis*	✕b	✕b	✕c	✕c
Otter *Lutra lutra*	✕b	✕b	✕c	✕c

a. Sections 4.2.84 to 4.2.86 addresses the potential of the Proposed Development to result in disturbance of migratory routes for fish. The proposed connection routes will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish. The proposed connection routes will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect sea lamprey is taken forward to Appropriate Assessment.

b. While otter, brook lamprey and river lamprey might use functionally linked habitat beyond the designated site boundary, they are not migratory and there will not be Likely Significant Effects of the Proposed Development due to its long distance to the River Tweed SAC.

c. Since a likely significant effect will arise alone, it cannot be dismissed 'in combination'.

Table D-11: Detailed screening matrix assessing the qualifying features of the Tweed Estuary SAC against the identified impact pathways during construction (C column) and decommissioning (D column).

Name of European site and Designation: Tweed Estuary SAC				
EU Code: UK0030292				
Distance to Proposed Development: 137 km				
Effect	Disturbance of functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Estuaries	N/A	N/A	N/A	N/A
Mudflats and sandflats not covered by seawater at low tide	N/A	N/A	N/A	N/A
Sea lamprey *Petromyzon marinus*	✓a	✓a	✓c	✓c
River lamprey *Lampetra fluviatilis*	✕b	✕b	✕c	✕c
a. Paragraphs 4.2.82 to 4.2.84 address the potential of the Proposed Development to result in disturbance of migratory routes for fish. The proposed connection routes will cross the River Tees and Greatham Creek, and there is potential for noise and vibration arising from construction to affect migratory fish. Therefore, based upon a precautionary approach, the potential for noise and vibration to affect sea lamprey will be taken forward to Appropriate Assessment.				

b. While river lamprey might use functionally linked habitat beyond the designated site boundary, they are not migratory and there will not be Likely Significant Effects of the Proposed Development due to its long distance to the Tweed Estuary SAC.

c. Since a likely significant effect will arise alone, it cannot be dismissed 'in combination'.

ANNEX E APPROPRIATE ASSESSMENT MATRICES

Table E-1: Detailed matrix assessing the qualifying species of the Teesmouth and Cleveland Coast SPA / Ramsar against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns)

Name of European site and Designation: Teesmouth & Cleveland Coast SPA/Ramsar																	
EU Code: UK9006061A																	
Distance to NSIP: Overlapping																	
Effect	Habitat Loss (HDD collapse)	Loss of Functionally Linked Land (temporary and permanent)		Visual Disturbance		Noise Disturbance			Water Quality			Air Quality			In-combination effects		
Stage of Proposed Development	C	C	D	C	D	C	O	D	C	O	D	C	O	D	C	O	D
[redacted]																	
Common tern *Sterna hirundo*	✕ a	✕ b	✕c	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕ j	✕j	✕k	✕k	✕k
Sandwich tern *Sterna sandvicensis*	✕ a	N/A	N/A	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕j	✕j	✕k	✕k	✕k
[redacted]																	
Knot *Calidris canutus*	✕ a	N/A	N/A	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕j	✕j	✕k	✕k	✕k

Ruff *Calidris pugnax*	✕ a	✕ b	✕c	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕j	✕j	✕k	✕k	✕k
Redshank *Tringa totanus*	✕ a	✕ b	✕c	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕j	✕j	✕k	✕k	✕k
Waterbird assemblage	✕ a	✕b	✕c	✕d	✕e	✕f	✕g	✕e	✕h	✕i	✕e	✕j	✕j	✕j	✕k	✕k	✕k

a. Section 6.1 discusses measures to avoid environmental risks during HDD. Where HDD is used to cross watercourses, risk of drilling fluid hydrofracture to the surface will be minimised by the following:

- Where HDD is used to cross watercourses, risk of escape of drilling fluid arising from hydrofracturing to the surface will be minimised by the following:
  - Undertaking a ground investigation
  - Detailed design of the launch point or landfill of the HDD, showing geological layers and intended drill path which has sufficient depth below surface for the expected ground conditions to minimise risk of failure/collapse
  - Undertaking a hydraulic fracture analysis
- During drilling the following measures are proposed:
  - Ensure drilling fluid is of sufficient viscosity and properties for the ground being drilled;
  - Have lost circulation materials on site to seal any breakout;
  - Use casing through weaker cohesive layers near the ground surface if necessary;
  - Removal of poor ground / ground stabilisation prior to drilling;
  - Monitoring of drilling fluid returns and volumes during drilling to warn of inadequate hole cleaning; and,
  - Monitoring downhole annular pressure (set by fracture calculations) in real time to warn of over pressurising by drilling fluid.

The Framework CEMP (EN070009/APP/5.12) for the Proposed Development includes the following commitments:

- A commitment to producing a Code of Construction Practice which would specify measures designed to minimise the risk of collapse of any HDD crossing;
- A requirement for the contractor's drilling method statement to form the basis of contingency plans which provide details of specific clean-up and pollution control measures which would be used in the event of an accidental spillage.

- Natural England would be consulted on the effectiveness of the proposed measures in reducing effects on designated sites; and
- A requirement for the contractor's drilling method statement to include pollution prevention measures that would be used to minimise the risk of accidental spillage.

b. Section 6.2 discusses permanent loss of functionally linked land. The only sectors where permanent habitat loss will affect qualifying bird species are Sectors 9 and 12 within The Foundry. Black headed gull and herring gull were recorded within Sector 9 at high tide. A peak count of 10 herring gulls were recorded in November 2022, a mean frequency of 0.94. This is below 1% of the SPA / Ramsar population. A peak count of 28 herring gulls was recorded in March 2022, with a mean frequency of 2.5. This is above the 1% SPA population threshold. Although the number of gulls recorded in March was above the 1% SPA population, the Teesmouth and Cleveland coast SPA and Ramsar is designated for non-breeding rather than breeding birds. As the birds were recorded in March (outside of the wintering period), the loss of habitat is unlikely to have an adverse effect upon site integrity.

   At low tide a peak count of 6 herring gulls was recorded in Sector 9 in January 2022 (mean frequency of 0.5). This is below 1% of the SPA / Ramsar population. Herring gulls were recorded within Sector 12 at low tide with a peak count of 40 birds in April 2023 (mean frequency 5.75). This is above 1% of the SPA population. However, as the SPA and Ramsar is designated for non-breeding herring gull, and the peak count was recorded in April 2023, there will be no adverse effect on site integrity.

   In summary, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of permanent loss of functionally linked land for herring gull or black-headed gull.

c. Section 6.3 discusses the temporary loss of functionally linked land during construction. Timing of works is proposed to avoid displacement of birds and habitats will be reinstated post construction. It is concluded that overall, there will be no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar.

d. Paragraph 6.6.48 states that at the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above ground structures on the Main Site removed, and the ground remediated as required to facilitate future re-use. The pipelines within the connection corridors would be likely to remain in situ. As such, land will become available to the qualifying species of the Northumbria Coast SPA and Ramsar and no effects upon site integrity are anticipated.

e. Section 6.4 discusses visual disturbance of birds during construction. Visual screening, timing of works and a sensitive lighting strategy are proposed to avoid an adverse effect on site integrity.

f. Paragraph 6.6.49 states that a Decommissioning Environmental Management Plan (DEMP) would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise, visual disturbance, changes in air quality and changes in water quality during the construction phase of the project would be appropriate for the decommissioning phase and incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

g. Section 6.5 discusses noise disturbance during construction. Timing of works and use of acoustic barriers are proposed to avoid adverse effects during construction. These measures will be secured by the Framework CEMP (EN070009/APP/5.12).

h. Section 6.6 discusses noise disturbance of birds during operation. The assessment of LSE identified that there is potential for noise to disturb of non-breeding black-headed gull and herring gull during the operational phase of the Proposed Development. Outside of the main site, the predicted noise levels are under 60 dB. There is a small area of dune habitat immediately north off the Main Site which is predicted to be affected by noise between 55 and 60 dB, however this part of the dune system is heavily disturbed by recreational users and also close to an existing road, the presence of

which would decrease bird use. Furthermore, the South Tees Development Corporation (STDC) site has been subject to disturbance from industrial activities for a number of years, and the assemblage of birds is likely to have habituated to noise at these levels. Therefore, there will be no adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar as a result of noise disturbing the qualifying bird species during operation.

i. Paragraphs 6.6.50 to 6.5.82 discuss changes in water quality during construction. With embedded and additional mitigation there will be no adverse effect on the Teesmouth and Cleveland Coast SPA and Ramsar.

j. Paragraphs 6.6.10 to 6.6.40 discuss changes in water quality during operation. With mitigation there will be adverse effect on the Teesmouth and Cleveland Coast SPA and Ramsar.

k. Paragraphs 6.5.3 to 6.5.10 discuss atmospheric pollution. [redacted]

l. At South Gare (the nearest historic nesting location) nitrogen deposition due to H2Teesside is forecast to be 0.01 kgN/ha/yr, while at the closest current nesting locations nitrogen deposition due to H2Teesside is forecast to be considerably less than 0.01 kgN/ha/yr and therefore effectively zero (as nitrogen deposition is generally not reported to more than two decimal places to avoid false precision). .

Section 7.0 assesses in combination effects. No residual adverse effects are identified from the Proposed Development in combination with other plans or projects.

Table E-2: Detailed matrix assessing the qualifying species of the Berwickshire and North Northumberland Coast SAC against the identified impact pathways during construction (C columns) and decommissioning (D columns).

Name of European site and Designation: Berwickshire and North Northumberland Coast SAC				
EU Code: UK0017072				
Distance to NSIP: 87 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Grey seal *Halichoerus grypus*	✕ a	✕b	✕c	✕c

a. Paragraphs 6.5.15 to 6.5.38 assess the effects of noise and visual disturbance on seals. To mitigate the effects of airborne sound on seals hauled-out at Seal Sands and using habitat within Greatham Creek during the use of trenchless technologies, noise abatement barriers (such as close-board acoustic fencing or other barriers) will be installed t0 reduce the amount of perceptible sound. It is considered that with these mitigation measures, there will be no affect on the conservation objectives of the Berwick and North Northumberland SAC, the Humber Estuary SAC and the Wash and North Norfolk Coast SAC which are to maintain or restore the structure and function of the habitats of qualifying species. Therefore, there will be no adverse effect on site integrity as a result of noise and visual disturbance of seals.

b. Paragraph 6.6.49 notes that A DEMP would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise and visual disturbance during the construction phase of the project would be incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

c. Section 7.0 assesses in combination effects. No residual adverse effects are identified from the Proposed Development in combination with other plans or projects.

Table E-3: Detailed matrix assessing the qualifying species of the Humber Estuary SAC against the identified impact pathways during construction (C columns) and decommissioning (D columns).

Name of European site and Designation: Humber Estuary SAC				
EU Code: UK0030170				
Distance to NSIP: 110 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Sea lamprey *Petromyzon marinus*	✕ a	✕c	✕d	✕d
Grey seal *Halichoerus grypus*	✕ b	✕c	✕d	✕d

a. Paragraphs 6.5.43 to 6.5.49 discuss noise and visual disturbance of migratory fish. Standard working hours will be implemented as much as possible to reduce working in hours of darkness and therefore reduce the requirement for artificial lighting. When extended working hours are required, the design measures included within the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) are to be implemented, reducing light glare or spill into the marine environment, including directing light away from the estuary (particularly at the Venator Site, close to Greatham Creek). A warm white light colour will also be used, which is considered less intrusive for ecological receptors. For example, some salmonids such as post-smolt Atlantic salmon are known to be particularly sensitive to light at the blue-green end of the visible spectrum (Becker et al., 2013). Any changes in artificial lighting which result in visual disturbance are expected to be localised, temporary and intermittent for the duration of the construction period. Due to the design measures proposed, there is not considered to be light spill into the marine environment, which could result in behavioural disturbance, such as changes in migratory patterns. Therefore, there will no adverse effect on the integrity of the Humber Estuary SAC as a result of noise, vibration or lighting affecting migratory fish.

b. Paragraph 6.5.13 assesses the effects of noise and visual disturbance on seals. To mitigate the effects of airborne sound on seals hauled-out at Seal Sands and using habitat within Greatham Creek during the use of trenchless technologies, noise abatement barriers (such as close-board acoustic fencing or other barriers) will be installed t0 reduce the amount of perceptible sound. It is considered that with these mitigation measures, there will be no effect on the conservation objectives of the Berwick and North Northumberland SAC, the Humber Estuary SAC and the Wash and North Norfolk Coast SAC which are to maintain or restore the structure and function of the habitats of qualifying species. Therefore, there will be no adverse effect on site integrity as a result of noise and visual disturbance of seals.

c. Paragraph 6.6.49 notes that A DEMP would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise and visual disturbance during the construction phase of the project would be incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

d. Section 7.0 assesses in combination effects. No residual adverse effects are identified from the Proposed Development in combination with other plans or projects.

Table E-4: Detailed matrix assessing the qualifying species of the River Tweed SAC against the identified impact pathways during construction (C columns) and decommissioning (D columns).

Name of European site and Designation: River Tweed SAC				
EU Code: UK0012691				
Distance to NSIP: 138 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Atlantic salmon *Salmo salar*	✕ a	✕b	✕c	✕c
Sea lamprey *Petromyzon marinus*	✕ a	✕b	✕c	✕c

a. Paragraphs 6.5.43 to 6.5.49 discuss noise and visual disturbance of migratory fish. Standard working hours will be implemented as much as possible to reduce working in hours of darkness and therefore reduce the requirement for artificial lighting. When extended working hours are required, the design measures included within the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) are to be implemented, reducing light glare or spill into the marine environment, including directing light away from the estuary (particularly at the Venator Site, close to Greatham Creek). A warm white light colour will also be used, which is considered less intrusive for ecological receptors. For example, some salmonids such as post-smolt Atlantic salmon are known to be particularly sensitive to light at the blue-green end of the visible spectrum (Becker et al., 2013). Any changes in artificial lighting which result in visual disturbance are expected to be localised, temporary and intermittent for the duration of the construction period. Due to the design measures proposed, there is not considered to be light spill into the marine environment, which could result in behavioural disturbance, such as changes in migratory patterns. Therefore, there will no adverse effect on the integrity of the River Tweed SAC as a result of noise, vibration or lighting affecting migratory fish.

b. Paragraph 6.6.49 notes that A DEMP would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise and visual disturbance during the construction phase of the project would be incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

c. Section 7.0 assesses in combination effects. No residual adverse effects are identified from the Proposed Development in combination with other plans or projects.

Table E-5: Detailed matrix assessing the qualifying species of the Tweed Estuary SAC against the identified impact pathways during construction (C columns) and decommissioning (D columns).

Name of European site and Designation: Tweed Estuary SAC				
EU Code: UK0030292				
Distance to NSIP: 137 km				
Effect	Disturbance in functionally linked habitat		In Combination Effects	
Stage of Proposed Development	C	D	C	D
Sea lamprey *Petromyzon marinus*	✕ a	✕b	✕c	✕c

a. Paragraphs 6.5.43 to 6.5.49 discuss noise and visual disturbance of migratory fish. Standard working hours will be implemented as much as possible to reduce working in hours of darkness and therefore reduce the requirement for artificial lighting. When extended working hours are required, the design measures included within the Indicative Lighting Strategy (Construction) (EN070009/APP/ 5.12) are to be implemented, reducing light glare or spill into the marine environment, including directing light away from the estuary (particularly at the Venator Site, close to Greatham Creek). A warm white light colour will also be used, which is considered less intrusive for ecological receptors. For example, some salmonids such as post-smolt Atlantic salmon are known to be particularly sensitive to light at the blue-green end of the visible spectrum (Becker et al., 2013). Any changes in artificial lighting which result in visual disturbance are expected to be localised, temporary and intermittent for the duration of the construction period. Due to the design measures proposed, there is not considered to be light spill into the marine environment, which could result in behavioural disturbance, such as changes in migratory patterns. Therefore, there will no adverse effect on the integrity of the River Tweed SAC as a result of noise, vibration or lighting affecting migratory fish.

b. Paragraph 6.6.49 notes that A DEMP would be produced and agreed with the Environment Agency as part of the Environmental Permitting surrender process and pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. It is considered that the measures proposed to avoid noise and visual disturbance during the construction phase of the project would be incorporated into the DEMP. Therefore, with mitigation, there would be no adverse effects on site integrity during the decommissioning phase.

c. Section 7.0 assesses in combination effects. No residual adverse effects are identified from the Proposed Development in combination with other plans or projects.

ANNEX F CITATIONS

EC Directive 79/409 on the Conservation of Wild Birds

Special Protection Area (SPA)

Name: Teesmouth and Cleveland Coast SPA

Counties/Unitary Authorities: Durham County Council, Hartlepool Borough Council, Middlesbrough Council, Redcar & Cleveland Borough Council, Stockton-on-Tees Borough Council.

The SPA is largely located between Hartlepool, Middlesbrough and Redcar. It lies within the five Unitary Authorities of Durham County, Hartlepool, Middlesbrough, Stockton-on-Tees and Redcar & Cleveland. Its marine extension lies entirely within UK territorial waters.

Boundary of the SPA:

The extended SPA terrestrial boundary protects habitats for breeding and non-breeding waterbirds including intertidal, wet grassland, mudflats and open water habitats. The SPA includes most of the Teesmouth and Cleveland Coast SSSI.

The boundary of the SPA also covers an area of open sea from Castle Eden Dene Mouth in the north to Marske-by-the-Sea in the south and includes the River Tees and associated docks, harbours etc. as far upriver as the Tees Barrage. [redacted]

Size of SPA: The revised SPA covers an area of 12,210.62 ha

Site description:

The Teesmouth and Cleveland Coast SPA is a wetland of European importance, located on the coast of north-east England between Castle Eden Dene Mouth in the north and Marske-by-the-Sea in the south. It includes the [redacted] and the common tern colony at Saltholme. The coastal parts of the site include a rocky limestone headland with sandy beaches stretching to the north, and much of Tees Bay to the south. South of Hartlepool, the Magnesian limestone is replaced by sandstones and mudstones, as far as Saltburn, creating low cliffs and sandy beaches.

The SPA comprises of a wide variety of habitats including: intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh, saline lagoons, sand dunes and estuarine and coastal waters on and around the Tees estuary, which has been considerably modified by human activities. These habitats provide feeding and roosting opportunities for important number of waterbirds in winter and during passage periods including in particular common redshank, red knot and ruff, which occur in internationally important numbers. [redacted]

The saltmarsh and mudflat habitats of the Teesmouth and Cleveland Coast SPA are of great importance to a diverse assemblage of bird species. Mudflats support high densities of benthic invertebrates, including worms, molluscs and crustaceans, which provide an important food resource for migrant and overwintering SPA bird species. Areas of saltmarsh provide significant feeding and roosting opportunities for many species of waterbird including

common redshank and red knot.

[redacted] the common tern, which breed at various locations, feed within the River Tees and associated water bodies and within the wider estuary mouth and bay. In late summer, Sandwich tern aggregate in important numbers at Coatham Sands, Seal Sands, North Gare Sands/Seaton Snook and Bran Sands when on passage.

Qualifying species:

The site qualifies under **Article 4** of the Birds Directive (2009/147/EC) for the following reasons (summarised in Table 1):

- The site regularly supports more than 1% of the Great Britain populations of four species listed in Annex I of the EC Birds Directive. Therefore the site qualifies for SPA Classification in accordance with the UK SPA selection guidelines (stage 1.1).

Species	Count (period)	% of population	Interest type
[redacted]	[redacted]		
Sandwich tern *Thalasseus sandvicensis*	1,900 individuals[3] (1988-1992)	4.3% GB[4]	Annex I
Common tern *Sterna hirundo*	399 pairs[5] (2010-2014)	4.0% GB[6]	Annex I
[redacted]	[redacted]		
Ruff *Caldris pugnax*	19 individuals (2011/12-2015/16)[9]	2.4% GB[10]	Annex I

- The site regularly supports more than 1% of the biogeographic population of two regularly occurring migratory species not listed in Annex I of the EC Birds Directive. Therefore the site qualifies for SPA Classification in accordance with the UK SPA selection guidelines (stage 1.2).

Species	Count (period)	% of population	Interest type
Red knot *Calidris canutus*	5,509 individuals[11] (1991/92-1995/96)	1.6% NE Canada/ Greenland/Iceland/UK	Migratory

[1] Data from: Cleveland Bird Reports. [redacted]
Data from: Musgrove *et al.* 2013; 1,500 pairs (2006-10)
[3] Data from: Carter 1993, SPA Departmental Brief; recent average of 149 individuals (WeBS: 2009/10-2013/14) representing 0.3% of GB
[4] Data from: Carter 1993, SPA Departmental Brief. Note: this passage population of 1,900 individuals was expressed as equating to 6.8% of the GB breeding population of Sandwich terns (14,000 pairs) in the Natura 2000 Standard Data Form for this site.
[5] Data from: Cleveland Bird Reports
[6] Data from: Musgrove *et al.* 2013; 10,000 pairs (2000).
[7] Data from: Cleveland INCA [redacted]
[8] Data from: Musgrove *et al.* 2013: 1,900 pairs (2000)
[9] Data from: WeBS 2011/12-2015/16
[10] Data from: Musgrove et al. 2013: 800 individuals
[11] Data from: SPA citation March 2000 version 0.4; recent average of 1,193 individuals (WeBS: 2009/10-2013/14) representing 0.3% of NE Canada & Greenland/Western Europe population (AEWA 2012)

		population[12]	
Common redshank *Tringa totanus*	1,648 individuals[13] (1987-1991)	1.1% East Atlantic population[14]	Migratory

Assemblage qualification:

The site qualifies under **Article 4** of the Birds Directive (2009/147/EC) as it used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season (Table 2)

	Count (period)	**Average number of individuals**
Waterbird assemblage	2011/12-2015/16	26,014[15]

During the period 2011/12-2015/16 the Teesmouth and Cleveland Coast SPA/Ramsar site, supported an average peak of 26,014 (SPA assemblage) / 26,786 (Ramsar assemblage) individuals. This assemblage is of both European and international importance. The assemblage includes a wide range of breeding, wintering and passage waterbird species, including those of European importance described above, as well as numbers exceeding 1% of the GB non-breeding populations of gadwall *Mareca strepera*, northern shoveler *Spatula clypeata* and sanderling *Calidris alba*. Additionally, Eurasian wigeon *Mareca penelope*, northern lapwing *Vanellus vanellus*, herring gull *Larus argentatus* and black-headed gull *Chroicocephalus ridibundus* are also present in sufficient numbers to warrant their being listed as a major component species of the assemblage, as their numbers exceed 2,000 individuals (10% of the minimum qualifying assemblage of 20,000 individuals).

Principal bird data sources:

AEWA – African-Eurasian Waterbird Agreement (2012). *Report on the Conservation Status of Migratory Waterbirds in the Agreement Area. Fifth Edition.* AEWA, Bonn

Carter 1993 Teesmouth and Cleveland Coast Departmental Brief. JNCC, Peterborough.

Cleveland Birds Reports (2010, 2011, 2012, 2013). Teesmouth Bird Club.

Cleveland Industry Nature Conservation Association [redacted]

Musgrove, M., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons M., Risely K., & Stroud, D. 2013 Population estimates of birds in Great Britain and the United Kingdom. British Birds 106: 64–100

Wetland Bird Survey reports (2011/12-2015/16), British Trust for Ornithology.

Wetlands International 2012. Waterbird Population Estimates, Fifth Edition. Wetlands International, Wageningen, The Netherlands.

[12] Data from: Wetlands International 2012; 345,000 individuals 1982-1992
[13] Data from: Carter 1993, SPA Departmental Brief; recent average of 1,156 individuals (WeBS: 2009/10-2013/14) representing 0.4% of the Iceland & Faroes/Western Europe population (AEWA 2012).
[14] Data from: Carter 1993, SPA Departmental Brief
[15] Data from; WeBs 2009/10-2013/14 and Cleveland Birds Reports

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 15 August 1995

3. Country:

UK (England)

4. Name of the Ramsar site:

Teesmouth and Cleveland Coast

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

54 37 50 N 01 07 07 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Middlesborough

Teesmouth and Cleveland Coast lies 48 km south-east of the city of Newcastle-upon-Tyne on the north-east coast of England.

Administrative region: Cleveland; Durham; Hartlepool; Redcar and Cleveland; Stockton-on-Tees

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 1247.31

Min. -1
Max. 4
Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Medium-large site encompassing a range of habitats (sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes) on and around an estuary which has been much-modified by human activities. Together these habitats support internationally important numbers of waterbirds.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

9528 waterfowl (5 year peak mean 1998/99-2002/2003)

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

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Common redshank , *Tringa totanus totanus*,	883 individuals, representing an average of 0.7% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	2579 individuals, representing an average of 0.9% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	basic, neutral, shingle, sand, mud, clay, alluvium, peat, sedimentary, sandstone, sandstone/mudstone, boulder
Geomorphology and landscape	lowland, coastal, floodplain, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), open coast (including bay), enclosed coast (including embayment), estuary, lagoon, pools, intertidal rock
Nutrient status	eutrophic, mesotrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Durham, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/durham.html) Max. daily temperature: 12.5° C Min. daily temperature: 5.2° C Days of air frost: 52.0 Rainfall: 643.3 mm Hrs. of sunshine: 1374.6

General description of the Physical Features:

Teesmouth and Cleveland Coast includes a range of coastal habitats – sand- and mud-flats, rocky shore, saltmarsh, freshwater marsh and sand dunes – on and around an estuary which has been considerably modified by human activities.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Teesmouth and Cleveland Coast includes a range of coastal habitats – sand- and mud-flats, rocky shore, saltmarsh, freshwater marsh and sand dunes – on and around an estuary which has been considerably modified by human activities.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces

19. Wetland types:

Inland wetland, Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	45
Tp	Freshwater marshes / pools: permanent	20
E	Sand / shingle shores (including dune systems)	14
H	Salt marshes	7
D	Rocky shores	7
K	Coastal fresh lagoons	3
F	Estuarine waters	2
M	Rivers / streams / creeks: permanent	1
J	Coastal brackish / saline lagoons	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Teesmouth and Cleveland Coast comprises intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. The Tees Estuary has been much-modified by such activities as land-claim, construction of breakwaters and training walls, and deep dredging. The remaining intertidal areas within the estuary are composed of mud and sand, with some *Enteromorpha* beds in sheltered areas. Outside the estuary mouth, sandflats predominate, but with significant rocky foreshores and reefs at both Redcar and Hartlepool and anthropogenic boulder beds at South Gare. Moderately extensive sand dune systems flank the estuary mouth, while a smaller dune system lies north of Hartlepool; foredunes are dominated by *Ammophila*, *Elytrigia juncea* and *Leymus* communities, fixed dunes by *Festuca rubra* communities. Surviving saltmarsh is very limited in

extent, and is largely typified by *Puccinellia*. Behind the dunes and sea-defences a number of significant areas of grazing marsh are found, where *Festuca rubra* saltmarsh persists alongside inundation grassland, a range of swamp communities and several shallow water bodies.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site
Higher Plants:
Festuca arenaria, Puccinellia rupestris, Ranunculus baudotii (all Nationally Scarce)

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

[redacted]

Species with peak counts in spring/autumn:

Northern shoveler , *Anas clypeata*, NW & C Europe	7 individuals, representing an average of 0% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	7 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site
Invertebrates:
Pherbellia grisescens, Thereva valida, Longitarsus nigerrimus, Dryops nitidulus, Macroplea mutica, Philonthus dimidiatipennis, Trichohydnobius suturalis (all RDB)

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: (unspecified)	+	
Fishing: commercial		+
Fishing: recreational/sport	+	+
Bait collection	+	
Arable agriculture (unspecified)		+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	+
Industrial water supply		+
Industry		+
Sewage treatment/disposal		+
Harbour/port	+	+
Flood control	+	+
Irrigation (incl. agricultural water supply)		+
Transport route	+	+
Urban development		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Eutrophication	2			+	+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Eutrophication - Under Asset Management Plan AMP4 Northumbrian Water is obliged to introduce tertiary treatment to its Billingham Sewage Treatment Works, and to undertake a major investigation into the occurrence and spread of *Enteromorpha* algal mats and water/sediment quality issues.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Site management statement/plan implemented	+	
Other	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna:

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Waterfowl monitoring: Durham University Dept of Biological Sciences as part of the above contract
Ringing programmes: Tees Ringing Group.

Habitat:

Monitoring of the effects of Northumbrian Water sewage inputs (NWL, EA, EN).
Breeding bird surveys of Teesmouth NNR (EN) and Cowpen Marsh SSSI (Industry Nature Conservation Association).

[redacted]

Monitoring of seal usage of site and breeding success (INCA).

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Teesmouth Field Centre approximately 3000 schoolchildren annually on a variety of study programmes. There are three public hides and several interpretive panels. English Nature, Hartlepool Countryside Wardens and Tees Valley Wildlife Trust undertake regular guided walks and events. British Energy and Huntsman Tioxide have provided hides which are available during guided visits.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality

Land based recreation:

The main activities are walking (especially dog walking), beach recreation, golf, and birdwatching, which take place year-round (though with a pronounced summer peak). The South Gare area has beach huts, car parks and a caravan site. Car parks are also located at North Gare and Seaton Carew. Seaton Carew and Cleveland Golf Clubs have courses adjacent to and impinging slightly on the site. Use is mainly April to September, but golf is played year-round.

Illegal use of motorcycles, quad-bikes and 4WD vehicles is particularly prevalent at South Gare, but is also increasing at Seaton Sands.

Wildfowling is confined to small areas of Cowpen Marsh and Saltholme Pools(1 September to 31 January).

Water based recreation:

In summer, power-boating, jet-skiing, dinghy-sailing and windsurfing all occur but at a low intensity (apart from Coatham Sands, where 'extreme sports' such as kite-surfing are increasing), and primarily on the open coast. Angling is largely confined to breakwaters (year-round), while bait-gathering in intertidal areas can be locally intensive, especially on Bran Sands (adjacent to the South Gare Breakwater).

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP & Davidson, NC (eds.) (1995) *Coasts and Seas of the United Kingdom. Region 5 North-east England: Berwick-upon-Tweed to Filey Bay*. Joint Nature Conservation Committee, Peterborough (Coastal Directories Series)

Batten, LA, Bibby, CJ, Clement, P, Elliot, GD & Porter, RF (1990) *Red Data Birds in Britain. Action for rare, threatened and important species*. Poyser, London, for Nature Conservancy Council and Royal Society for the Protection of Birds

Bennett, TL & Foster-Smith, JL (1998) Chapter 5. South-east Scotland and north-east England (Dunbar to Bridlington) (MNCR Sector 4). In: *Benthic marine ecosystems of Great Britain and the north-east Atlantic*, ed. by K. Hiscock, 123-154. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)

Brazier, DP, Davies, J, Holt, RHF & Murray, E (1998) *Marine Nature Conservation Review Sector 5. South-east Scotland and north-east England: area summaries*. Joint Nature Conservation Committee, Peterborough (Coasts and seas of the United Kingdom. MNCR series)

Buck, AL (ed.) (1997) *An inventory of UK estuaries. Volume 5. Eastern England*. Joint Nature Conservation Committee, Peterborough

Burd, F (1989) *The saltmarsh survey of Great Britain. An inventory of British saltmarshes*. Nature Conservancy Council, Peterborough (Research & Survey in Nature Conservation, No. 17)

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Davidson, NC, Laffoley, D d'A, Doody, JP, Way, LS, Gordon, J, Key, R, Pienkowski, MW, Mitchell, R & Duff, KL (1991) *Nature conservation and estuaries in Great Britain*. Nature Conservancy Council, Peterborough

Doody, JP, Johnston, C & Smith, B (1993) *Directory of the North Sea coastal margin*. Joint Nature Conservation Committee, Peterborough

Huddart, D & Glasser, NF (2002) *Quaternary of northern England*. Joint Nature Conservation Committee, Peterborough (Geological Conservation Review Series, No. 25)

Lacey *et al*. (1997) *Tees estuary management plan*. INCA, Billingham

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content. Volume 3: Site accounts*. Joint Nature Conservation Committee, Peterborough www.jncc.gov.uk/UKSPA/default.htm

European Site Conservation Objectives for Teesmouth and Cleveland Coast Special Protection Area Site Code: UK9006061

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying Conservation Advice document (where available), which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

[redacted]

A143 *Calidris canutus*; Red knot (Non-breeding)

A151 *Calidris pugnax;* Ruff (Non-breeding)

A162 *Tringa totanus*; Common redshank (Non-breeding)

A191 *Sterna sandvicensis*; Sandwich tern (Non-breeding)

A193 *Sterna hirundo*; Common tern (Breeding)

[redacted]

Waterbird assemblage

This is a European Marine Site

This SPA is a part of the Teesmouth and Cleveland Coast European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 4 May 2020 (version 5). This document updates and replaces an earlier version dated 21 February 2019 to reflect the approval by Government on 16 January 2020.of the extension to the SPA and the classification of additional qualifying features.

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

Citation for Special Area of Conservation (SAC)

Name: North York Moors

Unitary Authority/County: North Yorkshire, Redcar and Cleveland

SAC status: Designated on 1 April 2005

Grid reference: NZ711021

SAC EU code: UK0030228

Area (ha): 44082.25

Component SSSI: North York Moors SSSI

Site description:
This site in north-east Yorkshire within the North York Moors National Park contains the largest continuous tract of upland heather moorland in England. Dry heath covers over half the site and forms the main vegetation type on the western, southern and central moors where the soil is free-draining and has only a thin peat layer. The principal type present is heather – wavy hair-grass (*Calluna vulgaris – Deschampsia flexuosa*) heath, with some heather – bell heather *Erica cinerea* heath on well-drained areas throughout the site, and large areas of heather – bilberry *Vaccinium myrtillus* heath on steeper slopes.

Cross-leaved heath – bog-moss (*Erica tetralix – Sphagnum compactum*) wet heath is the second most extensive vegetation type on the site and is predominantly found on the eastern and northern moors where the soil is less free-draining. Purple moor-grass *Molinia caerulea* and heath rush *Juncus squarrosus* are also common within this community. In the wettest stands bog-mosses, including *Sphagnum tenellum*, occur, and the nationally scarce creeping forget-me-not *Myosotis stolonifera* can be found in acid moorland streams and shallow pools.

Blanket mire occurs in small amounts along the main watershed of the high moors where deep peat has accumulated. These areas are dominated by heather and cross-leaved heath with frequent hare's-tail cottongrass *Eriophorum vaginatum* and common cottongrass *E. angustifolium*.

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

- Blanket bogs*
- European dry heaths
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath)

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

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030228
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Area (SPA)

Name: North York Moors

Unitary Authority/County: North Yorkshire County and Redcar & Cleveland Unitary Authority

Consultation proposal: North York Moors Site of Special Scientific Interest (SSSI) (which includes the renotification of Tripsdale SSSI, Fylingdales Moor SSSI and May Moss SSSI) has been recommended has a Special Protection Area because of the site's European Ornithological importance.

The North York Moors SPA contains the largest continuous tract of heather moorland in England. The site displays a wide range of high quality dry heathland and blanket bog vegetation types dominated by *Calluna.* The transition from dry heathland to blanket bog is complemented by a diverse mosaic of wet heath and flush communities.

Boundary of SPA: The SPA boundary is coincident with North York Moors SSSI. See SPA map for detail of boundary.

Size of SPA: The SPA covers an area of 44,087.68 ha.

European ornithological importance of the SPA: North York Moors SPA is of European importance because:

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

Annex I species	Estimated breeding population 1996	% GB population
Merlin *Falco columbarius*	35 - 40 pairs	2.7 - 3.1 % GB
Golden Plover *Pluvialis apricaria*	526 -706 pairs	2.3- 3.1 % GB

Data sources:

Charlton, T. & Archer, R (1996). *North York Moors National Park breeding wader survey 1996.* RSPB.
Nattrass, M. & Downing, R. (1991) *Survey of merlins breeding in the North York Moors National Park, 1991*. RSPB.
Rebecca, G. & Bainbridge, I (In press) The status of breeding merlin *Falco columbarius* in Britain in 1993-94. *Bird study*.
Stone, B.H., Sears, J.E., Cranswick, P.A., Gregory, R.D., Gibbons, D.W., Rehfisch, M.M., Aebischer, N.J. & Reid, J.B. (1997) Population estimates of birds in Britain and the United Kingdom. *British Birds* **90:**1-22.

Non-qualifying species of interest

In addition, the site supports a rich upland breeding bird assemblage which includes Short-eared Owl *Asio flammeus*, Peregrine *Falco peregrinus* and Hen Harrier *Circus cyaneus* (all Annex I species), together with Redshank *Tringa totanus*, Red Grouse *Lagopus lagopus scoticus* and a nationally important population of Curlew *Numenius arquata*.

Status of SPA:

North York Moors was classified as a Special Protection Area on 12 May 2000.

European Site Conservation Objectives for North York Moors Special Area of Conservation Site code: UK0030228

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of the qualifying natural habitats**
- **The structure and function (including typical species) of the qualifying natural habitats, and,**
- **The supporting processes on which the qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath
H4030. European dry heaths
H7130. Blanket bogs*

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives for North York Moors Special Protection Area Site Code: UK9006161

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A098 *Falco columbarius*; Merlin (Breeding)

A140 *Pluvialis apricaria*; European golden plover (Breeding)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

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

Citation for Special Area of Conservation (SAC)

Name: Durham Coast

Unitary Authority/County: Durham

SAC status: Designated on 1 April 2005

Grid reference: NZ455407

SAC EU code: UK0030140

Area (ha): 393.63

Component SSSI: Durham Coast SSSI

Site description:
The Durham Coast is the only example of vegetated sea cliffs on Magnesian Limestone exposures in the UK. These cliffs extend along the North Sea coast for over 20 km from South Shields southwards to Blackhall Rocks. Their vegetation is unique in the British Isles and consists of a complex mosaic of maritime-influenced, calcareous and species-rich-neutral grasslands, tall-herb fen, seepage flushes and wind-pruned scrub. Within these habitats rare species with varied ecological requirements often grow together, forming unusual and species-rich communities of high scientific interest. The communities present on the sea cliffs are largely maintained by natural processes including exposure to sea spray, erosion and slippage of the soft Magnesian Limestone bedrock and overlying glacial drifts, as well as localised flushing by calcareous water.

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

- Vegetated sea cliffs of the Atlantic and Baltic coasts

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030140
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Durham Coast Special Area of Conservation Site code: UK0030140

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which the qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the “Habitats Regulations”). They must be considered when a competent authority is required to make a ‘Habitats Regulations Assessment’, including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term ‘favourable conservation status’ is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

RAMSAR INFORMATION SHEET

FOR WETLANDS OF INTERNATIONAL IMPORTANCE

Site reference number 7UK148
1 Compilation date Jan 2000
2 Country UK (England)
3 Name of wetland Northumbria Coast
4 Site centre location: Latitude: 55 27 59 N Longitude: 01 35 18 W
5 Altitude 0m
6 Area (ha) 1107.98

7 Overview

The Northumbria Coast Ramsar site comprises several discrete sections of rocky foreshore between Spittal, in the North of Northumberland, and an area just south of Blackhall Rocks in County Durham. These stretches of coast regularly support internationally important numbers of purple sandpiper and turnstone. [redacted]

8 Wetland type **Marine/coastal wetland**

Code	Name	% Area
D	Rocky shores	96
E	Sand / shingle shores (including dune systems)	3.3
M	Rivers / streams / creeks: permanent	0.2
Other	Other	0.5

9 Ramsar Criteria 6
10 Map of the site √
11 Compiler Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax : +44(0) 1733 562626 / +44(0) 1733 555948

12 Justification of criteria

Ramsar criterion 6

The site supports internationally important wintering populations of turnstone *Arenaria interpres* (2.6 % of the Eastern Atlantic Flyway population) and purple sandpiper *Calidris maritima* (1.6% of the Eastern Atlantic Flyway population)

13 General location

Nearest town/city: Newcastle upon Tyne
The site comprises several discrete stretches of the coastline in north east England, running between Spittal in the north of Northumberland to an area just south of Blackhall Rocks in County Durham.

Administrative Region: Northumberland, County Durham, Tyne and Wear

14 Physical Features

Soil & Geology	acidic, basic, clay, gravel, igneous, limestone/chalk, metamorphic, neutral, sand, sandstone, sedimentary, shingle, slate/shale
Geomorphology and Landscape	cliffs, coastal, crags/ledges, intertidal rock, open coast (including bay), pools
Nutrient status	no information
pH	no information
Salinity	saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent
Summary of main climatic features	Rainy, temperate climate with a mild winter and periodic frost. Mean minimum temperature approximately 7.4°C. Mean maximum temperature approximately 14.4°C. Mean annual precipitation approximately 6222.4mm, with a winter maximum.

15 Hydrological values

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping

16 Ecological features

The site consists mainly of areas of rocky shore with associated boulder and cobble beaches. These support a rich algal flora and associated fauna and form an important feeding area for wading birds. The areas of sandy beach within the site support a flora which includes marram grass *Ammophila arenaria* and sea sandwort *Honkenya peploides*.

17 Noteworthy flora

18 Noteworthy fauna

Species occurring at levels of international importance:

Over winter the area regularly supports:

Purple Sandpiper (*Calidris maritima*) (Eastern Atlantic (wintering))	787 individuals, representing an average of 1.6% of the population (5 year peak mean for 1992/93 to 1996/97)
Turnstone (*Arenaria interpres*) (Western Palearctic (wintering))	1739 individuals, representing an average of 2.6% of the population (5 year peak mean for 1992/93 to 1996/97)

Species occurring at levels of national importance:

During the breeding season the area regularly supports:

[redacted]

19 Social and Cultural Values

Aesthetic
Conservation education
Current scientific research
Non-consumptive recreation
Other
Sport fishing
Tourism
Transportation/navigation

20 Land tenure/ownership

Ownership category	On-Site	Off-Site
Non-governmental organisation	+	+
Local authority, municipality etc.	+	+
National/Crown estate	+	+
Private	+	+

21 Current land use

Activity	On-Site	Off-Site	Scale
Nature conservation	+	+	Large-Scale
Tourism	+	+	Large-Scale
Recreation	+	+	Large-Scale
Research	+		Small-Scale
Collection of non-timber natural products: (unspecified)	+	+	Small-Scale
Fishing: (unspecified)	+	+	Small-Scale
Fishing: commercial	+	+	Small-Scale
Fishing: recreational/sport	+		Small-Scale
Gathering of shellfish	+	+	Small-Scale
Shell collection	+	+	Small-Scale
Bait collection	+	+	Small-Scale
Arable agriculture (unspecified)		+	Large-Scale
Sewage treatment/disposal		+	Large-Scale
Harbour/port	+	+	Small-Scale

22 Adverse factors affecting the ecological character of the site

Activity	On-Site	Off-Site	Scale
General disturbance from human activities	+	+	Large-Scale

23 Conservation measures taken

Conservation measure	On-site	Off-site
SSSI	+	
Candidate SAC	+	
Land owned by a NGO for nature conservation	+	
Site management statement/plan implemented	+	

24 Conservation measures proposed but not yet implemented

see below

[redacted]

25 Current scientific research/survey/monitoring and facilities

Fauna:

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

26 Current conservation education
None

27 Current recreation and tourism
A diverse range of recreational activities takes place along the coast including walking, camping, sea angling, bird watching, water sports (water skiing, sailing, windsurfing and canoeing) and general use of amenity beaches. Bird watching is particularly popular at Druridge Bay where there is a Country Park and a number of Nature Reserves. As well as attracting a large number of day trippers, a sizeable population of summer visitors stay in caravan sites and other accommodation along the coast.

28 Functional jurisdiction
Department of the Environment, Transport and the Regions

29 Management authority
English Nature
Northumbria Team
Stocksfield Hall
Stocksfield
Northumberland
NE43 7TN

30 Bibliography

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Stroud, D.A., Mudge, G.P. and Pienkowski, M. W., *eds*. 1990. *Protecting Internationally Important Bird Sites.* Peterborough, Nature Conservancy Council.

Reference should also be made to Country Agencies Management Plans for sites that are within National Nature Reserves.

Annex 2 Special Protection Area (SPA) Citation

EC Directive 79/409 on the Conservation of Wild Birds
potential Special Protection Area (SPA)

Name: Northumbria Coast

Counties/Unitary Authorities: Northumberland County Council, Durham County Council, South Tyneside Metropolitan Borough Council, North Tyneside Council, and City of Sunderland.

Boundary of the SPA:

The boundary of Northumbria Coast SPA includes the coastline between Berwick-upon-Tweed in the north to the Tyne Estuary in the south. The boundary is defined by the Mean High Water Mark.

Size of SPA: The SPA covers an area of 1,107.98 ha.

Site description:

The Northumbria Coast SPA includes much of the coastline between the Tweed and Tees Estuaries in north-east England. The site consists of mainly discrete sections of rocky shore with associated boulder and cobble beaches. The SPA also includes parts of three artificial pier structures and a small section of sandy beach (Stroud *et al.* 2001).

The rocky shore areas with reefs, have small areas of sand interspersed amongst the main reefs. The man-made structures such as the piers at River Tyne South Pier and Seaham Harbour pier are used as high tide roosts. The tops of the piers and the sides are used by birds throughout the tidal cycle.

The inter-tidal rock platform is an important resource used by wintering purple sandpiper and turnstones although they are commonly found along the strandline of sandy beaches. The rocky shores and the strand line support high densities of invertebrates which are important food for waterfowl. Purple sandpiper are almost entirely restricted to the rocky shore where they feed on a variety of marine invertebrates but their main food preference is for mussels, winkles and dog whelks (Feare 1996). Turnstones feed on seaweed covered rocks congregating at high tide to roost on the mainland shore or continue to feed on the washed up seaweed on the strandline. Discrete areas of estuarine intertidal mudflats and sand flats are also included within the Northumbria Coast SPA.

Arctic and [redacted]nest at Newton Links/Long Nanny. The Long Nanny tern site is situated at the mouth of the Long Nanny burn, in Beadnell Bay and comprises of a long section of sandy beach ending in a small, low-lying sand spit at the mouth of the river, bordered by an accreting sand dune system to the west (Bridge *et al.* 2014). The beaches of fine sand, vegetated banks of sea rocket and dunes of marram and lyme grass provide good conditions for nesting. Terns forage in Beadnell Bay and the surrounding coastal waters, which support large numbers of lesser sandeel *Ammodytes lancea* (Bridge *et al.* 2014).

Qualifying species:

The site qualifies under **Article 4** of the Birds Directive (2009/147/EC) for the following reasons (summarised in Table 1):

- The site regularly supports more than 1% of the GB populations of two species listed in

Annex I of the EC Birds Directive. Therefore, the site qualifies for SPA Classification in accordance with the UK SPA selection guidelines (stage 1.1).

- The site regularly supports more than 1% of the biogeographical population of two regularly occurring migratory species not listed in Annex I of the EC Birds Directive. Therefore, the site qualifies for SPA designation in accordance with the UK SPA selection guidelines (stage 1.2).

Table 1 Summary of qualifying ornithological interest in Northumbria Coast SPA

Feature	Count (period)	% of subspecies or population	Interest type
Arctic tern *Sterna paradisaea*	1,549 pairs 3,098 individuals (2010-2014)[1]	2.92% of GB population[3]	Annex 1
[redacted]			
Turnstone *Arenaria interpres*	1,739 individuals (1992/93 - 1996/97)[2]	2.6% of biogeographic population[2]	Regularly occurring migrant
Purple sandpiper *Calidris maritima*	787 individuals (1992/93 - 1996/97)[2]	1.6% of biogeographic population[2]	Regularly occurring migrant

[1] Data from: Seabird Monitoring Programme (SMP) and colony managers (pairs multiplied by 2 to arrive at breeding adults).
[2] Data from: Northumbria Coast SPA citation (Available from: http://publications.naturalengland.org.uk/publication/6372874327687168?category=4698884316069888).
[3] GB breeding populations derived from Musgrove *et al*. (2013).

Principal bird data sources

Breeding Arctic tern: 2010-2014 colony counts from JNCC Seabird Monitoring Programme contributed by colony managers: National Trust, supplemented by most up to date counts in some instances from those colony managers.

All other qualifying features [redacted] wintering turnstone and purple sandpiper): data from 1992-1997 as presented in 2000 classification citation of Northumbria Coast SPA, available from: http://publications.naturalengland.org.uk/publication/6372874327687168?category=4698884316069888

European Site Conservation Objectives for Northumbria Coast Special Protection Area Site Code: UK9006131

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A148 *Calidris maritima*; Purple sandpiper (Non-breeding)

A169 *Arenaria interpres*; Ruddy turnstone (Non-breeding)

[redacted]

This is a European Marine Site

This SPA is a part of the Northumbria Coast European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

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

Citation for Special Area of Conservation (SAC)

Name:	Berwickshire and North Northumberland Coast
Unitary Authority/County:	Northumberland, Scottish Borders
SAC status:	English part designated on 1 April 2005 Scottish part designated on 17 March 2005
Grid reference:	NU206401
SAC EU code:	UK0017072
Area (ha):	65334.94
Component SSSI:	Bamburgh Coast and Hills SSSI, Burnmouth Coast SSSI, Castle Point to Cullernose Point SSSI, Howick to Seaton Point SSSI, Lindisfarne SSSI, Newton Links SSSI, Northumberland Shore SSSI, St Abb's Head to Fast Castle SSSI, The Farne Islands SSSI

Site description:

Whilst predominantly rocky, this extensive and diverse stretch of coastline has several characteristic, sediment-dominated embayments in north-east England, including Budle Bay, Beadnell Bay and Embleton Bay. Each of these areas is relatively exposed and uniform in nature and is characterised by crustacean /polychaete- and bivalve/polychaete-biotopes. In the subtidal zone, Beadnell and Embleton Bays form a sandy break in the otherwise continuous reef habitat in this site. These areas are characterised by extensive areas of clean sand with often dense populations of the heart urchin *Echinocardium cordatum*, and razor clams *Ensis siliqua* and *E. arcuatus*.

Stretches of the coast in England support a very extensive range of intertidal mudflats and sandflats, ranging from wave-exposed beaches to sheltered muddy flats with rich infaunal communities. Those in the Lindisfarne and Budle Bay area and on the adjacent open coast to the north are the most extensive in north-east England. They support the largest intertidal beds of narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei* on the east coast of England, a diverse infauna, and some large beds of mussels *Mytilus edulis*. Some of the bays along the open coast have mobile sediments, with populations of sand-eels *Ammodytes* sp., small crustaceans and polychaete worms. More sheltered sediments have very stable lower shore communities of burrowing heart urchins and bivalve molluscs.

Moderately wave-exposed reef habitats occur throughout the site. The subtidal rocky reefs and their rich marine communities, together with the wide variety of associated intertidal reefs, are the most diverse known on the North Sea coast. Their remarkably varied nature is due to the wide range of physical conditions in the area, from wave-exposed locations on the open coast, through more sheltered reefs within bays, to those exposed to strong tidal streams in sounds and off headlands. There is also a diverse range of rock types, including soft limestones and hard volcanic rock. The Farne Islands are of special importance as they are among the very few rocky islands with extensive reefs in the enclosed North Sea. A large number of the species present are characteristic of cold water and several reach their southern or eastern limit of distribution within the area.

Caves occur throughout the site in both the intertidal and the subtidal zones in a range of different hard rock exposures. There are examples of partially submerged caves in the cliffs

north of Berwick and in the limestone at Howick (south of Craster), and there are submerged sea caves, tunnels and arches in the volcanic rock of the Farne Islands and around St Abb's Head. Caves occur in association with reefs, in both the intertidal and the subtidal zones. Depending on the depth of the cave and its morphology, the site supports a range of distinct biological communities.

The section of the site in north-east England is representative of grey seal *Halichoerus grypus* breeding colonies in the south-east of its breeding range in the UK. It supports around 2.5% of annual UK pup production.

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

- Large shallow inlets and bays.
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)
- Reefs
- Submerged or partially submerged sea caves

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

- Grey seal *Halichoerus grypus*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0017072
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Berwickshire and North Northumberland Coast Special Area of Conservation Site Code: UK0017072

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying Conservation Advice document (where available), which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats
H1160. Large shallow inlets and bays; Shallow inlets and bays
H1170. Reefs
H8330. Submerged or partially submerged sea caves; Sea caves
S1364. *Halichoerus grypus*; Grey seal

This is a cross border site

This site crosses the border between England and Scotland. Some features may only occur in one Country. The advice of Scottish Natural Heritage should therefore be sought separately.

This is a European Marine Site

These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 4). This document updates and replaces an earlier version dated 22 February 2016 to reflect the consolidation of the Habitats Regulations in 2017.

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

Citation for Special Area of Conservation (SAC)

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

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

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

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

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. The sand dunes are features of the outer estuary on both the north and south banks particularly on Spurn peninsula and along the Lincolnshire coast south of Cleethorpes. Examples of both **Fixed dunes with herbaceous vegetation (`grey dunes`)** and **Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes)** occur on both banks of the estuary and along the coast. Native sea buckthorn **Dunes with *Hippophae rhamnoides*** also occurs on both sides of the estuary.

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

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

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

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

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

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

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030170
Date of registration:10 December 2009

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Humber Estuary Special Area of Conservation Site Code: UK0030170

With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons*

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H2110. Embryonic shifting dunes

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram

H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland*

H2160. Dunes with *Hippophae rhamnoides*; Dunes with sea-buckthorn

S1095. *Petromyzon marinus*; Sea lamprey

S1099. *Lampetra fluviatilis*; River lamprey

S1364. *Halichoerus grypus*; Grey seal

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Humber Estuary European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 31 March 2014 to reflect the consolidation of the Habitats Regulations in 2017.

Harbour Porpoise (*Phocoena phocoena)*
Special Area of Conservation:
Southern North Sea

Conservation Objectives and Advice on Operations

March 2019

Advice under Regulation 21 of The Conservation of Offshore Marine Habitats and Species Regulation 2017 and Regulation 37(3) of the Conservation of Habitats and Species Regulations 2017

Further information

This document is available as a pdf file on the JNCC website for download if required (www.jncc.defra.gov.uk).

Contact details:

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Marine Species Team
Joint Nature Conservation Committee
Inverdee House
Aberdeen
AB11 9QA

Email: OffshoreMPAs@jncc.gov.uk
Tel: [redacted]

NE

Natural England enquiries

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Email: enquiries@naturalengland.org.uk

Summary of Conservation Objectives and Advice on Operations

The Conservation Objectives and Advice on Operations are set out for the Southern North Sea Special Area of Conservation (SAC) for harbour porpoise (*Phocoena phocoena*). The site covers both inshore (within 12 nautical miles of coast) and offshore (beyond 12 nautical miles of coast) waters where Natural England (NE) and the Joint Nature Conservation Committee (JNCC) have respective advisory responsibilities as the Statutory Nature Conservation Bodies (SNCB).

The general objective of achieving or maintaining Favourable Conservation Status (FCS) for all species and habitat types listed in Annexes I and II of the Habitats Directive needs to be translated into Conservation Objectives for SACs. These objectives describe the condition to be achieved by a site for it to contribute in the best possible way to achieving FCS at the national, bio-geographical and European level[1]. The Advice on Operations is site-specific but based on a broad assessment of the sensitivity of the harbour porpoise to anthropogenic pressures at a UK scale.

The advice in this document has been developed using the best available scientific information and expert interpretation as of February 2019. The advice provided here may be subject to change as our knowledge about the site and the impacts of human activities improves.

To ensure the site contributes in the best possible way to achieving FCS, management of human activities occurring in or around the site is required if these activities are likely to have an adverse impact (directly or indirectly) on the integrity of the site, with regards to its Conservation Objectives. It should be noted that as European Protected Species under Annex IV of the Habitats Directive, harbour porpoises are already strictly protected throughout their European range. As such, several conservation measures are already in place in the UK.

To achieve the Conservation Objectives for the Southern North Sea SAC, the Relevant[2] and Competent[3] Authorities should consider human activities within their remit which might affect the integrity of the site.

[1] http://jncc.defra.gov.uk/PDF/comm02D07.pdf

[2] Relevant Authorities are those who are already involved in some form of relevant marine regulatory function and would therefore be directly involved in the management of a marine site lying within territorial waters. The bodies which may be relevant authorities are listed in Regulation 6 of the Conservation of Habitats and Species Regulations 2017. All Relevant Authorities are also Competent Authorities.

[3] Competent Authorities are defined in Regulation 5 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 and Regulation 7 of the Conservation of Habitats and Species Regulations 2017. In summary, a Competent Authority is any person or organisation that has the legally delegated or invested authority (e.g. Minister, government department, public body of any kind or statutory undertaker) to perform a designated function.

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1 Introduction

1.1 Background

Initial advice on a network of sites identified within UK waters for harbour porpoise (*Phocoena phocoena*) was submitted to UK and Devolved Governments as a series of draft SACs in June 2015. The sites were identified within the UK portions of Management Units (MUs[4]) defined for the species (ICES, 2014; IAMMWG, 2015). The Welsh and Northern Irish Governments, along with Defra on behalf of England and relevant offshore waters, gave approval for sites within their areas of jurisdiction to proceed to consultation (January to May 2016). In light of the responses to the consultation, five sites were submitted to the European Commission as candidate SACs in January 2017. These five sites were adopted by the EC as Sites of Community Importance on 12 December 2017 and designated as SACs by Ministers on 26th February 2019. These sites are shown in Figure 1.

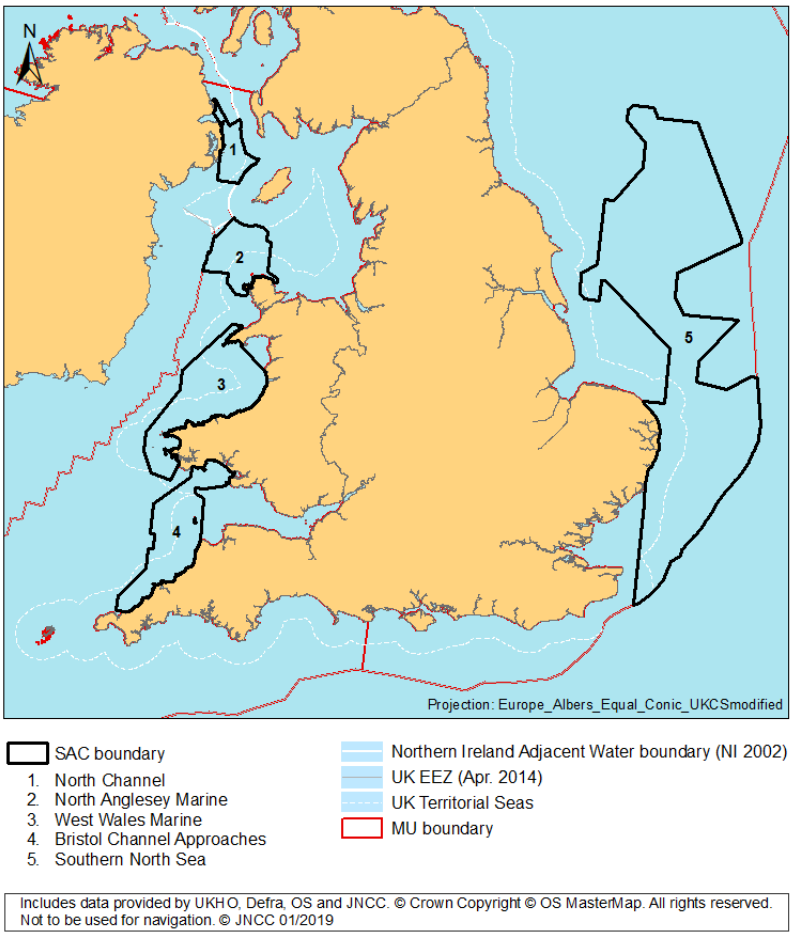


Figure 1: Special Areas of Conservation for the harbour porpoise, *Phocoena phocoena* identified in Northern Ireland, England, Wales and offshore waters. The Management Unit (MU) boundary (red line) refers to the UK portion of the North Sea and Celtic and Irish Seas MUs.

[4] For conservation and management purposes it is practical to divide the population into smaller units, termed Management Units (MUs). These MUs were developed to take account of biological populations of animals but were also be determined by political boundaries and are at an appropriate scale at which to assess human activities. In the UK, three MUs have been defined for harbour porpoise: West of Scotland, Celtic and Irish Seas, and North Sea (IAMMWG, 2015)

This advice document is for the Southern North Sea SAC (Figure 2) which is subject to protection under the Conservation of Habitats and Species Regulations 2017[5] and the Conservation of Offshore Marine Habitats and Species Regulation 2017[6] (collectively referred to as the Habitats Regulations). The advice is given in fulfilment of the duty of the Statutory Nature Conservation Bodies (SNCBs) under the Habitats Regulations to advise Relevant and Competent Authorities as to (a) the Conservation Objectives for the site; and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated. The SNCBs aim to ensure that the Conservation Objectives are up-to-date, accessible and enable the assessment of the potential effects of plans and projects.

2 Responsibilities of Relevant and Competent Authorities

Competent Authorities (including those which are also Relevant Authorities) are required to exercise their functions to comply with the Habitats Regulations. Competent Authorities must, within their areas of jurisdiction, consider both direct and indirect effects on the site. This includes considering operations inside and outside the boundary of the SAC, if the impacts could affect the achievement of the site's Conservation Objectives. Decisions on management measures (e.g. the scale and type of mitigation) are the responsibility of the relevant regulatory or management bodies. These bodies will consider SNCB advice and hold discussions with the sector concerned, where appropriate. Where consent is required and the operation (if considered a plan or project) is likely to significantly affect a European Site, Article 6(3) of the Habitats Directive requires that an Appropriate Assessment (AA) is carried out. The AA is part of the "Habitat Regulations Assessment" (HRA), which is a case-specific assessment made in view of the Conservation Objectives for the affected site or sites. Each HRA requires case-specific advice from the SNCB but the assessment is the responsibility of the competent authority concerned.

The variability of harbour porpoise distribution and abundance within sites is in part due to their mobility and wide-ranging nature as well as natural and anthropogenic changes in habitat and prey. Relevant and Competent Authorities are not required to undertake any actions to ameliorate changes in the condition of the site if it is shown that the changes result wholly from natural causes. It is therefore important to contextualise any apparent deterioration of harbour porpoise presence in the site in terms of natural variability and the abundance and distribution patterns at the population level (i.e. MU).

3 Conservation Objectives for harbour porpoise SACs

3.1 The role of Conservation Objectives

Site level Conservation Objectives are a set of specified objectives that must be met to ensure that the site contributes in the best possible way to achieving Favourable Conservation Status (FCS) of the designated site feature(s) at the national and biogeographic level (EC, 2012). Conservation Objectives constitute a necessary reference for:

- identifying any site-based conservation measures that may be required;
- carrying out HRAs of the implications of plans or projects.

The purpose of the HRA is to determine whether a plan or project adversely affects a site's integrity. The critical consideration in relation to site integrity is not the extent or degree of an

[5] http://www.legislation.gov.uk/uksi/2017/1012/contents/made
[6] http://www.legislation.gov.uk/uksi/2017/1013/contents/made

impact, or whether an impact is direct or indirect, but whether a plan or project, either individually or in combination with other plans or projects, affects the site's ability to achieve its Conservation Objectives and therefore contribute to Favourable Conservation Status.

Harbour porpoise are protected everywhere in European waters under the provisions of the Habitats Regulations. The harbour porpoise in UK waters are considered part of a wider European population and the highly mobile nature of this species means that the concept of a 'site population' is not considered an appropriate basis for expressing Conservation Objectives for this species. Site based conservation measures will complement wider ranging measures that are in place for the harbour porpoise.

3.2 Background to Conservation Objectives

The Conservation Objectives are designed to help ensure that the obligations of the Habitats Directive can be met. Article 6(2) of the Directive requires that there should be no deterioration or significant disturbance of the qualifying species or to the habitats upon which they rely. Therefore, the focus of the Conservation Objectives for harbour porpoise sites is on addressing pressures that affect site integrity and would include:

- killing or injuring harbour porpoise (directly or indirectly);
- preventing their use of significant parts of the site (disturbance / displacement);
- significantly damaging relevant habitats; or
- significantly reducing the availability of prey.

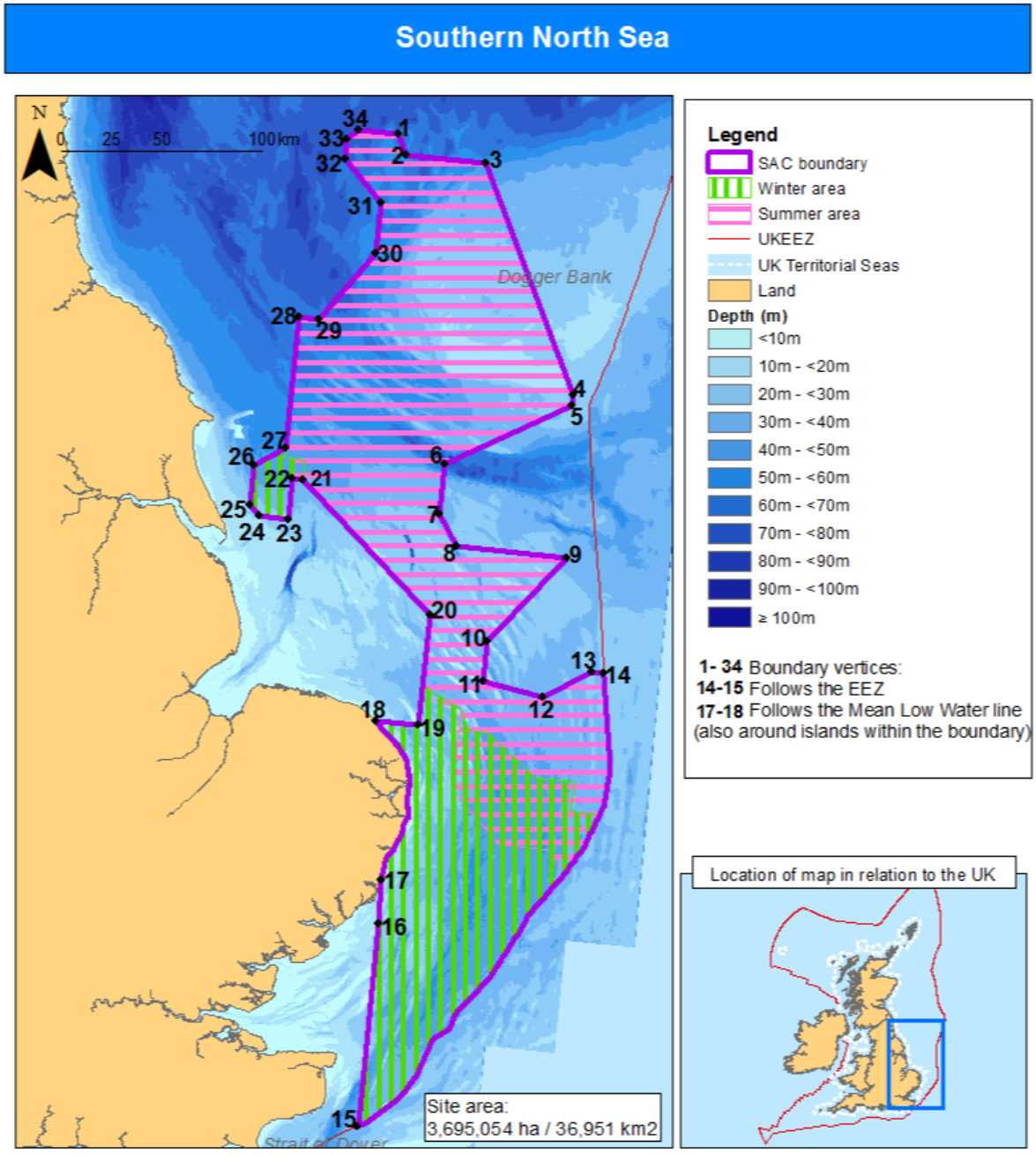
This document includes both a statement of the Conservation Objectives and explanatory text on their intent and interpretation specific to the site. The Conservation Objectives have been set taking account of European Commission guidance (EC, 2012). Further guidance on the management of specific pressures of harbour porpoise is being developed.

3.3 The Southern North Sea SAC Conservation Objectives

The qualifying feature of the site is the Habitats Directive Annex II species:

- harbour porpoise (*Phocoena phocoena*)

Seasonal differences in the relative use of the site have been identified based on the analyses of Heinänen and Skov (2015). Harbour porpoise sightings data were modelled seasonally (Summer: April-September and Winter: October-March) for each MU. The outputs of this analysis were maps of areas by season and MU, that persistently contained elevated densities of harbour porpoises. These areas were used as the basis for site identification and as a consequence, sites may have seasonal components which should be considered in the assessment of impacts and proposed management. The Southern North Sea has been designated because of its importance to harbour porpoise in both the summer and winter months (Figure 2).



ID	Latitude	Longitude	ID	Latitude	Longitude	ID	Latitude	Longitude	ID	Latitude	Longitude
1	55° 28' 53.1'' N	01° 02' 24.8'' E	10	53° 17' 32.9'' N	02° 11' 31.6'' E	19	52° 53' 06.4'' N	01° 45' 21.9'' E	28	54° 37' 0.5'' N	00° 27' 44.8'' E
2	55° 23' 34.2'' N	01° 07' 24.8'' E	11	53° 06' 45.7'' N	02° 11' 43.8'' E	20	53° 22' 42.4'' N	01° 44' 22.2'' E	29	54° 37' 11.8'' N	00° 37' 01.8'' E
3	55° 24' 03.2'' N	01° 45' 17.6'' E	12	53° 04' 11.8'' N	02° 38' 38.6'' E	21	53° 54' 05.6'' N	00° 39' 29.7'' E	30	54° 56' 28.6'' N	00° 59' 18.7'' E
4	54° 25' 05.4'' N	02° 37' 56.9'' E	13	53° 12' 19.1'' N	02° 59' 22.3'' E	22	53° 54' 0.3'' N	00° 35' 04.2'' E	31	55° 09' 56.9'' N	00° 58' 38.1'' E
5	54° 22' 23.6'' N	02° 37' 58.3'' E	14	53° 12' 19.0'' N	03° 04' 57.1'' E	23	53° 43' 17.2'' N	00° 35' 41.1'' E	32	55° 20' 23.2'' N	00° 39' 10.7'' E
6	54° 03' 07.5'' N	01° 43' 06.7'' E	15	51° 04' 38.9'' N	01° 39' 44.1'' E	24	53° 42' 60.0'' N	00° 22' 03.6'' E	33	55° 25' 46.4'' N	00° 38' 51.5'' E
7	53° 49' 40.4'' N	01° 43' 32.5'' E	16	51° 59' 04.9'' N	01° 38' 08.0'' E	25	53° 45' 35.5'' N	00° 17' 20.7'' E	34	55° 28' 33.4'' N	00° 43' 26.4'' E
8	53° 41' 38.9'' N	01° 52' 54.2'' E	17	52° 10' 54.3'' N	01° 37' 11.0'' E	26	53° 56' 22.0'' N	00° 16' 38.8'' E			
9	53° 41' 57.7'' N	02° 42' 50.7'' E	18	52° 52' 51.4'' N	01° 26' 06.8'' E	27	54° 02' 03.1'' N	00° 30' 01.3'' E			

Figure 2: The Southern North Sea Special Area of Conservation for harbour porpoise. Summer and winter areas shown.

The Conservation Objectives for the site are:

To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters

In the context of natural change, this will be achieved by ensuring that:

1. Harbour porpoise is a viable component of the site;

2. There is no significant disturbance of the species; and

3. The condition of supporting habitats and processes, and the availability of prey is maintained.

Conservation Objective 1: Harbour porpoise is a viable component of the site

This SAC has been selected primarily based on the long-term, relatively higher densities of porpoise in contrast to other areas of the MU. The implication is that the SAC provides relatively good foraging habitat and may also be used for breeding and calving. However, because the number of harbour porpoise using the site naturally varies (e.g. between seasons), there is no exact value for the number of animals expected within the site.

The intent of this objective is to minimise the risk of injury and killing or other factors that could restrict the survivability and reproductive potential of harbour porpoise using the site. Specifically, this objective is primarily concerned with operations that would result in unacceptable levels of those impacts on harbour porpoises using the site. Unacceptable levels can be defined as those having an impact on the FCS of the populations of the species in their natural range. The reference population for assessments against this objective is the MU population in which the SAC is situated (IAMMWG 2015).

Harbour porpoise is a European Protected Species (EPS) listed on Annex IV of the Habitats Directive and as such is protected under the Habitats Directive Article 12 and transposing regulations from deliberate killing (or injury), capture and disturbance throughout its range. In addition, Article 12 (4) of the Habitats Directive is concerned with incidental capture and killing. It states that Member States 'shall establish a system to monitor the incidental capture and killing of the species listed on Annex IV (all cetaceans). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned'. Site based measures should therefore be aligned with the existing strict protection measures in place throughout UK waters. Significant disturbance within or affecting the site is considered in the second conservation objective.

Conservation Objective 2: There is no significant disturbance of the species

Disturbance of harbour porpoise typically, but not exclusively, originates from operations that cause underwater noise including, as examples, seismic surveys, pile driving and sonar. Responses to noise can be physiological and/or behavioural. JNCC has produced guidelines to minimise the risk of physical injury to cetaceans from various sources of loud, underwater noise[7]. However, disturbance is primarily a behavioural response to noise and may, for example, lead to harbour porpoises being displaced from the affected area.

This SAC was identified as having persistently higher densities of harbour porpoises (Heinänen and Skov 2015) compared to other areas of the MU. This is likely linked to the habitats within the site providing good feeding opportunities. Therefore, operations within or affecting the site should be managed to ensure that the animals' potential usage of the site is

[7] http://jncc.defra.gov.uk/page-4273

maintained. Disturbance is considered significant if it leads to the exclusion of harbour porpoise from a significant portion of the site. Specifically, draft SNCB advice / guidance for assessing the significance of noise disturbance to a site suggests:

Noise disturbance within an SAC from a plan/project individually or in combination is significant if it excludes harbour porpoises from more than:

1. 20% of the relevant area[8] of the site in any given day[9], and

2. an average of 10% of the relevant area of the site over a season[10,11].

Conservation Objective 3: The condition of supporting habitats and processes, and the availability of prey is maintained

Supporting habitats, in this context, means the characteristics of the seabed and water column. Processes encompass the movements and physical properties of the habitat. The maintenance of supporting habitats and processes contributes to ensuring that prey is maintained within the site and is available to harbour porpoises using the site. Some evidence shows that the harbour porpoise has a high metabolic rate compared to terrestrial mammals of similar size (Rojano-Doñate et al. 2018) and high feeding rates (Wisniewska et al., 2016). The harbour porpoise is therefore thought to be a species that is highly dependent on year-round proximity to food sources and its distribution and condition may strongly reflect the availability and energy density of its prey (Brodie 1995 in Santos & Pierce, 2003). The densities of porpoise using a site are likely linked to the availability (and density) of prey within the site. Harbour porpoise eat a variety of prey including gobies, sandeel, whiting, herring and sprat. However, the diet of porpoises when within the sites is not well known but is likely comparable to that in the wider seas.

There are several operations (Table 2) which potentially affect the achievement of this Conservation Objective. Whilst some plans/projects are unlikely to have a significant effect alone, an effect might become significant when considered in combination with other plans/projects and against the background of existing activities/pressures on the site. Further work is needed to assess historic, existing and planned levels of plans/projects in the sites and to better understand their impacts on the habitats and prey within the sites.

4 Advice on Operations

4.1 Purpose of advice

This section details the advice on activities specifically occurring within or close to the Southern North Sea SAC that would be expected to impact the site; this is known as Advice on Operations. Initial assessments were conducted at a UK scale, with subsequent site-level assessment detailing our understanding of the operations and their potential to impact the site (Section 5 & 6). Advice is only given where pressures[12] may impact the site and

[8] The relevant area is defined as that part of the SAC that was designated on the basis of higher persistent densities for that season (summer defined as April to September inclusive, winter as October to March inclusive).

[9] Applicable only in Habitats Regulations Assessments (HRA) due to impracticality of daily noise limit management of activities, but retrospective compliance analysis advised

[10] Summer defined as April to September inclusive, winter as October to March inclusive

[11] For example, a daily footprint of 19% for 95 days would result in an average of 19x95/183 days (summer) =9.86%

[12] See Annex B for definition of key terms

therefore, may require management, if the Conservation Objectives are to be met. Widespread pressures may also act to affect the overall status of harbour porpoise, but their effects are not restricted to specific sites. Such pressures are best dealt with through broader measures. Alongside and in addition to the identification of the network of harbour porpoise sites, an overarching conservation strategy (DETR, 2000) has been in place for harbour porpoise since 2000. In light of a recent conservation literature review (IAMMWG *et al* 2015), a UK Dolphin and Porpoise Conservation Strategy is being developed.

The advice outlined below should also be used to help identify the extent to which existing operations are, or can be made, consistent with the Conservation Objectives, and thereby focus the attention of Relevant and Competent Authorities and monitoring programmes to areas that may need management measures.

This Advice on Operations will be supplemented through further discussions with the Relevant and Competent Authorities and any advisory groups that may be formed for the site.

4.2 Background

In compiling this Advice on Operations, the SNCBs have considered the pressures that may be caused by human activities and may affect the integrity of the site when considered against the Conservation Objectives. The advice is generated through a broad grading of sensitivity and exposure of the harbour porpoise to pressures associated with activities to gain an understanding of how vulnerable the species is to each activity at a UK level. The activities and their associated pressures to which the harbour porpoise is deemed vulnerable at a UK level are then considered at a site level to inform the risks to achieving the Conservation Objectives along with any potential management that may be required to mitigate against such risks. Annex A details the assessments of the level of impact risk[13] from operations on harbour porpoise populations at a UK-wide scale. This informs on the activities likely to impact the site.

This document is guidance only and activities and their management within or affecting the site will be considered in the context of HRA and where applicable through other environmental assessment processes, such as Environmental Impact Assessment (EIA).

5 Operation assessments at UK scale

The assessments have been carried out using all available evidence as of February 2019. If further information is made available in future which would improve our understanding of harbour porpoise vulnerability in UK waters, the assessments may be updated. This advice is provided without prejudice for use by the Relevant and Competent Authorities. The level of any impact will depend on the location, timing and intensity of the relevant operation. This advice is provided to assist and focus the Relevant and Competent Authorities in their consideration of the management of these operations.

The harbour porpoise is a wide-ranging species and occurs throughout the UK Continental Shelf area (JNCC, 2013). It does occur in deeper waters but in very low densities, and perhaps only seasonally. As a predominantly continental shelf species, it is exposed to a wide range of pressures that are both ubiquitous (e.g. pollution) and patchy (e.g. bycatch) in nature, and the list of anthropogenic activities leading to these pressures is long. Based on current available information, the operations that pose the most notable risk of impact to UK harbour porpoise are shown in Table 1.

[13] Risk includes consideration of severity of implications of impact

The current levels of impact of the various pressures are based on the Article 17 assessments[14] and the full list of assessed activities and key references can be found in Annex A. Updates to the assessments will occur as more evidence becomes available.

Definitions of pressures are explained in Annex B.

Activities which currently pose a low risk to harbour porpoise at the UK level (Annex A) have not been considered in this advice. The exposure to the pressures associated with these activities is currently very limited. Non-anthropogenic impacts are also not considered, such as attack and predation from other marine mammal species that have the potential to impact harbour porpoise populations.

Table 1: Key activities (operations) and the relative risk of impacts on harbour porpoise throughout UK waters. Those pressures ranked 'high' are known to have the greatest impact relative to other pressures on the population of UK harbour porpoises. Activities which currently pose a low risk are not shown.

Operations	**Pressures**	**Impacts**	**Current relative level of risk of impact**
Commercial fisheries with bycatch of harbour porpoise (predominantly static nets)	**Removal of non-target species**	• Mortality through entanglement/bycatch	High
Discharge/run-off from land-fill, terrestrial and offshore industries	**Contaminants**	• Effects on water and prey quality • Bioaccumulation through contaminated prey ingestion Leading to health issues (e.g. on reproduction)	High
Shipping, drilling, dredging and disposal, aggregate extraction, pile driving, acoustic surveys, underwater explosion, military activity, acoustic deterrent devices and recreational boating activity	**Anthropogenic underwater sound**	• Mortality • Internal injury • Disturbance leading to physical and acoustic behavioural changes (potentially impacting foraging, navigation, breeding, socialising) • Habitat changes/loss	Medium
Shipping, recreational boating, tidal energy installations	**Death or injury by collision**	• Mortality • Injury	Medium/Low
Commercial fisheries (reduction in prey resources)	**Removal of target species**	• Reduction in food availability • Increased competition from other species • Displacement from natural range	Medium

[14] EU Habitats Directive Article 17 assessment, harbour porpoise report: http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1351_UK.pdf . Updated Article 17 reports for 2013-2018 will be available in 2019.

6 Site specific considerations: Southern North Sea SAC

6.1 Sensitivity of harbour porpoise to existing activities within or impacting the site

The Southern North Sea site spans territorial and offshore waters and covers a large geographical area of 36,951km^2. A summary of the site can be found in the Selection Assessment Document on the Site Information Centre[15].

All available information on activities within the site has been used to assess the threats and pressures within the site. However, precise information on some activities within the boundary is not currently available due to lack of targeted data collection to date. Assessing exposure carries certain assumptions about the spatial extent, frequency and intensity of the pressures associated with marine activities.

Table 2 is an overview of activities (operations) occurring within or in proximity to the Southern North Sea site to which the harbour porpoise has a current relative level of risk of impact as High or Medium at a UK level (Table 1) and therefore may require further consideration concerning options for management. The impact of a pressure at the site level can differ to that at UK level dependent on the amount of activity within or adjacent to the site. GIS layers of spatial activity data as well as review of literature, were used to identify the impact risk within the site (where a pressure is concentrated within a site) and whether it differs from the UK level risk. These assessments include all available information as of February 2019.

In 2012, the UK Government adopted a revised approach to the management of fishing activities within European marine sites (EMS) in England[16]. The revised approach is designed to ensure consistency in the management of fishing activities with Article 6 of the Habitats Directive. Risk based prioritisation of managing the fishing activities of UK and non-UK vessels has been applied to relevant SAC features within the UK 12 nautical mile (nm) territorial limit. For SACs outside of 12 nm, management measures will be introduced by appropriate regulators to ensure adequate protection.

JNCC and the country SNCBs are working with the Regulators and Industry to ensure that a pragmatic approach to mitigation and management of pressures that may affect the integrity of the site is adopted. Any future guidance documents will be made available on the Site Information Centre on the JNCC website.

[15] SAC Selection Assessment Document: http://jncc.defra.gov.uk/page-7243

[16] https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery

Table 2: Operations occurring within/near to the Southern North Sea site which may affect the integrity of the site.

Operations	Pressure	Comment on current level of activity	Management considerations
Commercial fisheries (with harbour porpoise bycatch)	Removal of non-target (bycatch) species	Bycatch of harbour porpoise in fishing gear is one of the most significant anthropogenic pressures impacting the population at a UK level. The commercial fisheries most associated with harbour porpoise bycatch are bottom set nets, such as gillnets and tangle nets. The Fishery Activity Database (Marine Management Organisation) shows that fishing effort is higher along the coast. There are pockets of higher bycatch rates in areas close to the site boundary, particularly in areas off the coast from Flamborough Head, although the use of static and drift nets is higher in the southern regions of the site. VMS data from large vessels suggest there is higher static net effort from EU registered vessels compared to UK vessels in the offshore region of the SAC. Effort in the south east appears to have increased between 2009 and 2013.	Where bycatch may pose a risk to achieving the site's conservation objectives, mitigation may be required. Where management measures are required, the development of these would be led by fishery managers in discussion with fishing interests and informed by any detailed information about fishing activity that can be made available. Detailed measures, if required, will be developed by the relevant management authority (European Commission/MMO/IFCA/Defra) The use of pingers as a mitigation measure is required on static nets deployed by vessels >12 m in length in specified areas through EU Regulation 812/2004[17]. This part of the UK fleet currently utilises the DDD pinger, which has been agreed under derogation. Additional noise disturbance may need to be considered if acoustic deterrent devices are considered to be used as mitigation. A fisheries guidance document will be developed in collaboration with management authorities and stakeholders. The majority of bycatch is taken by the numerous small bottom set gillnetting vessels (<12m), for which the use of pingers is not mandatory under Regulation 812/2004. One option for management could be to extend the pinger requirement to include any vessels. Further work is needed to understand the scale of disturbance that could result from the wide-spread deployment of pingers on all vessels operating within the site. If necessary, consideration of alternatives to pinger use could be explored and might include gear modification or alternative gear types.

[17] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:150:0012:0031:EN:PDF

Discharge/run-off from land-fill, terrestrial/ offshore industries	Contaminants	Current exposure within/near the site is unknown.	This pressure cannot be managed effectively at the site level. Most of the relevant pollutants have been effectively phased out of use by action under the OSPAR Convention and the Stockholm convention, which restrict the marketing and use of PCBs; plan for disposal of PCBs; and eliminate or restrict the production and use of persistent organic pollutants [POPs]). However, human activities are the most likely cause of the re-release of these chemically stable chemicals into the environment or for introduction of other contaminants of which the impacts are poorly known. Any novel sources of potential contamination and/or activities likely to cause re-release of pollutants form stores associated with a new plan or project will be assessed under HRA both within and outside the site where there is the potential to impact upon site integrity. Current sources of exposure have to be identified and further efforts to limit or eliminate PCB discharges to the marine environment may still be needed.
Shipping	Anthropogenic underwater sound	Several ports along the east coast of England result in large vessel shipping routes throughout the site. There is higher pressure along the southern boundary of the site, although development is ongoing in the Humber to increase port capacity. An estimated increase in local vessel traffic associated with wind farms is expected at 25% during construction and 20% during operation.	Harbour porpoise use sound for foraging, navigation, communication and predator detection. Underwater noise therefore has the potential to interrupt or affect these behaviours as well as cause hearing damage, particularly at short distances. The peak frequency of echolocation pulses produced by harbour porpoise is 120–130 kHz, corresponding to their peak hearing sensitivity although hearing occurs throughout the range of ~1 and 180 kHz (Southall *et al* 2007). The underwater sounds created by large ships are unlikely to cause physical trauma but could make preferred habitats less attractive as a result of disturbance (habitat displacement, area avoidance). However, additional management is unlikely to be required based on current levels within the site. Significant increases in vessel traffic, for example as may be associated with the installation of wind farms in

			the area, would need further assessment.
Oil and gas drilling		Areas licensed for oil and gas extraction are present in the northern and central parts of the site.	Existing and inactive (exploratory and dry) wells and oil and gas licensed blocks occur within the network of harbour porpoise sites and any future applications would be subject to an HRA.
Pile driving		Current and licensed areas for offshore wind, including construction and maintenance phases are located within the site.	A European Protected Species (EPS) licence is required for any construction activity which could affect cetaceans and carries the risk of resulting in a disturbance or injury offence. Developers are required to follow the 'Statutory Nature Conservation Agency protocol for minimising the risk of injury to marine mammals from piling noise'[18]. An HRA will be considered for all new (or review of consent) developments (coastal and marine) using pile driving within the site **or** within 26km of site boundaries. If additional mitigation (to that required under EPS licence) is required, planning and management of pile driving activities may be needed. There is potential for a reduction or limitation of the disturbance / displacement effects by varying the schedule of piling, particularly if several developments are constructing at the same time and pile driving footprints do not overlap (which would maximise area from which porpoise are excluded). Limited spatio-temporal restrictions may be needed. Other examples of mitigation that might be required include the use of sound dampers, i.e. methods that create a barrier to sound transfer (e.g. bubble curtains) and the use of alternative foundation types (e.g. gravity foundations, suction cups, floating turbines, drilling).
Dredging and disposal		A number of capital and maintenance dredging and disposal sites are present within the site boundary.	Dredging and disposal can cause disturbance leading to changes in harbour porpoise behaviour as well as to their habitat and prey. There is also potential for resuspension of pollutants from the sediment. The risk from single plans/projects may be considered relatively low but is assessed through HRA. However,

[18] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50006/jncc-pprotocol.pdf

			there is currently considerable uncertainty regarding effects on habitat and prey. New dredging projects (or licence renewals) are subject to HRA. Cumulative impacts will be considered within the HRA.
Aggregate extraction		Extensive existing licensed and active areas within the site.	Aggregate extraction can cause disturbance leading to changes to harbour porpoise behaviour as well as to their habitat and prey. However, the risk is considered relatively low and additional management is unlikely to be required. New aggregate extraction projects (or licence renewals) are subject to HRA. Cumulative impacts will be considered within the HRA.
Geophysical surveys (including seismic) surveys		Geophysical surveys occur in the site.	Some geophysical surveys that may affect the integrity of the site may require consent and be subject to HRA. Each case needs to be assessed individually, and the *JNCC Guidelines for minimising the risk of injury to marine mammals from geophysical surveys* (updated August 2017[19]) are available online. Within the guidance, seismic survey is defined as *'Any geophysical survey that uses airguns to generate sound which is sent into the seabed and the reflected energy is recorded and processed to produce images of the geological strata below; described as 2D, 3D and 4D and includes any similar techniques that use airguns.'* It is currently not known whether sub-bottom profilers cause disturbance to harbour porpoise. Further research is needed to understand the sound propagation and effect ranges from these types of equipment. Cumulative impacts of geophysical surveys will need to be considered. Further advice on assessment and management of noisy activities within the sites is being developed by the SNCBs in consultation with Regulators, industry and NGOs.

[19] http://jncc.defra.gov.uk/pdf/jncc_guidelines_seismicsurvey_apr2017.pdf.

Acoustic deterrent/mitigation devices		Unknown, no consistent areas of usage but can be used as a mitigation tool during pile driving and unexploded ordnance (UXO) detonations.	See pile driving and UXOs.
Pinger devices		23 UK registered >12 m gillnet boats of which four are required to use pingers in the area of the site to meet the requirements of Reg812/2004. Use on vessels under 12 m within the site is unknown but likely low.	See 'Fisheries (commercial and recreational) with harbour porpoise bycatch'. The use of pingers is required for >12m gillnet sector and there are 4 vessels fishing within the site that are required to use pingers. Because the majority of the total bycatch occurs in bottom set nets deployed from vessels <12m, which are the greatest component of the UK gillnet fleet, one option for management could be to extend the pinger requirement to further vessels deploying static nets within site boundaries. However, the impact of potential disturbance as a result of such an approach may need to be assessed and the potential for other mitigation options such as alternative gear types, gear modifications or spatial gear restriction may need to be considered.
Military activity		Although few active MOD areas are located within the site, the MOD can operate anywhere in UK waters.	Activities take place under Range Standing Orders, command guidance and environmental risk management tools, which include measures to reduce the risk of killing, injury and disturbance of marine mammals (for example live firing trials are subject to confirmation that marine mammals are not present in the vicinity of targets). MOD, a Competent Authority, incorporates the SACs into their environmental assessments via their MOD Environmental Protection Guidelines (Maritime) and Marine Environment and Sustainability Assessment Tool (MESAT)[20].
Unexploded ordnance (UXOs)		Unexploded ordnance from WWII can be found throughout the North Sea, including within the site. Projects that could inadvertently explode	Although the removal of UXOs is short term, the noise is significant and can cause injury or death to harbour porpoise. An EPS licence and/or HRA may be required. Mitigation is usually required to reduce risk of injury and killing. As a minimum, the JNCC

[20] http://www.royalnavy.mod.uk/-/media/royal-navy-responsive/documents/useful-resources/environmental-protection/environmental-protection-guidelines-maritime-v21.pdf?la=en-gb

		UXOs must undertake a survey to search for possible ordnance ahead of the project commencing. Most ordnance found is exploded on site or removed for health and safety reasons.	guidelines for minimising the risk of disturbance and injury to marine mammals whilst using explosives are applied. A combination of Marine Mammal Observers (MMO)s, Acoustic Deterrent Devices (ADD) and occasionally scare charges are used to ensure harbour porpoise and other marine mammals are a sufficient distance from the explosion to prevent death or injury. Discussions are ongoing between industry, regulators and SNCBs on the most appropriate suite of mitigation measures for UXO clearance (including the possible use of bubble curtains). This will depend on the size of UXOs likely to be encountered and the practicality of deployment of the mitigation measure, amongst other factors. Discussions are ongoing between industry, regulators and SNCBs on the most appropriate suite of mitigation measures for UXO clearance (including the possible use of bubble curtains). This will depend on the size of UXOs likely to be encountered and the practicality of deployment of the mitigation measure, amongst other factors.
Shipping	Death or injury by collision	Several ports along the east coast of England resulting in busy shipping routes throughout the site, with the highest level of activity in the south.	Post mortem investigations of stranded harbour porpoise (Deaville & Jepson, 2011; Deaville 2011:2017) have revealed some deaths caused by trauma (potentially linked with vessel strikes). However, this is not currently considered a significant risk and no additional management is likely to be required.
Recreational boating activity		Royal Yachting Association (RYA) cruising routes are present across the extent of the site, although focussed along the coast	See 'Shipping' (with death or injury by collision). Adherence to wildlife codes of conduct is already advocated, e.g: WiSe scheme; SeaWatch code of conduct; ZSL code of conduct; The RYA good practice guide - The Green Wildlife Guide for Boaters UK SNCBs are looking at the option of developing an overarching wildlife watching code of conduct to site alongside the Scottish code.
Commercial fisheries	Removal of target (prey) species	Fisheries targeting prey species such as whiting, herring, sandeel and sprat throughout their	Currently, most commercial species are managed at scales relevant for stock management and not at the site level.

		ranges in the North Sea, fished by UK and EU fisheries.	Harbour porpoise diet within UK waters includes a wide variety of fish and they will generally focus on the most abundant local species (De Pierrepont *et al* 2005; Camphuysen *et al* 2006). The predominant prey type appears to be whiting, gobies and sandeel, although shoaling fish such as mackerel and herring are also taken. Harbour porpoise diets overlap extensively with diets of other piscivorous marine predators (notably seals) and many of the main prey species are also taken by commercial fisheries, although porpoises tend to take smaller fish than those targeted by fisheries (Santos and Pierce 2003). The overlap between commercial fisheries and harbour porpoise prey is unknown within the site. Further research is required to establish whether there is any direct overlap.

6.2 Limitations of the evidence

It is important to note that the information used to catalogue activities occurring within the site is not complete. The available data are drawn from existing monitoring programmes (e.g. the UK's Bycatch Monitoring Scheme for Protected Species and other European datasets linked to VMS monitoring of fishing vessels) but these have limitations, including availability and accessibility of data at the time of preparing this advice. Caveats with how the data have been collected also need to be understood to correctly interpret the information. This has resulted in the use of expert judgement where sufficient evidence is lacking but risk is implied. Below are some points to consider alongside the above table to ensure the information is not taken out of context:

- **Data availability**
  - Globally, the marine environment is generally far behind the evidence levels of that on land, particularly in offshore areas, mainly due to scale and difficulty/cost of data acquisition.
  - There can be sensitivities surrounding data that have been gathered by industry, and some data are not available for use for advice and management purposes. Often these data become available eventually, but not in time to inform management decisions.

- **Fishing: Limitations of fishing Vessel Monitoring System (VMS) data**
  - VMS positional data are transmitted at approximately 2-hour intervals. There is no information transmitted regarding precise vessel activity, therefore assumptions on its activity, based on logbook returns and vessel speed profile are often made.
  - Vessel positional data (e.g. VMS) cannot inform regulators regarding extent of static gear deployment or soak times.
  - Fishing vessels under 12m long, (and from 2009 until 2013, vessels under 15m long) are not required to use the VMS, and therefore VMS data tells us nothing

regarding the activity of this segment of the fleet. However, local information can be obtained from fisheries management authorities and will be used to develop more detailed guidance to assist with identification of any management measures where considered necessary.

- **Contaminants**
    - Although use of many of the relevant substances (e.g. PCBs) has been heavily regulated for many years, including a ban on further production, re-suspension or reintroduction of pollutants may occur. It is difficult to identify sources of contamination when dealing with highly mobile species.

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8 Annex A: Assessment of the level of impact risk from operations (activities) on UK harbour porpoise populations

The relative level of risk of impact to harbour porpoise from a range of pressures was assessed at UK level (Table A1) as part of the 3rd reporting round for Article 17[21]. See Annex B for the definitions of pressures as used for the harbour porpoise assessments. For the assessment the relative importance of the pressure was assessed by considering the evidence available of an impact and the nature of that impact (direct/indirect) together with the area over which the pressure is acting in UK waters in relation to the species distribution. The relative levels are assigned according to the Article 17 guidance (Evans and Marvela, 2013) as:

Code	Meaning	Comment
H	High importance/impact	Important direct or immediate influence and/or acting over large areas
M	Medium importance/impact	Medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally
L	Low importance/impact	Low direct or immediate influence, indirect influence and/or active over small part of the area/acting only regionally

Table A1: Full assessment of relative level of the impact risk from operations (activities) on harbour porpoise in UK waters based on considerations for Article 17 assessment for harbour porpoise conservation status[22].

Operations	**Pressures[23]**	**Impacts**	**Relative level of risk of impact**	**Evidence**		**Key references**
				Spatial overlap (species & pressure)	**Post-mortem examination**	
Commercial fisheries with bycatch (predominantly static nets)	Removal of non-target species	• Mortality through entanglement/by catch	High	✓	✓	Deaville and Jepson, 2011; Morizur *et al* 1999; Read *et al* 2006; Northridge, S. and Kingston, A. 2010; Northridge *et al* 2016; ICES 2015b

[21] http://jncc.defra.gov.uk/page-6564

[22] EU Habitats Directive Article 17 assessment, harbour porpoise report: http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1351_UK.pdf

[23] The NE Advice on Operations also has a 'Radionuclide' pressure category assessed as being insufficient in evidence. This would likely be a 'low' in terms of impact risk and as such is unlikely to pose a significant threat to maintenance of harbour porpoise FCS

Discharge/run-off from land-fill, terrestrial and offshore industries	Contaminants [24]	• Effects on water and prey quality • Bioaccumulation through contaminated prey ingestion • Health issues (e.g. on reproduction)	High		✓	Jepson *et al* 2005; Jepson *et al* 2016; Deaville & Jepson, 2011; ICES, 2015a; Van De Vijver *et al* 2003; Law *et al* 2012; Pierce *et al* 2008; Murphy *et al* 2015.
Noise[25] from shipping, drilling, dredging and disposal, aggregate extraction, pile driving, acoustic surveys, underwater explosion, military activity, acoustic deterrent devices and recreational boating activity	Anthropogenic underwater sound	• Mortality • Internal injury • Disturbance leading to physical and acoustic behavioural changes (potentially impacting foraging, navigation, breeding, socialising) • Habitat change/loss	Medium	✓		Deaville & Jepson, 2011; Stone & Tasker, 2006; Stone, 2015; Jepson *et al* 2005; Fernandez *et al* 2005; Würsig & Richardson, 2009; WGMME, 2012.
Shipping, recreational boating, renewable energy installations	Death or injury by collision	• Mortality • Injury	Medium/ Low	✓	✓	Deaville & Jepson, 2011; Dolman *et al* 2006; ICES 2015a
Commercial fisheries, bycatch	Removal of target species	• Reduction in food availability • Increased competition from other species • Displacement from natural range • Habitat change/loss	Medium		✓	Simmonds and Isaac, 2007; OSPAR QSR 2010; MacLeod *et al* 2007a, b; Thompson *et al* 2007; Santos and Pierce, 2003; Pierce *et al* 2007; ICES 2015b
Agriculture, aquaculture, sewage	Nutrient enrichment	• Effects on water quality • Increased risk of algal blooms may present health issues • Habitat change/loss	Low	✓	✓	Craig *et al* 2013
Agriculture, aquaculture, sewage	Organic enrichment	• Effects on water quality • Increased risk of algal blooms may present health issues • Habitat change/loss	Low	✓		Craig *et al* 2013

[24] The NE Advice on Operations splits contaminants into 'Transition elements and organo-metals, e.g. TBT'; 'Hydrocarbon and PAHs'; and 'synthetic compounds, e.g. pesticides, antifoulants, PCBs and pharmaceuticals'. Users of this advice should be mindful of all these categories of contaminants.

[25] The NE Advice on Operations includes 'vibration' as a pressure but considers that the potential effects of vibration are adequately covered by consideration of the potential pressure 'Underwater Noise Changes' and refers back to this pressure. Similar considerations should be undertaken using this advice.

Waste disposal - navigational dredging (capital, maintenance)	Physical change (to another seabed type)	• Changes in availability of prey species • Habitat change/loss	Low			
Bridges, tunnels, dams, installations, presence of vessels (shipping, recreation)	Water flow (tidal current) changes – local	• Changes in location of prey species • Displacement of harbour porpoise • Habitat change/loss	Low			
Terrestrial and at-sea 'disposal'	Litter	• Mortality through entanglement • Ingestion	Low	✓	✓	Deaville and Jepson, 2011
Bridges, tunnels, dams, installations, presence of vessels (shipping, recreation)	Barrier to species movement	• Habitat inaccessible • Potential physiological effects • Habitat change/loss	Low	✓		WGMME., 2012; ICES 2015a
Sewage	Introduction of microbial pathogens	• Increased risk of disease	Low		✓	Harvell *et al* 1999; Gulland and Hall, 2007; Van Bressem *et al* 2009

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9 Annex B: Definitions of Pressures as applied within harbour porpoise SAC Advice on Operations

Pressures	Definition in the context of harbour porpoise advice
Removal of non-target species	The removal of species not targeted by the fishery; in this case the bycatch (and probable mortality) of harbour porpoise
Contaminants	Introduced material capable of contaminating harbour porpoise, prey or habitat important to harbour porpoise, with a negative impact directly or indirectly on porpoises
Anthropogenic underwater sound	Introduced noise with the potential to cause injury, stress or disturbance to harbour porpoise
Death or injury by collision	Introduction of physical objects; mobile or immobile, that may collide with or result in potential collision of harbour porpoise resulting in injury or mortality
Removal of target species	Removal of harbour porpoise prey, resulting in increased competition amongst porpoise and other species, and/or displacement from their natural range

Inshore and Offshore Special Area of Conservation: Southern North Sea

SAC Selection Assessment Document

January 2017

Further information

This document is available as a pdf file on the JNCC website for download if required (www.jncc.gov.uk).

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1. Introduction

This document provides detailed information about the Southern North Sea site proposed for designation for the Annex II species harbour porpoise (*Phocoena phocoena*) and evaluates this interest feature according to the Habitats Directive[1] selection criteria and guiding principles. This is a single feature site, proposed to be designated solely for the purpose of aiding the management of harbour porpoise populations throughout UK waters, in accordance with EU legislation. The site includes parts of both territorial waters (out to 12 nautical miles from the baseline) and offshore waters (from 12 nautical miles from the coast out to 200 nautical miles or to the UK Continental Shelf limit), and is therefore a joint responsibility between the Joint Nature Conservation Committee (JNCC) and Natural England (NE).

The Conservation of Habitats and Species Regulations 2010[2] (as amended) transpose the Habitats Directive into law on land and in territorial waters of England and Wales. The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007[3] (as amended in 2010) transpose the Habitats Directive into law for UK offshore waters.

The advice contained in the present document is produced to enable the Secretary of State to decide whether he/she proposes to submit the Southern North Sea site to the European Commission as a site eligible for designation as a Special Area of Conservation (SAC), in accordance with Regulation 10 of the Conservation of Habitats and Species Regulations 2010 (as amended), and Regulation 7 of the Offshore Marine Conservation (Natural Habitats &c) Regulation 2007 (as amended). JNCC and NE have been asked by Defra to provide this advice.

The Habitats Directive aims to conserve biodiversity by maintaining or restoring Annex I habitats and Annex II species to a favourable conservation status. Member States are required to contribute to a coherent European ecological network of protected sites through designation of SACs for natural habitats and wild species listed on the Annexes of the Directive. Sites eligible for designation as marine SACs are selected on the basis of the criteria set out in Annex III (Stage 1) of the Habitats Directive and relevant scientific information. Sites are considered only if they host a Habitats Directive Annex I habitat or Annex II species. For Annex II aquatic species that range over wide areas, sites must clearly identify areas that represent the physical and biological factors essential to these species' life and reproduction. Socio-economic factors are not taken into account in the identification of sites to be proposed to the European Commission.

While some wide-ranging highly mobile aquatic species have clearly-defined breeding/nurturing/feeding areas (i.e. areas 'essential to their life and reproduction'), the harbour porpoise is a naturally widely-distributed cetacean in European North Atlantic waters, and relatively little is known about its breeding behaviour. In addition, there are few obvious natural site boundaries for mobile species in the open sea. In practice, therefore, Article 4 of the Habitats Directive, which requires Member States to propose sites for Annex II species, and Annex III (site selection criteria) have proved difficult to apply to this species.

To address this problem, the European Commission (EC) held a workshop involving experts in December 2000 and published guidance on the designation of SACs for harbour porpoise in 2007 (EC, 2007). The guidance states that '*it is possible to identify areas representing crucial factors for the life cycle of this species. These areas would be identifiable on the basis of:*

- *the continuous or regular presence of the species (although subject to seasonal variations);*
- *good population density (in relation to neighbouring areas);*
- *high ratio of young to adults during certain periods of the year and*

[1] http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/OP_Resources/HABITAT_DIRECTIVE_92-43-EEC.pdf
[2] http://www.legislation.gov.uk/uksi/2010/490/pdfs/uksi_20100490_en.pdf
[3] http://www.legislation.gov.uk/uksi/2007/1842/pdfs/uksi_20071842_en.pdf

- *other biological elements are characteristic of these areas, such as very developed social and sexual life.'*

The guidance also states that '*defining boundaries for 'sites' in offshore waters which support a given percentage of the national population of some mobile species may be difficult due to the lack of obvious natural boundaries (such as coast, topographical boundaries, etc.) in the open sea. This criterion is also challenging to use in the offshore marine environment where populations may often be distributed across several national boundaries.'* Therefore, the application of these additional criteria has also proven difficult.

In addition to information on the Annex II species hosted within the site, this document contains;

i) a map of the site;
ii) its name, location and extent;
iii) the data resulting from application of the criteria specified in Annex III (Stage 1) to the Habitats Directive.

In preparing this document, JNCC and NE have taken into consideration the format established by the European Commission, under which the Member States are required to provide site information to the Commission when proposing candidate SACs. This format is set out in the 'Natura 2000 Standard data form'[4] (prepared by the European Topic Centre for Biodiversity and Nature Conservation on behalf of the European Commission to collect standardised information on SACs throughout Europe).

[4] The Standard Data Form template is available here: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0484&from=EN

2. Background to identification of harbour porpoise Special Areas of Conservation in UK waters

The Joint Cetacean Protocol (JCP) was created in 2004 and is amongst the largest collation of standardised survey data on harbour porpoise in the world, comprising 39 data sources with data from at least 545 distinct survey platforms (ships and aircraft) representing over 1.05 million km of survey effort (coverage) over an 18-year period from 1994-2011. DHI Water Environments (UK) Ltd (DHI) were contracted by JNCC to undertake an analysis of these data in order to determine if persistent areas of high harbour porpoise density were present in the wider UK seas (Heinänen and Skov, 2015). This study will hereafter be referred to as the DHI analysis/model.

Partly to ensure geographic representation, UK waters were divided into three Management Units (MUs)[5] identified by the Interagency Marine Mammal Working Group (IAMMWG): the North Sea (NS), the Celtic and Irish Seas (CIS) and West Scotland (WS). These MUs align with the UK parts of the Assessment Units[6] proposed for the harbour porpoise by the International Council for the Exploration of the Sea (ICES) in their advice to OSPAR. The Management Units were selected to combine what we understand of the ecology of harbour porpoise with the practicality of managing human activities.

The DHI analysis modelled the relationship between environmental variables and the observed harbour porpoise distribution to develop distribution models in each MU. These models described discrete areas of predicted high porpoise density and captured the year-to-year variation within the different locations. Areas within the MUs that were identified to persistently have the top 10% of predicted high densities of harbour porpoise were considered in detail in the analysis. Areas of Search (AoS), within which the final SAC boundaries would be identified, were selected based on these top 10% of predicted high density areas. The top 10% areas were filtered by model confidence and areas of less than 500km^2 were removed on the grounds that such small areas are ineffective for harbour porpoise conservation in relation to the much larger AoS identified in the Management Units. Sites within the AoS were restricted to higher confidence areas only7.

Sufficiency, seasonality and geographic spread of sites were considered in order to identify a network of recommended draft SACs (rdSACs). Sufficiency thresholds of 20% of the nominal UK harbour porpoise abundance and 10-14% of the UK habitat for the species[7] within the rdSACs of each MU were met.

A UK network of sites for harbour porpoise was submitted to Government as draft SACs (dSACs) in June 2015. Once the sites gain approval from Governments to go to consultation, the classification changes from dSACs to possible SACs (pSACs), once submitted to the European Commission they are classed as candidate SACs (cSACs). The Governments of Wales and Northern Ireland, and Defra on behalf of England and offshore decided to proceed to consultation with five of the sites (Figure 1), subject to an adjustment to the North Channel SAC boundary. This adjustment reflected the decision by Scottish Ministers not to proceed with pSACs in their waters at that time. Together with the existing Skerries & Causeway SAC (grade C for harbour porpoise), these five sites cover 10.3% of the UK habitat and 18.7% of the UK population[8] of harbour porpoises, and are distributed in territorial and offshore waters throughout the North Sea MU and the Celtic and Irish Seas MU. In addition, there are 34 UK SACs which already list harbour porpoise as a non-qualifying feature (grade D) in UK waters. The five sites consulted on were submitted to the European Commission as cSACs on 30th January 2017.

[5] IAMMWG, 2015. Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough. 37pp.
[6] ICES. 2014 available from http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WGMME/wgmme_2014.pdf
[7] IAMMWG, 2015. The use of harbour porpoise sightings data to inform the development of draft Special Areas of Conservation in UK waters. JNCC Report No. 565, JNCC Peterborough. 29pp.
[8] UK habitat for harbour porpoise is considered the UK continental shelf which is approximated by waters of 200m depth or less.

Along with all other Member States, the UK has legal obligations to protect harbour porpoises throughout the territory over which it exercises sovereignty. The network of protected sites will contribute towards maintaining the favourable conservation status of the wider population of harbour porpoise. Alongside and in addition to the identification of the network of harbour porpoise sites, an overarching conservation strategy[9] has been in place for harbour porpoise since 2000. This was further reviewed in 2009 and will continue to be reviewed and updated when necessary.

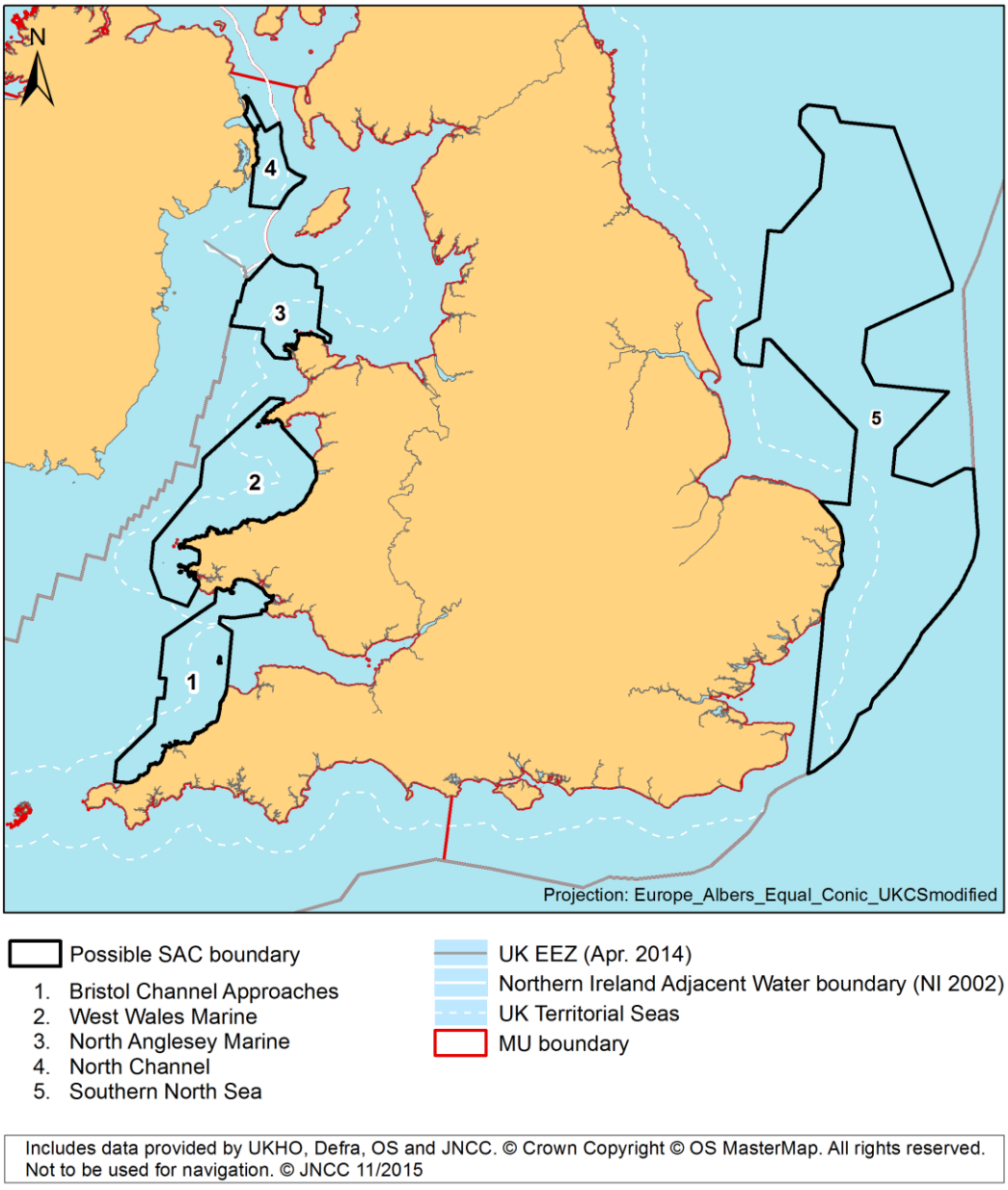


Figure 1: A network of five possible SACs (pSACs) for harbour porpoise in Wales, England, Northern Ireland and offshore waters**.**

[9] DETR. 2000. A UK conservation strategy for the harbour porpoise (*Phocoena phocoena*). Department for the Environment Transport and the Regions; Ministry of Agriculture, Fisheries and Food; Scottish Executive Rural Affairs Department; Department of Agriculture and Rural Development (Northern Ireland); National Assembly for Wales Environment Division; Department of the Environment in Northern Ireland

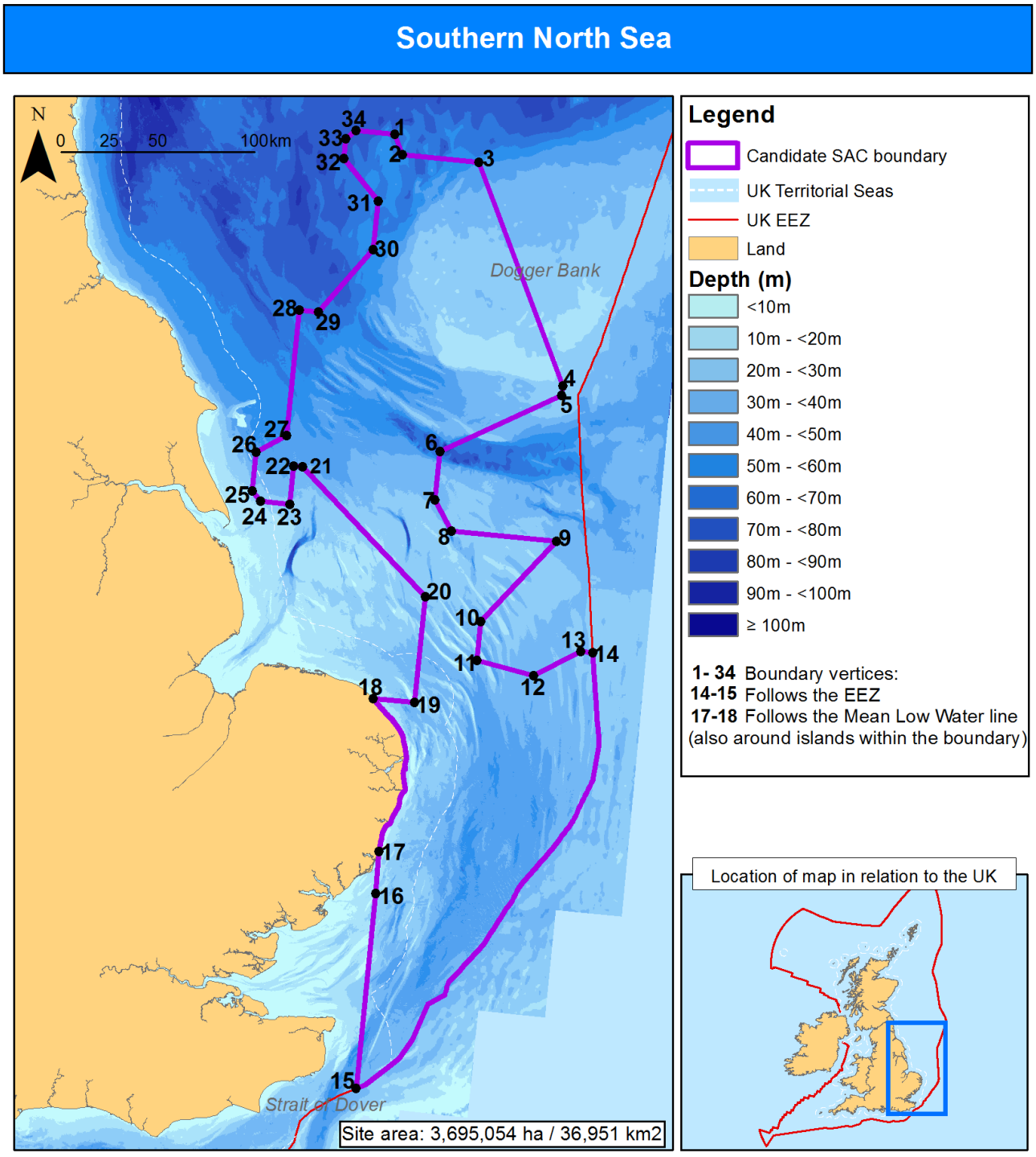
3. Southern North Sea SAC: Selection Assessment

Site name Southern North Sea	**Site centre location** 53º33'03.6"N, 01º47'59.6"E (Datum: WGS 1984)
Site surface area 3,695,054ha / 36,951km^2 (Datum: Europe Albers Equal Area modified to UK, calculated in ArcGIS)	**Biogeographic region** Atlantic
Administrative Region UK offshore waters (JNCC) English inshore waters (NE)	**Percentage cover within region** Offshore waters: 88% English inshore waters: 12%

4. Interest features under the EU Habitats Directive

1351: Harbour porpoise (*Phocoena phocoena*)

5. Map of site



ID	Latitude	Longitude	ID	Latitude	Longitude	ID	Latitude	Longitude	ID	Latitude	Longitude
1	55° 28' 53.1" N	01° 02' 24.8" E	10	53° 17' 32.9" N	02° 11' 31.6" E	19	52° 53' 06.4" N	01° 45' 21.9" E	28	54° 37' 00.5" N	00° 27' 44.8" E
2	55° 23' 34.2" N	01° 07' 24.8" E	11	53° 06' 45.7" N	02° 11' 43.8" E	20	53° 22' 42.4" N	01° 44' 22.2" E	29	54° 37' 11.8" N	00° 37' 01.8" E
3	55° 24' 03.2" N	01° 45' 17.6" E	12	53° 04' 11.8" N	02° 38' 38.6" E	21	53° 54' 05.6" N	00° 39' 29.7" E	30	54° 56' 28.6" N	00° 59' 18.7" E
4	54° 25' 05.4" N	02° 37' 56.9" E	13	53° 12' 19.1" N	02° 59' 22.3" E	22	53° 54' 00.3" N	00° 35' 04.2" E	31	55° 09' 56.9" N	00° 58' 38.1" E
5	54° 22' 23.6" N	02° 37' 58.3" E	14	53° 12' 19.0" N	03° 04' 57.1" E	23	53° 43' 17.2" N	00° 35' 41.1" E	32	55° 20' 23.2" N	00° 39' 10.7" E
6	54° 03' 07.5" N	01° 43' 06.7" E	15	51° 04' 38.9" N	01° 39' 44.1" E	24	53° 43' 00.0" N	00° 22' 03.6" E	33	55° 25' 46.4" N	00° 38' 51.5" E
7	53° 49' 40.4" N	01° 43' 32.5" E	16	51° 59' 04.9" N	01° 38' 08.0" E	25	53° 45' 35.5" N	00° 17' 20.7" E	34	55° 28' 33.4" N	00° 43' 26.4" E
8	53° 41' 38.9" N	01° 52' 54.2" E	17	52° 10' 53.8" N	01° 37' 10.6" E	26	53° 56' 22.0" N	00° 16' 38.8" E			
9	53° 41' 57.7" N	02° 42' 50.7" E	18	52° 52' 51.5" N	01° 26' 06.6" E	27	54° 02' 03.1" N	00° 30' 01.3" E			

6. Site summary

The Southern North Sea site is located in the North Sea MU and has been recognised as an area with predicted persistent high densities of harbour porpoise. The main area included within the site covers important winter and summer habitat, which emerged as part of the top 10% persistent high density areas for these seasons within the UK. Approximately two thirds of the site, the northern part, is recognised as important for porpoises during the summer season, whilst the southern part is more important during the winter.

The Southern North Sea site is very large and covers an area of 36,951km^2 stretching from the central North Sea north of the Dogger Bank southwards to the Strait of Dover. The water depths within the site range between 10m and 75m, with the majority of the site shallower than 40m. The majority of the substrate types within the site are categorised as sublittoral sand and sublittoral coarse sediment (Eunis level 3, EUSeaMap). The boundary of the Southern North Sea site crosses four other Special Areas of Conservation. The four SACs, the Dogger Bank SAC, Margate and Long Sands SAC, the North Norfolk Sandbanks and Saturn Reef SAC and Haisborough, Hammond and Winterton SAC, are all classified for their Annex I habitat of 'Sandbanks which are slightly covered by sea water all the time' and the latter two are also designated for 'Reef'.

Defining habitats of cetaceans is problematic; this is primarily due to their highly mobile nature and their distribution being driven mainly by the distribution and availability of their prey. In the absence of prey data, relationships between habitat variables (such as depth, water temperature, seabed sediment etc) are often used as proxies of prey distribution (e.g. Marubini *et al,* 2009; Skov & Thomsen, 2008; Embling *et al,* 2010). Regional variation in these relationships between habitat variables occurs and was evident between the Management Units in the analyses undertaken by DHI.

The analyses undertaken by DHI used several different environmental variables and modelled them against observed density of harbour porpoise for each MU. In all MUs, the coarseness of the seabed sediment was important, with porpoises showing a preference for coarser sediments (such as sand/gravel) rather than fine sediments (e.g. mud). Similar habitat associations have been made in the eastern part of the North Sea (Skov *et al,* 2014). Sandeels (*Ammodytidae*), which are known prey for harbour porpoises, exhibit a strong association with particular surface sediments (Benke & Siebert, 1996; Santos, 1998). Fine particle fractions have been demonstrated to limit the distribution of the lesser sandeel (*Ammodytes marinus*) around the Shetland Isles (Wright *et al,* 2000). Harbour porpoise feed on a wide variety of fish and generally focus on the most abundant local species. The predominant prey type appears to be bottom-dwelling fish, although shoaling fish such as mackerel (*Scomber scombrus*) and herring (*Clupea harengus*) are also taken (Santos & Pierce, 2003; Pierce *et al,* 2007).

For the North Sea MU the DHI model results for both the summer and winter seasons show water depth and variables within the water column are the most important physical factors that increase the probability of presence and density of harbour porpoise. The harbour porpoise density in the North Sea MU peaked in stable waters (based on vertical differences in temperature) with lower gradients of eddy activity (turbulence); higher densities were also found in areas with current speeds of 0.4-0.6m/s. The analysis indicated a preference for water depths between 30 and 50m throughout the year. There was a negative relationship with increasing levels of traffic beyond a threshold of approximately 80 ships per day.

The physical characteristics of the Southern North Sea site are well aligned to the environmental variables determining the probability of presence and the density of harbour porpoise. The majority of the site incorporates shallow depths of around 40m (see section 5). The seabed energy layer of EU SeaMap[10] indicates that the energy levels, including current and wave energy, are predominantly medium across the majority of the site.

7. Site boundary

To date, the guidance developed by JNCC for defining SAC boundaries for marine sites away from the coast has focused on habitat features; largely from modelled data. The harbour porpoise sites are also, in part, based on modelled data and the outputs predict areas with expected high densities of harbour porpoise. The outputs from this approach and that for habitat features are similar. Therefore, the guidelines are largely transferable to consideration of boundaries for harbour porpoise sites:

1. As a general principle, site boundaries should be drawn closely around the qualifying feature for which the sites have been selected, taking into account the need to ensure that the site operates as a functional whole for the conservation of the feature;
2. Where possible, the seaward boundaries of the sites should be drawn using straight lines to ensure ease of identification on charts and at sea (and thereby minimising the number of nodes in the boundary where feasible);
3. However, a balance is needed between more complex site shapes drawn more tightly around the feature and simple square/rectangular boundaries so that the area of 'non-interest-feature' included within the site boundary is minimised, but this should not be to the detriment of the structural and functional integrity of the interest feature;
4. Site boundary coordinates be provided in degrees, minutes, seconds.

The nature of the boundaries for the recommended draft SAC were 'blocky' due to their emergence from the 25km^2 gridded model output of the DHI analysis (5km x 5km grid squares). Additional principles for creating boundaries for the harbour porpoise sites were also needed:

5. Diagonal runs of pixels (the DHI grid squares) should be straightened by a line that approximates the centre of the diagonal;
6. Vertical and horizontal lengths of more than two pixels of the sites were maintained whenever possible to preserve overall shape;
7. Modifications of the boundary of each recommended draft SACs should not alter the total area of the site by more than approximately 5%;
8. Candidate SACs will not extend into rivers;
9. Estuaries are excluded where the width of the entrance is ≤2km and the model did not indicate the area was included;
10. The 'coastal' edge of sites is defined by the Mean Low Water (MLW) tide line;
11. In England, small ports and harbours, which have enclosed inner harbours areas, have been excluded.
12. Site boundaries were aligned with the EEZ boundary where they were closely aligned.

[10] Phase 1 energy layers are available for download from EUSeaMap: http://www.emodnet-seabedhabitats.eu/default.aspx?page=1953

8. Assessment of interest feature against selection criteria

8.1. Harbour porpoise (*Phocoena phocoena*)

Annex III selection criteria for Annex II Species: Stage 1B

Stage 1 of Annex III of the Habitats Directive refers to the assessment at national level of the relative importance of sites based on:

(a) Size and density of the population of the species present on the site in relation to the populations present within national territory.
(b) Degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities.
(c) Degree of isolation of the population present on the site in relation to the natural range of the species.
(d) Global assessment of the value of the site for conservation of the species concerned.

As UK waters are divided into Management Units to ensure geographic coverage and to facilitate management for harbour porpoise, each site has been assessed in relation to the MU rather than at the national level.

a) Proportion of UK part of the North Sea Management Unit population[11]

Abundance estimates calculated for each site were used directly to grade criterion iii a) *Size and density of the population of the species present on the site in relation to the populations present within national territory.* The identification of SACs for harbour porpoise has been driven by assessments at the scale of national territory within Management Units to ensure sites constitute a geographically *representative* network; the criterion has been applied at this scale.

The explanatory notes to the Natura 2000 standard data form suggest the following ranking to grade the sites based on the size of the population in the site relative to the population in the national territory (criterion III (a)) and for the purpose of harbour porpoise candidate SACs, relative to the relevant UK management unit:

Grade A: >15% to 100% of the relevant UK management unit population
Grade B: >2% to 15% of the relevant UK management unit population
Grade C: >0% to 2% of the relevant UK management unit population

The candidate SACs are '*clearly identifiable'* based on the modelling and persistence analyses undertaken by DHI. The analytical approach taken by DHI incorporated some of the sub-criteria of the European Commission guidance for identifying sites for marine mobile species (EC, 2007), such as sub-criteria *'Continuous or regular presence of the species (although subject to seasonal variations', 'Good population density (in relation to neighbouring areas)'* and some elements of sub-criteria *'Other biological elements that are characteristics, such as very developed social and sexual life'*. All of the sites have regular presence of harbour porpoise, whilst some show seasonal variation. It was not possible to assess the ratio of young to adults because data have not been collected consistently at an appropriate scale. The abundance within the candidate SACs can be estimated from existing survey data (Hammond *et al,* 2013) and thereby Criterion III (a) can be applied directly for the purposes of grading the site.

The Southern North Sea site was identified as being within the top 10% of persistent high density areas for harbour porpoise in UK waters for both winter and summer seasons (Heinänen and Skov, 2015). Due to the large area of the Southern North Sea site, the population supported is substantial in the UK and

[11] UK MU population is defined throughout this document as 'the UK portion of the MU where water depths are 200m or less'.

European context. It is estimated (based on the SCANS-II survey which took place in July 2005 only) that the site supports approximately 18,500 individuals (95% Confidence Interval: 11,864 - 28,889) for at least part of the year, as seasonal differences are likely to occur, and represents approximately 17.5% of the population within the UK part of the North Sea MU. It should be noted that because this estimate is from a one-month survey in a single year it cannot be considered as a specific population number for the site. It is therefore not appropriate to use site population estimates in any assessments of effects of plans or projects (i.e. Habitats regulation Assessments), as these need to take into consideration population estimates at the MU level, to account for daily and seasonal movements of the animals.

Although survey effort was not constant for all months of the year, the DHI analysis showed high confidence in the modelling across the majority of the site during the winter and the summer season, indicating a year round presence of raised densities of harbour porpoise within the site.

Therefore the Southern North Sea site has been identified as an important area for harbour porpoise during both seasons and, based on the figure of 17.5% of the North Sea MU population, the Southern North Sea site would be graded A on the basis of the EC standard data form (A = >15% to 100% of the UK part of the MU population).

b) Degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities

The five sites (Figure 1) cover approximately 10.3% of available porpoise habitat (continental shelf) and porpoise densities within this network are amongst the highest modelled for the population as indicated by the DHI analysis. This supports the notion that these areas, relative to the rest of the continental shelf, include the best habitat for harbour porpoises and have been used persistently over the last two decades. It is assumed that the preference for these habitats is associated with good feeding opportunities and prey aggregations. The available evidence indicates that the conservation status of the UK harbour porpoise population is currently Favourable[12]. Therefore, it is considered that the conservation of the feature in all the sites is graded as II (elements are well conserved), and 'restoration possibilities' do not have to be considered. Therefore, the overall grade for this criterion is at least grade B. We do not know which features of the habitat are the most important drivers of the association with prey; nor do we know what the main prey species of porpoise within the sites are. Until this is known, the quality of the habitat (good or excellent) cannot be determined, so a grade of A/B has been awarded.

Therefore, with respect to the degree of conservation of the features of the habitat important for the harbour porpoise, the Southern North Sea site would be graded A/B ('Excellent'/'Good conservation') overall, without the necessity for consideration of restoration possibilities.

c) Degree of isolation of the population present on the site in relation to the natural range of the species

As a wide-ranging species, the animals within the site cannot be considered isolated in relation to the rest of the population. Animals within the site are part of the wider MU population.

Therefore, with respect to isolation, the Southern North Sea site would be graded C: population not isolated within extended distribution range.

d) Global assessment

The global assessment is weighted towards the grade awarded to the site for its size and density, given that the conservation of features is not clearly understood and the sites are all equal in quality with regard to their 'degree of isolation'.

[12] http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1351_UK.pdf

Therefore, the Southern North Sea site is considered to have a global grade A, i.e. within the context of the UK North Sea management unit. It contains a significant proportion of both the UK MU (17.5%) and European population of harbour porpoises and it covers important and persistent high density areas for both summer and winter season.

Summary of grades for Stage 1B criteria

	Proportion of UK MU Population (a)	**Conservation of features (b)**	**Isolation of population (c)**	**Global assessment (d)**
Southern North Sea	A	A/B	C	A

9. Supporting scientific documentation

The process leading to the selection of the Southern North Sea site was based on a combination of observed data and predictive modelling (Heinänen and Skov, 2015). The study investigated whether persistent high density areas of harbour porpoise could be identified in UK waters, using 18 years (1994 to 2011) of sea-based Joint Cetacean Protocol (JCP) data covering the entire UK EEZ.

The JCP assembled disparate effort-related cetacean sightings datasets from European / north-east Atlantic waters and included those from all major UK sources e.g. 'Small Cetacean Abundance in the North Sea and adjacent waters' SCANS & SCANS-II from 1994 and 2005 respectively (Hammond *et al,* 2002; Hammond *et al,* 2013); 'Cetacean Offshore Distribution and Abundance in European Atlantic' CODA surveys from 2007 (CODA, 2009); European Seabirds At Sea (ESAS), which collected and collated seabird and cetacean data from the majority of countries with a north-west European coastline between 1979 and 1999, with ad hoc surveys beyond 1999; Sea Watch Foundation (SWF; i.e. NGO led surveys); Atlantic Research Coalition (ARC); and from other non-governmental and marine renewable industry sources.

The DHI report addressed challenges, such as variable survey coverage in different parts of the UK EEZ within the study period, by developing statistical distribution models capable of predicting seasonal and yearly means. Where there were sufficient data, models were run for two seasons: summer and winter for each MU.

Data on concentrations of prey of harbour porpoises were not available for the entire EEZ at a fine spatial scale (5km). Therefore, physical oceanographic properties of currents, water masses and the seafloor were used as variables in the model. It is assumed that these variables affect the probability of harbour porpoises encountering prey. Mean shipping intensity was also included in the model to account for some anthropogenic disturbance.

The DHI model results indicate that densities of harbour porpoises are influenced by both oceanographic and pressure variables. The degree of influence of these factors varies in different parts of UK waters and with the different seasons. Analyses of the persistency of high density areas integrated evaluations of the number of years that high densities were predicted for an area, with evaluations of the degree of recent high densities as predicted by the distribution models. Due to the uneven survey effort over the period, the uncertainty in modelled distributions varied greatly. Robust model predictions (based on relative standard errors) were found in all shelf waters of the North Sea north of the Channel.

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STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030395**

SITENAME **Southern North Sea**

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 6. SITE MANAGEMENT
- 7. MAP OF THE SITE

1. SITE IDENTIFICATION

1.1 Type	1.2 Site code Back to top
B	UK0030395

1.3 Site name

Southern North Sea

1.4 First Compilation date	1.5 Update date
2017-01	2019-03

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Monkstone House, City Road, Peterborough, PE1 1JY
Email:	

Date site proposed as SCI:	2017-01
Date site confirmed as SCI:	2017-12
Date site designated as SAC:	2019-02
National legal reference of SAC designation:	Regulations 13 and 17-19 of The Conservation of Habitats and Species Regulations 2017 (https://www.legislation.gov.uk/uksi/2017/1012/contents/made), and Regulations 11, 19 and 20 of The Conservation of Offshore Marine Habitats and Species Regulations 2017 (http://www.legislation.gov.uk/uksi/2017/1013/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
1.7999	53.551

2.2 Area [ha]:

3695054.0

2.3 Marine area [%]

100.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKZZ	Extra-Regio

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1351	Phocoena phocoena			p	11864	28889	i	C	M	A	A	C	A

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N01	100.0
Total Habitat Cover	100

Other Site Characteristics

General site characteristics: Sand and coarse sediments. Non-vegetated. Full salinity. Water depths between 10m and 75m.

4.2 Quality and importance

Harbour porpoise (Phocoena phocoena) "For which this is considered to be one of the best areas in the United Kingdom".

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	C02		b
L	J03		b
L	G04		b
H	F02		b
M	H03	O	b
H	C03		b
L	D03		b

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

For information on this site, including the Selection Assessment Document, Conservation Objectives and Advice on Activities document, as well as information about the identification process of the UK network of harbour porpoise SACs, see the Site Information Centre (see link) for this site. The population size estimate in Section 3.2, provided at the time the site was proposed as an SCI, is based on data from a survey conducted in 2005 (Hammond et al. 2013). Revised “population in the site” estimates based on the 2016 survey (Hammond et al. 2017) are a minimum of 20237 (lower 95% CI) and maximum of 41538 (higher 95% CI). All these estimates are derived from one-month summer surveys and should not be considered as specific population sizes for the site. Hammond, P. Macleod, K. Berggren, P. Borchers, D. Burt, L. Canadas, A. Desportes, G. Donovan, G. Gilles, A. Gillespie, D. Gordon, J. Hiby, L. Kuklik, I. Leaper, R. Lehnert, K. Leopold, M. Lovell, P. Øien, N. Paxton, C. Ridoux, V. Rogan, E. Samarra, F. Scheidat, M. Sequeira, M. Siebert, U. Skov, H. Swift, R. Tasker, M. Teilmann, J. van Canneyt, O. Vazques, J. (2013). Cetacean abundance and distribution in European Atlantic shelf waters to inform conservation and management. Biological Conservation. 164. 107 - 122. Hammond, P. Lacey, C. Gilles, A. Viquerat, S. Börjesson, P. Herr, H. Macleod, K. Ridoux, V. Santos, M. Scheidat, M. Teilmann, J. Vingada, J. Øien, N. (2017). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Available: https://synergy.st-andrews.ac.uk/scans3/files/2017/05/SCANS-III-design-based-estimates-2017-05-12-final-revis

Link(s): http://jncc.defra.gov.uk/page-7243

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Joint Nature Conservation Committee
Address:	
Email:	

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [ ] Yes
- [ ] No, but in preparation
- [X] No

7. MAP OF THE SITES

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INSPIRE ID:

Map delivered as PDF in electronic format (optional)

[ ] Yes [X] No

Reference(s) to the original map used for the digitalisation of the electronic boundaries (optional).

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

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

Citation for Special Area of Conservation (SAC)

Name:	River Tweed
Unitary Authority/County:	Northumberland, Scottish Borders
SAC status:	English part designated on 1 April 2005 Scottish part designated on 17 March 2005
Grid reference:	NT503338
SAC EU code:	UK0012691
Area (ha):	3797.41
Component SSSI:	Abbey St Bathans Woodlands SSSI, Kirkhope Linns SSSI, Lennel, Charley's Brae SSSI, Riskinhope SSSI, River Tweed SSSI, Tweed Catchment Rivers – England: Lower Tweed and Whiteadder SSSI, Tweed Catchment Rivers – England: Till Catchment SSSI, Tweed River SSSI

Site description:
The River Tweed drains a large catchment on the east coast of the UK, with sub-catchments in both Scotland and England. It shows a strong nutrient gradient along its length, with oligotrophic (nutrient-poor) conditions in its headwaters, and nutrient-rich lowland conditions just before it enters the sea at Berwick. The river has a high ecological diversity which reflects the mixed geology of the catchment. Stream water-crowfoot *Ranunculus penicillatus* ssp. *pseudofluitans*, a species of southern rivers and streams, here occurs at its most northerly location as does fan-leaved water-crowfoot *R. circinatus*, along with river water-crowfoot *R. fluitans*, common water-crowfoot *R. aquatilis*, pond water-crowfoot *R. peltatus* and a range of hybrids.

The fish fauna of the river is one of the richest in Great Britain. The Tweed supports a very large, high-quality Atlantic salmon *Salmo salar* population with large seasonal migrations: one run in the spring and a larger one in the autumn. The high proportion of the River Tweed accessible to salmon, and the variety of habitat conditions in the river, has resulted in it supporting the full range of salmon life-history types, with sub-populations of spring, summer salmon and grilse all being present. Salmon require clean gravel beds for spawning. The presence of brook *Lampetra planeri*, river *Lampetra fluviatilis* and sea lampreys *Petromyzon marinus* throughout the catchment is also important. These species prefer the lower gradient, fast flowing rivers with boulders as spawning grounds and the juveniles show preference for silty areas in slower flowing waters.

The extensive water and riparian habitats of the Tweed provide conditions suitable for all necessary aspects of otters' *Lutra lutra* life cycles. The extensive tributary burns provide good feeding habitat.

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

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. (Rivers with floating vegetation often dominated by water-crowfoot)

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

- Atlantic salmon *Salmo salar*
- Brook lamprey *Lampetra planeri*
- Otter *Lutra lutra*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012691
Date of registration: 14 June 2005

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for River Tweed Special Area of Conservation Site Code: UK0012691

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document (where available), which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H3260. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot

S1095. *Petromyzon marinus*; Sea lamprey

S1096. *Lampetra planeri*; Brook lamprey

S1099. *Lampetra fluviatilis*; River lamprey

S1106. *Salmo salar*; Atlantic salmon

S1355. *Lutra lutra*; Otter

This is a cross border site

This site crosses the border between England and Scotland. Some features may only occur in one Country. The advice of Scottish Natural Heritage should therefore be sought separately.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 4). This document updates and replaces an earlier version dated 22 February 2016 to reflect the consolidation of the Habitats Regulations in 2017.

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

Citation for Special Area of Conservation (SAC)

Name:	The Wash and North Norfolk Coast
Unitary Authority/County:	Lincolnshire, Norfolk
SAC status:	Designated on 1 April 2005
Grid reference:	TF558403
SAC EU code:	UK0017075
Area (ha):	107761.28
Component SSSI:	Gibraltar Point SSSI, North Norfolk Coast SSSI, The Wash SSSI

Site description:

The Wash is the largest embayment in the UK. It is connected via sediment transfer systems to the north Norfolk coast. Together, the Wash and North Norfolk Coast form one of the most important marine areas in the UK and European North Sea coast, and include extensive areas of varying, but predominantly sandy, sediments subject to a range of conditions. Communities in the intertidal include those characterised by large numbers of polychaetes, bivalve and crustaceans. Subtidal communities cover a diverse range from the shallow to the deeper parts of the embayments and include dense brittlestar beds and areas of an abundant reef-building worm ('ross worm') *Sabellaria spinulosa*. The embayment supports a variety of mobile species, including a range of fish, otter *Lutra lutra* and common seal *Phoca vitulina*. The extensive intertidal flats provide ideal conditions for common seal breeding and hauling-out.

Sandy sediments occupy most of the subtidal area, resulting in one of the largest expanses of subtidal sandbanks in the UK. The subtidal sandbanks vary in composition and include coarse sand through to mixed sediment at the mouth of the embayment. Communities present include large dense beds of brittlestars *Ophiothrix fragilis*. Species include the sand-mason worm *Lanice conchilega* and the tellin *Angulus tenuis*. Benthic communities on sandflats in the deeper, central part of the Wash are particularly diverse. The subtidal sandbanks provide important nursery grounds for young commercial fish species, including plaice *Pleuronectes platessa*, cod *Gadus morhua* and sole *Solea solea*.

In the tide-swept approaches to the Wash, with a high loading of suspended sand, the relatively common tube-dwelling polychaete worm *Sabellaria spinulosa* forms areas of biogenic reef. These structures are varied in nature, and include reefs which stand up to 30 cm proud of the seabed and which extend for hundreds of metres. The reefs extend into The Wash where super-abundant *S. spinulosa* occurs and where reef-like structures such as concretions and crusts have been recorded. The reefs are diverse and productive habitats which support many associated species that would not otherwise be found in predominantly sedimentary areas. Associated motile species include large numbers of polychaetes, mysid shrimps, the pink shrimp *Pandalus montagui*, and crabs.

Sandy flats predominate in the intertidal zone with some soft mudflats in the areas sheltered by barrier beaches and islands along the north Norfolk coast. The biota includes especially large numbers of polychaetes, mysid shrimps, the pink shrimp and crabs. Salinity ranges from that of the open coast in most of the area (supporting rich invertebrate communities) to estuarine close to the rivers. Smaller, sheltered and diverse areas of intertidal sediment, with a

rich variety of communities, including some eelgrass *Zostera* spp. beds and large shallow pools, are protected by the north Norfolk barrier islands and sand spits.

The site contains the largest single area of saltmarsh in the UK and is one of the few areas in the UK where saltmarshes are generally accreting. The proportion of the total saltmarsh vegetation represented by glasswort *Salicornia* and other colonising annuals is high because of the extensive enclosure of marsh in this site and is also unusual in that it forms a pioneer community with common cord-grass *Spartina anglica*. There are large ungrazed saltmarshes on the North Norfolk Coast and traditionally grazed saltmarshes around the Wash. Saltmarsh swards dominated by sea-lavenders *Limonium* spp. are particularly well-represented. In North Norfolk, in addition to typical lower and middle saltmarsh communities, there are transitions from upper marsh to tidal reedswamp, sand dunes (which are largely within the adjacent North Norfolk Coast SAC), shingle beaches and mud/sandflats. Mediterranean saltmarsh scrub vegetation is dominated by a shrubby cover up to 1 metre high of bushes of shrubby sea-blite *Suaeda vera* and sea-purslane *Atriplex portulacoides*, with a patchy cover of herbaceous plants and bryophytes. This scrub vegetation often forms an important feature of the upper saltmarshes, and extensive examples occur where the drift-line slopes gradually and provides a transition to dune, shingle or reclaimed sections of the coast. At a number of locations on this coast perennial glasswort *Sarcocornia perennis* forms an open mosaic with other species at the lower limit of the sea-purslane community.

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

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*
- Large shallow inlets and bays
- Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*). (Mediterranean saltmarsh scrub)
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)
- Reefs
- *Salicornia* and other annuals colonising mud and sand. (Glasswort and other annuals colonising mud and sand)
- Sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks)

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

- Common seal *Phoca vitulina*
- Otter *Lutra lutra*

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

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0017075
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for The Wash and North Norfolk Coast Special Area of Conservation Site Code: UK0017075

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons*

H1160. Large shallow inlets and bays

H1170. Reefs

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H1420. Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*); Mediterranean saltmarsh scrub

S1355. *Lutra lutra*; Otter

S1365. *Phoca vitulina*; Common seal

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the The Wash and North Norfolk Coast European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

ANNEX G TRAFFIC AIR QUALITY ASSESSMENT

H2Teesside Project

Planning Inspectorate Reference: EN070009/APP/5.10

Land within the boroughs of Redcar and Cleveland and Stockton-on-Tees, Teesside and within the borough of Hartlepool, County Durham

Document Reference 5.10: Annex G Applicant Consideration of Natural England's Steps on advising a competent authority on the HRA of a road traffic project

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(g)

Applicant: H2 Teesside Ltd

Date: October 2024

Rev: 0

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1.0 APPLICANT CONSIDERATION OF NATURAL ENGLAND'S STEPS ON ADVISING A COMPETENT AUTHORITY ON THE HRA OF A ROAD TRAFFIC PROJECT

1.1 Introduction

1.1.1 As part of the Habitat Regulations Assessment (HRA) procedure, an assessment of plans and projects (as required by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations')) likely to generate road traffic emissions to air during construction or operation which are capable of affecting European Sites has been completed, following Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations.

1.2 Step 1: Assessment of Road Traffic Emissions Likely to Reach European Sites

1.2.1 In line with Step 1 of Natural England's method (NEA001), road traffic emissions from the proposed development and their proximity to the Teesmouth and Cleveland Coast SPA have been assessed. Table G-1 lists the affected road links and their distances from the SPA. Road links within 200m of a European site are considered further in Step 2.

1.2.2 ES Figure 8-3: Air Quality Study Area – Construction Road Traffic Locations [APP-098] and Table G-1 shows that several road links are within 200m of the Teesmouth and Cleveland Coast SPA. Specifically:

- Road link 1 (A1085 Trunk Road, 100m east of Ennis Road) and road link 10 (Unnamed Road, 725m east of A178 Seaton Carew Road) are 5m from the SPA.
- Road link 9 (A178 Seaton Carew Road, 535m north of Huntsman Drive) is 3m from the SPA.
- Road link 10 (Unnamed Road, 725m east of A178 Seaton Carew Road) is 5m from the SPA.
- Road link 14 (A1185 west of A178 Seaton Carew Road) is 20m from the SPA.
- Road link 8 (A1046 Port Clarence Road, 20m north of Beech Terrace) is 32m from the SPA.
- Road link 3 (A1042 Kirkleatham Lane) is 125m from the SPA.
- Road link 13 (B1275 Belasis Avenue) is 160m from the SPA.

1.2.3 These road links clearly fall within the 200m distance criteria and will need further air quality assessment to evaluate potential impacts on the SPA's qualifying features.

1.2.4 Road links more than 200m from the site, such as road links 2, 4, 5, 6, 7, 11 and 12 are less likely to contribute significant air quality impacts to the SPA and are not carried forward into Step 2.

Table G-1: Distance of the affected road links to the nearest European site

AFFECTED ROAD LINK	DESCRIPTION	DISTANCE TO TEESMOUTH AND CLEVELAND COAST SPA (M)
1	A1085 Trunk Road, 100m east of Ennis Road	5
2	A1085 Trunk Road, 1345m south of West Coatham Lane	>2000
3	A1042 Kirkleatham Lane, 85m south of Staintondale Avenue	125
4	A1085 Trunk Road, 500m north of A1053 Tees Dock Road	>2500
5	A1085 Broadway, 235m east of Birchington Avenue	>3500
6	A1380 High Street, 50m east of Lackenby Lane	7000
7	A66, 140m east of Whitworth Road	>3000
8	A1046 Port Clarence Road, 20m north of Beech Terrace	32
9	A178 Seaton Carew Road, 535m north of Huntsman Drive	3
10	Unnamed Road, 725m east of A178 Seaton Carew Road	5
11	A1053 Greystone Road (MAY 2023 data)	>3500
12	A174 (West of Greystone Roundabout) (May 2022 data)	7000
13	B1275 Belasis Avenue	160
14	A1185 (west of A178 Seaton Carew Road)	20

1.3 Step 2: Identification of Qualifying Features within 200m of Affected Road Links Sensitive to Air Pollution

1.3.1 In Step 2, an assessment is made of whether any of the qualifying features of the Teesmouth and Cleveland Coast SPA are within 200m of the affected road links are sensitive to air pollution.

1.3.2 For the Teesmouth and Cleveland Coast SPA, the primary qualifying features include bird species. However, based on the distances and data available, there are no sensitive qualifying features within the 200m zone of the affected road links.

1.3.3 Table G-2 confirms that no road links are within 200m of sensitive ecological features (such as bird species). It can therefore be concluded that the qualifying features of the Teesmouth and Cleveland Coast SPA are not likely to be significantly exposed to air pollution from the affected road traffic emissions, without the need for further assessment.

1.3.4 Following the approach set out in NEA001 the process stops at Step 2 as further assessment effort is unnecessary to understand the likely significance of effects on the designated features, from road traffic emissions.

Table G-2: Sensitive qualifying features within 200m of the affected road links

AFFECTED ROAD LINK	SENSITIVE QUALIFYING FEATURE* IN TEESMOUTH AND CLEVELAND COAST SPA WITHIN 200M OF AFFECTED LINK (YES/NO)
1	No – Nearest qualifying feature at >2.5km
2	No – Nearest qualifying feature at >2km
3	No – Nearest qualifying feature at >4.5km
4	No – Nearest qualifying feature at >4km
5	No – Nearest qualifying feature at >5km
6	No – Nearest qualifying feature at >8km
7	No – Nearest qualifying feature at >5km
8	No – Nearest qualifying feature at >6km
9	No – Nearest qualifying feature at >3km
10	No – Nearest qualifying feature at >2km
11	No – Nearest qualifying feature at >5km
12	No – Nearest qualifying feature at >8.5km
13	No – Nearest qualifying feature at >5.5km
14	No – Nearest qualifying feature at >3km

* As presented in ES Appendix 13A: Ornithology baseline report table 13A-5 [APP-208]

Final Recommendation

1.3.5 Based on the assessments in Steps 1 and 2, there are no road links within 200 meters of the Teesmouth and Cleveland Coast SPA that are recommended for an appropriate assessment due to either alone or in-combination effects.