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15. Ornithology

15.1 Introduction

- 15.1.1 This chapter of the Preliminary Environmental Information (PEI) Report identifies the potential impacts to ornithology that are to be considered as part of the Environmental Impact Assessment (EIA) of the Proposed Development.
- 15.1.2 A detailed description of the Site, the Surrounding Area and the Proposed Development is provided in Chapters 3 and 4 (PEI Report, Volume I), respectively. Construction and Management details can be found in Chapter 5 (PEI Report, Volume I).
- 15.1.3 This chapter sets out a review of the existing ornithology baseline, potential temporary and permanent impacts of the Proposed Development, and identifies the scope of further work required to assess these impacts. The key ornithology receptors are set out in detail within Section 15-5. In summary, these are:
- All ornithological interest features of Teesmouth and Cleveland Coast Special Protection Area (SPA);
 - All ornithological interest features of Teesmouth and Cleveland Coast Ramsar;
 - All ornithological interest features of Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI); and
 - The ornithological interest features for which any sites are designated at a non-statutory level (known as Local Wildlife Sites, LWS); and breeding and non-breeding birds that do not contribute to the functioning of the above designated sites (i.e. birds occurring more broadly within the wider countryside surrounding and within the proposed Site boundary).
- 15.1.4 Potential impacts to marine water quality have been considered within Chapter 9: Surface Water, Flood Risk and Water Resources (PEI Report, Volume I). Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume I) considers potential impacts to land-based ecological receptors but also considers linkages with wider receptors (such as ornithology). Chapter 13: Aquatic Ecology (PEI Report, Volume I) considers impacts to freshwater ecological receptors including those within land-locked freshwaters and non-tidal freshwaters. Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I) considers impacts to marine ecology and fisheries.
- 15.1.5 This chapter is supported by the following technical appendices, provided in PEI Report, Volume III:
- Appendix 15A: Legislation and Planning Policy;
 - Appendix 15B: Ecological Impact Assessment Methods;



- Appendix 15C: Baseline Ornithology Report (AECOM, 2019a);
- Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report; and
- Appendix 12C: Preliminary Ecological Appraisal Report STDC site

15.2 Legislation and Planning Policy Context

Legislation

- 15.2.1 Detailed information regarding the legislation and policy which is of most relevance to the Proposed Development is provided in Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume I) and Appendix 15A: Legislation and Planning Policy (PEI Report, Volume III).

Planning Policy

- 15.2.2 Planning policy relevant to the Proposed Development is provided and described in Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume III).

15.3 Guidance

Species of Conservation Concern

- 15.3.1 Eaton *et al.* (2015), summarised by the Royal Society for the Protection of Birds¹, have published lists of Birds of Conservation Concern (BoCC). Red List species are those that have declined in numbers and/or range by at least 50% over the last 25 years, those that have shown an historical population decline between 1800 and 1995; and species that are of global conservation concern. The species on the Red List are of the most urgent conservation concern.
- 15.3.2 Amber List species include those that have shown a moderate decline in numbers and/or range (25%-49%) over the last 25 years and those with total populations of less than 300 breeding pairs. Also included are those species which represent a significant proportion (greater than 20%) of the European breeding or wintering population, those for which at least 50% of the British population is limited to 10 sites or less, and those of unfavourable conservation status in Europe.
- 15.3.3 The remaining species are placed on the Green List, indicating that they are of low conservation priority. These species still receive full protection through the provisions of the WCA. Certain introduced non – native species such as Canada goose (*Branta canadensis*) are not listed and for the purposes of this report are classed as having no conservation status in the UK.
- 15.3.4 These lists confer no legal status. However, they are useful when assessing the significance of predicted impacts and determining the level of mitigation that may be required when birds are affected by development or any other

¹ https://www.bto.org/sites/default/files/shared_documents/publications/birds-conservation-concern/birds-of-conservation-concern-4-leaflet.pdf



activity. Furthermore, inclusion on the Red List is a factor in determining the species for which national or Local Biodiversity Action Plans (BAPs) were developed.

Biodiversity Action Plans

- 15.3.5 The UK Biodiversity Action Plan (BAP) was withdrawn in March 2011, the lists of Priority Species and Habitats being superseded by those within Section 41 of the NERC Act (2006). Local Biodiversity Action Plans (LBAPs) are no longer used as a formal expression of delivery of biodiversity targets but identify sub-regional priorities for nature conservation and propose agreed actions to conserve/maintain/enhance/increase local Priority Species and Habitats.
- 15.3.6 Tees Valley Biodiversity Partnership (2012) identify 10 species; barn owl (*Tyto alba*), ringed plover (*Charadrius hiaticula*), grey partridge (*Perdix perdix*), tree sparrow (*Passer montanus*), corn bunting (*Emberiza calandra*), shelduck (*Tadorna tadorna*), little tern (*Sternula albifrons*), bittern (*Botaurus stellaris*), swift (*Apus apus*) and yellow wagtail (*Motacilla flava*) that can be regarded as LBAP Priority Species on this basis.

15.4 Assessment Methodology and Significance Criteria

Impact Assessment and Significance Criteria

- 15.4.1 Ecological Impact Assessment (EclA) is the process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems and forms the ecological component of the wider EIA.
- 15.4.2 The EclA detailed in this chapter has been undertaken in accordance with best practice guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019).
- 15.4.3 The impact assessment and significance criteria for Ornithology is as-per the approach detailed within Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume I). This is supported by Appendix 15B: Ecological Impact Assessment Methods (PEI Report, Volume III).
- 15.4.4 The CIEEM approach described in Appendix 15B: Ecological Impact Assessment Methods (PEI Report, Volume III) broadly accords with the EIA methodology described in Chapter 2: Assessment Methodology (PEI Report, Volume I). However, the matrix approach has not been used to classify effects as this deviates from CIEEM guidance. In order to provide consistency of terminology in the final assessment, the findings of the CIEEM assessment have been translated into the classification of effects scale used in other chapters of the PEI Report as outlined in Table 15-1. The category of “Negligible” effects, defined in Chapter 2 as an “imperceptible effect to an environmental resource or receptor”, is analogous to the category of “Neutral” as set out below.

Table 15-1: Relationship Between CIEEM Assessment Terms and Those Used in Other PEI Reports Chapters

| CIEEM assessment terms | Equivalent terminology used in other PEI Report chapters | |
|---|--|---------------------|
| Beneficial effect on structure/ function or conservation status at regional, national or international level. | Significant (beneficial) | Major beneficial |
| Beneficial effect on structure/ function or conservation status at County level. | | Moderate beneficial |
| Beneficial effect on structure/ function or conservation status at Site or Local level. | Not significant | Minor beneficial |
| No effect on structure/ function or conservation status. | Not significant | Neutral |
| Adverse effect on structure/ function or conservation status at Site or Local level | Not significant | Minor adverse |
| Adverse effect on structure/ function or conservation status at County level. | Significant (adverse) | Moderate adverse |
| Adverse effect on structure/ function or conservation status at Regional, National or International level. | | Major adverse |

Extent of Study Area

- 15.4.5 The study areas used in this assessment were defined with reference to the likely Zone of Influence (Zol) over which the Proposed Development may have potential to result in significant effects on relevant biodiversity, ornithological and geological features, but also with regard to the precautionary principle to ensure sufficient data was gathered to meet worst case needs for impact assessment and ongoing design iterations.
- 15.4.6 These Zol are feature specific, for example the Zol for assessment of potential impacts and effects on reptiles is much less than that for assessment of air quality impacts and effects on nature conservation designations.
- 15.4.7 It is important to recognise that the potential Zol of the Proposed Development may vary over time (e.g. the construction Zol may differ from the operational Zol) and/ or depending on the individual sensitivities of different ecological features.
- 15.4.8 It is also important to recognise that the potential Zol would vary depending on the particular species being considered. For this reason, the largest Zol has been presented below in Figure 15-1: Study Areas (PEI Report, Volume II); this is for the consideration of air quality effects on mobile ornithological receptors. The extent of the study areas applied during the desk study and field surveys are set out in further detail below Sources of Information/Data
- 15.4.9 The ecological baseline has been determined through a combination of desk study and field survey, set out in detail in the baseline reports appended to



this chapter (i.e. Appendix 12C: Preliminary Ecological Appraisal Report (STDC Site) and Appendix 15C: Baseline Ornithology Report (PEI Report, Volume III)).

15.4.10 It is also important to note that in addition to the ornithological features considered within the study area, some transient species from other designated sites may enter the Zol for the Proposed Development. This is considered further within Appendix 15D: HRA LSE Screening (PEI Report, Volume III).

15.4.11 The ornithological baseline is summarised in Section 15.6.

Desk Study

15.4.12 A desk study was undertaken throughout 2018/2019 to identify biodiversity and geological designations as well as protected and notable habitats and species of potential relevance to the Proposed Development. The desk study was carried out using the data sources detailed in Table 15-2 and is described further in the Preliminary Ecological Appraisal (PEA) and ornithological baseline reports provided respectively as Appendices 12C: Preliminary Ecological Appraisal Report and 15C: Baseline Ornithology Report (PEI Report, Volume III).

15.4.13 Protected and notable habitats and species include those listed under Schedules 1, 5 and 8 of the WCA; Schedules 2, 4 and 5 of The Habitats Regulations; and species and habitats of principal importance for nature conservation in England listed under Section 41 (S41) of the NERC Act. Other habitats and species have also been considered and assessed on a case by case basis, e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation.

15.4.14 Alongside ongoing engagement with Natural England, further species-specific data have been requested from several organisations to help provide contemporary data to underpin the finalised impact assessments. Most recently, this has included ornithology data from the Industry Nature Conservation Authority (INCA) and the Royal Society for the Protection of Birds (RSPB). These and any other additional data will be reported in the final ES.

Table 15-2: Desk Study Area and Data Sources

| Ecological Feature | Study Area | Data Sources |
|--|------------|--|
| International nature conservation designations e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar | 15 km | Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk) (accessed March 2018) |
| National statutory nature conservation designations e.g. Site of Special Scientific Interest (SSSI) | 15 km | MAGIC website (accessed March 2018) |
| Local statutory nature conservation designations (biodiversity) e.g. Local Nature Reserve (LNR) | 2 km | Environmental Records Information Centre North East (ERIC) (received July 2019) |
| Local non-statutory nature conservation designations (biodiversity) e.g. Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC), ancient woodland | 1 km | Environmental Records Information Centre North East (ERIC) (received July 2019) |
| Protected and notable bird records | 1 km | Environmental Records Information Centre North East (ERIC) (received July 2019) |
| Wetland birds | N/A | British Trust for Ornithology (BTO) Wetland Birds Survey (WeBS) (received September 2018) Core count 5-year synopsis tables for 7 Core Count Sectors (Coatham Sands North; Redcar and Coatham Sands South; Quarries and Lagoons; Bran Sands North; Bran Sands South; Coatham Marsh; and Haverton Hole North ²). The data cover the count years 2012/13 – 2016/17. |
| Information on habitats and habitat connections (based on aerial photography) relevant to interpretation of planning policy and assessment of potential protected and notable species constraints. | N/A | Ordnance Survey 1:25,000 Pathfinder maps and aerial photography (Accessed March 2018) |
| General information on Local Biodiversity Action Plan Priority Species | N/A | Tees Valley Nature Partnership Website (Tees Valley Nature Partnership, 2012) (Accessed March 2018) |

Field Surveys

15.4.15 The scope of the ornithological surveys was determined through early consultation with Natural England (see Section 15.5) and an initial programme (as access became available) of Phase 1 Habitat survey and Preliminary Ecological Appraisal (PEA) as described in Appendix 12C: Preliminary Ecological Appraisal (PEA) Report (PEI Report, Volume III). This

² WeBS count sectors in the Teesside area have recently changed in connection with the confirmation of the proposed extension to the SPA/Ramsars. Haverton Hole North, Cowpen Marsh, Saltholme Central and Saltholme Pools have been sub-divided and renamed. However the data acquired by AECOM remain spatially relevant.



survey effort was informed by the design of the Proposed Development when the surveys were commissioned. This was modified and updated over time to reflect changes to the proposed Site boundary and the outcome of consultation. Work to help refine the baseline further is ongoing, as noted below.

- 15.4.16 The field surveys undertaken to-date to inform the scheme design and the PEI Report are summarised in Table 15-3 and Figure 15-2. Full details of the scope and methodology for each survey are provided in the relevant technical appendices, which are cross referenced in Table 15-3 as appropriate.
- 15.4.17 Whilst a comprehensive suite of surveys has been undertaken to inform the baseline, additional ornithological surveys were programmed for spring and summer 2020 to help refine the impact assessment further. These are detailed in Appendix 12C: Preliminary Ecological Appraisal Report, PEI Report, Volume III) and include protected species and further botanical surveys.
- 15.4.18 The outbreak of the Coronavirus Disease (COVID-19) in spring 2020 and the subsequent governmental advice regarding workplace health and safety protocols led to a review of the original suite of surveys planned for 2020.
- 15.4.19 In light of COVID-19, it was not possible to begin the original series of planned surveys in their entirety. Instead, under the unprecedented circumstances surrounding COVID-19, a limited number of field surveys regarded as essential to 'top-up' the baseline were planned.
- 15.4.20 This approach is seen to be consistent with the advice provided by Natural England within their 'Guidance on implications for Natural England's development management advice' (Natural England, 2020). This approach was also discussed on a site-specific basis and confirmed with Natural England throughout April 2020. A revised plan to undertake targeted surveys was finalised in May 2020, with surveys commencing soon after.

Table 15-3: Ornithological Field Surveys Completed to Date

| Ecological survey | Technical appendix (PEI Report, Volume III) | Study area | Survey date(s) |
|---|---|--|--|
| Breeding Bird Surveys (Common Bird Census method, Marchant (1983)) | 15C | Former SSI Steelworks and land to the east (“Teardrop”); Steelhouse Loop; Coatham Sands and Gare Road; Saltholme Substation; and Lackenby Substation | 17th April 2018 23rd April 2018 22nd May 2018 12th June 2018 12th July 2018 |
| Intertidal and High Tide Bird Counts (using methodology consistent with BTO WeBS ³) | 15C | The sand dunes adjacent to Coatham Sands to the north (Sectors A-C); Coatham Marsh to the east of the former SSI Steelworks and land to the east (“Teardrop”) (Sectors D & E); The Teardrop (Sectors F & G); former SSI Steelworks and the Teesside works immediately to the south and west of the former SSI Steelworks (Sectors H-L); and the Steel House Pond (Sector SHP1) | 11th September 2017 25th September 2017 10th October 2017 24th October 2017 14th November 2017 27th November 2017 7th December 2017 19th December 2017 8th January 2018 20th January 2018 1st February 2018 19th February 2018 8th March 2018 19th March 2018 3rd April 2018 10th April 2018 25th May 2018 19th June 2018 27th July 2018 10th August 2018 20th August 2018 |

³ The Wetland Bird Survey (WeBS) is the long-term monitoring scheme for non-breeding waterbirds in the UK, which aims to provide the principal data for the conservation of their populations and wetland habitats. WeBS is a partnership between the British Trust for Ornithology, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee (the last on behalf of Natural England, Natural Resources Wales and Scottish Natural Heritage and the Department of the Environment Northern Ireland) in association with the Wildfowl and Wetlands Trust. Core counts are synchronised monthly counts undertaken at wetlands throughout the UK.

15.5 Consultation

- 15.5.1 Pre-application engagement has been ongoing with Natural England since 2017, as summarised below:
- July 2017 (Pre-Application engagement meeting);
 - September 2017 (Methodology and scope review);
 - March 2019 (Pre-Application engagement meeting);
 - April 2019 (Pre-Application engagement meeting; and
 - February 2020 (Pre-Application engagement meeting);
- 15.5.2 An EIA Scoping Opinion was received from the Planning Inspectorate in April 2019. A summary of the comments and how they have been considered and actioned is provided in Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume I).
- 15.5.3 The scope of the Ornithological inputs into the wider Habitats Regulations Assessment was discussed with Natural England (February 2020). This is reported in further detail within Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report (PEI Report, Volume III).

15.6 Baseline Conditions

Existing Baseline

- 15.6.1 The ecological features relevant to the Proposed Development are summarised in Table 15-4.
- 15.6.2 Full details of the findings of desk and field-based studies, including evaluation of the relative nature conservation value of identified ecological features, is provided in Appendices 12C: Preliminary Ecological Appraisal (PEA) Report and 15C: Baseline Ornithology Report (PEI Report, Volume III). These appendices should be referred to for more information on the grounds for scoping ecological features in and out of impact assessment.
- 15.6.3 The Habitats Regulation Assessment (HRA), which is informed by the Ornithological assessment within this chapter, is reported within Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report (PEI Report, Volume III).
- 15.6.4 The assessment presented in this chapter does not repeat the source data contained within the supporting appendices.

Table 15-4: Summary of Relevant Biodiversity and Geology Features Requiring Further Assessment of Impacts and Effects

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|---|--|--|------------------------------------|--|---|--|--|
| International Designated Sites³ | | | | | | | |
| Teesmouth and Cleveland Coast SPA | <p>The SPA is designated for internationally important numbers of marine and shore birds, including:</p> <ul style="list-style-type: none"> • <i>Recurvirostra avosetta</i>; Pied avocet (Breeding) • <i>Calidris canutus</i>; Red knot (Non-breeding) • <i>Calidris pugnax</i>; Ruff (Non-breeding) • <i>Tringa totanus</i>; Common redshank (Non-breeding) • <i>Sterna sandvicensis</i>; Sandwich tern (Non-breeding) • <i>Sterna hirundo</i>; Common tern (Breeding) • <i>Sterna albifrons</i>; Little tern (Breeding) • Waterbird assemblage • In addition to breeding sites the SPA includes areas designated for marine and terrestrial | The PCC is immediately south of the SPA. The proposed CO ₂ Export Pipeline; Water Connection Corridors; and CO ₂ Gathering Network are located within the SPA. | International, statutory protected | <p>Appendix 12C: Preliminary Ecological Appraisal</p> <p>Appendix 15C: Baseline Ornithology Report</p> <p>Chapter 8: Air Quality</p> <p>Chapter 12: Terrestrial Ecology and Nature Conservation</p> <p>Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report</p> | C, O | C, O | |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|--------------------------------------|---|--|------------------------------------|--|---|--|--|
| | foraging habitats for little tern (<i>Sternula albifrons</i>), common tern (<i>Sterna hirundo</i>), avocet (<i>Recurvirostra avosetta</i>) and ruff (<i>Calidris pugnax</i>) that extend several kilometres out to sea.. | | | | | | |
| Teesmouth and Cleveland Coast Ramsar | <p>The Ramsar is designated for internationally important numbers of marine and shore birds, including:</p> <ul style="list-style-type: none"> • Peak winter count of 9,528 waterfowl (5 year peak mean 1998/99-2002/03) • Peak spring/autumn count of common redshank (<i>Tringa totanus totanus</i>); 883 individuals representing an average of 0.7% of the GB population (5 year peak mean 1998/9-2002/3) • Peak winter count of red knot (<i>Calidris canutus islandica</i>); 2,579 individuals representing an average of 0.9% of the GB | The PCC is immediately south of the Ramsar. The proposed CO ₂ Export Pipeline; Water Connection Corridors; and CO ₂ Gathering Network are located within the Ramsar. | International, statutory protected | <p>Appendix 12C: Preliminary Ecological Appraisal</p> <p>Appendix 15C: Baseline Ornithology Report</p> <p>Chapter 8: Air Quality</p> <p>Chapter 12: Terrestrial Ecology and Nature Conservation</p> <p>Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report</p> | C, O | C, O | |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|--|--|--|---|--|---|--|--|
| | <p>population (5 year peak mean 1987-1991)</p> <p>Other features include a broad range of freshwater, marsh, intertidal and dune habitats present.</p> | | | | | | |
| North York Moors SPA | <p>Designated for high numbers of breeding golden plover (<i>Pluvialis apricaria</i>) and merlin (<i>Falco columbarus</i>).</p> | <p>The PCC is located 11.9 km north of the SPA. The proposed Electrical Connection Corridor at Lackenby substation is located 6.6 km northwest of the SPA.</p> | <p>International, statutory protected</p> | <p>Appendix 12C: Preliminary Ecological Appraisal</p> <p>Appendix 15C: Baseline Ornithology Report</p> <p>Chapter 8: Air Quality</p> <p>Chapter 12: Terrestrial Ecology and Nature Conservation</p> <p>Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report</p> | O | | n/r |
| National and Local Designated Sites⁴ | | | | | | | |
| Teemouth and Cleveland Coast SSSI | <p>Designated for nationally important features supported by a mosaic of coastal and freshwater habitats.</p> | <p>The PCC is adjacent to the SSSI. The proposed CO₂ Export Pipeline; Natural Gas Connection Corridor; Water</p> | <p>National, statutory protected</p> | <p>Appendix 12C: Preliminary Ecological Appraisal</p> | C, O | | C, O |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) Power, Capture and Compressor site (PCC) Proposed Connection corridors ² |
|-----------------------------|---|---|-----------------------------|---|---|
| | <p>Formally designated for:</p> <ul style="list-style-type: none"> • >20,000 Non-breeding waterbirds; • Aggregations of breeding birds – Avocet; • Aggregations of breeding birds - Common Tern; • Aggregations of breeding birds - Little Tern; • Aggregations of non-breeding birds – Gadwall; • Aggregations of non-breeding birds – Knot; • Aggregations of non-breeding birds - Purple Sandpiper; • Aggregations of non-breeding birds – Redshank; • Aggregations of non-breeding birds - Ringed Plover; • Aggregations of non-breeding birds – Ruff; • Aggregations of non-breeding birds – Sanderling; | <p>Connection Corridors; and CO₂ Gathering Network are located within the SSSI. The designation overlaps with other internationally designated sites of the same name.</p> | | <p>Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report</p> | |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|-----------------------------|---|---|-------------------------------|--|---|--|--|
| | <ul style="list-style-type: none"> • Aggregations of non-breeding birds - Sandwich Tern; • Aggregations of non-breeding birds – Shelduck; • Aggregations of non-breeding birds – Shoveler; and • Assemblages of breeding birds - Mixed: sand-dunes and saltmarsh, lowland open waters and their margins. | | | | | | |
| Teesmouth NNR | <p>Formally designated for the following ornithological interest features:</p> <ul style="list-style-type: none"> • >20,000 waterbird assemblage; • BAP breeding birds; waders, grey partridge (<i>Perdix perdix</i>), skylark (<i>Alauda arvensis</i>), linnet (<i>Linaria cannabina</i>), reed bunting (<i>Emberiza schoeniclus</i>); • Knot (non-breeding); • Little tern (breeding); • Redshank (non-breeding); | <p>The PCC is located 2.7 km east of the NNR. The proposed Natural Gas Connection Corridor is adjacent to the NNR and the CO₂ Gathering Network is 600 m south of the NNR. The NNR overlaps with the Teesmouth and Cleveland Coast SSSI.</p> | National, statutory protected | <p>Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation</p> | C, O | | C, O |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | |
|-----------------------------|--|---|-----------------------------|--|---|--|
| | | | | | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
| | <ul style="list-style-type: none"> • Ringed plover (spring); • Sandwich tern (post-breeding); and • Shelduck (winter). | | | | | |
| Eston Moor LNR | Designated for habitats suitable for common breeding bird species, including birch woodland, scrub and wetland. | The PCC is located 6.5 km north of the LNR. The proposed Electrical Connection Corridor at Lackenby substation is located 1.2 km north of the LNR. | District, statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | n/r |
| Seaton Dunes and Common LNR | The dune system is one of the largest and most diverse in north-east England which is important feeding and breeding area for many species (including short-eared owl <i>Asio flammeus</i> and waders such as sanderling <i>Calidris alba</i> , knot, ringed plover, turnstone <i>Arenaria interpres</i> , oystercatcher <i>Haemotopus ostralegus</i> , and grey plover <i>Pluvialis</i> | The PCC is located 3.8 km southwest of the LNR. The proposed Water Connection Corridors is located 1.9 km south of the LNR. The LNR overlaps with the Teesmouth and Cleveland Coast SSSI. | District, statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | n/r |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|-------------------------------------|---|--|-----------------------------|--|---|--|--|
| | <p><i>squatarola</i>). Adjacent common is low-lying grazed freshwater marsh attracting migrant and wintering waterfowl including redwing <i>Turdus iliacus</i> and fieldfare <i>Turdus pilaris</i>, as well as providing important feeding ground for flocks of waders.</p> | | | | | | |
| Charlton's Pond LNR | <p>Designated for habitats suitable for common breeding bird species and waders, such as wetland and broadleaved woodland. The pond on site was first designated as a bird sanctuary in the late 1960's.</p> | <p>The PCC is located 9.8 km east of the LNR. The CO₂ Gathering Network is located 1 km east of the LNR.</p> | District, statutory | <p>Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation</p> | O | | n/r |
| Cowpen Bewley Wood Country Park LNR | <p>Former clay pit serving a nearby brickworks, the site is designated amongst other things for bird interest thanks to open water and wetland habitats, with 80+ species recorded at the site throughout the year including breeding mute swan <i>Cygnus</i></p> | <p>The PCC is located 8.5 km east of the LNR. The CO₂ Gathering Network is located 1.3 km southeast of the LNR.</p> | District, statutory | <p>Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality</p> | O | | n/r |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|-----------------------------|--|--|-----------------------------|--|---|--|--|
| | <p><i>olor</i>, spotted flycatcher <i>Muscicapa striata</i> as a passage migrant and red-crested pochard <i>Netta rufina</i> and red-necked grebe <i>Podiceps grisegena</i> as winter visitors in some years. Historically, long-eared owl <i>Asio otus</i> has roosted on site.</p> | | | Chapter 12: Terrestrial Ecology and Nature Conservation | | | |
| RSPB Reserve Saltholme | Designated as the site is one of the largest breeding colonies of common terns in the UK and breeding lapwing (red list) are present, as well as being used by foraging peregrine <i>Falco peregrinus</i> and breeding marsh harrier <i>Circus aeruginosus</i> in 2019. | The PCC is located 1.2 km east of the reserve. The CO ₂ Gathering Network is adjacent to the reserve and the proposed Water Connection Corridors is located within the reserve. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | O | | C |
| Coatham Marsh LWS | Designated for its habitats including saltmarsh, standing water and reedbed. Breeding reed warbler <i>Acrocephalus scirpaceus</i> , sedge warbler | The PCC is located 560 m west of the LWS. The CO ₂ Gathering Network; Natural Gas Connection Corridor; and Electrical | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal | C, O | | C |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|--------------------------------------|---|---|------------------------------|--|---|--|--|
| | <p><i>Acrocephalus schoenobaenus</i> and grasshopper warbler <i>Locustella naevia</i> have been recorded in reedbeds. Waders such as redshank utilise the site during the winter and the site is the most reliable in the region for bittern <i>Botaurus stellaris</i>. Migrants occasionally frequent the site such as red-breasted flycatcher <i>Ficedula parva</i>, Yellow-browed Warbler <i>Phylloscopus inornatus</i> and Great Grey Shrike <i>Lanius excubitor</i>. The grassland is regularly used by hunting Barn Owl <i>Tyto alba</i>.</p> | <p>Connection Corridor are located 250 m west of the LWS.</p> | | <p>Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation</p> | | | |
| <p>Greatham Creek North Bank LWS</p> | <p>The mudflats and saltmarsh along the bank are utilised by SPA birds in small numbers.</p> | <p>The PCC is located 4.9 km east of the LWS. The proposed Natural Gas Connection Corridor is located 600 m south of the LWS.</p> | <p>County, non-statutory</p> | <p>Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation</p> | <p>O</p> | | <p>n/r</p> |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | |
|-----------------------------|---|--|-----------------------------|--|---|--|
| | | | | | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
| Greatham North West LWS | An important site for breeding lapwing and supports 3.7% of total Teesmouth and Cleveland Coast SPA bird numbers. | The PCC is located 5.7 km east of the LWS. The proposed Natural Gas Connection Corridor is located 1 km south of the LWS. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | O |
| Phillips Tank Farm LWS | Site is important for breeding lapwing and supports 3.7% of total Teesmouth and Cleveland Coast SPA bird numbers. | The PCC is located 5.4 km east of the LWS. The proposed Natural Gas Connection Corridor is located 1.4 km south-east of the LWS. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | O |
| Zinc Work Fields LWS | Designated for occasionally supporting >2% of the total wintering waterbird population of the Teesmouth and Cleveland Coast SPA and presence of >0.5% of the national population of Ring Ouzel (<i>Turdus torquatus</i>). | The PCC is located 3.5 km east of the LWS. The proposed Water Connection Corridors are located 1.2 km east of the LWS. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality | O | O |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|--|--|--|------------------------------------|--|---|--|--|
| | | | | Chapter 12: Terrestrial Ecology and Nature Conservation | | | |
| Greenabella Marsh LWS | Grassland, marsh and reedbed habitats present supporting breeding common terns, wildfowl and waders as well as foraging short-eared owl, merlin <i>Falco columbarius</i> and peregrine. 223 bird species have been recorded here since 1993. | The PCC is located 4.6 km east of the LWS. The proposed Natural Gas Connection Corridor is located 800 m southeast of the LWS. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | | O |
| Wilton Woods Complex LWS | Ancient woodland with suitable habitat for woodland breeding birds. | The PCC is located 4 km north of the LWS. The proposed Electrical Connection Corridor is located 300 m north of the LWS. | County, non-statutory | Appendix 12C: Preliminary Ecological Appraisal Appendix 15C: Baseline Ornithology Report Chapter 8: Air Quality Chapter 12: Terrestrial Ecology and Nature Conservation | O | | n/r |
| Species⁵ | | | | | | | |
| Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 | Bird species protected under Schedule 1 of the Wildlife & Countryside Act 1981. Annex | In 2019 all little tern breeding associated with the SPA occurred at | International, statutory protected | Appendix 15C: Baseline Ornithological Report | O | | O |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|---|---|--|------------------------------------|---|---|--|--|
| qualifying species - breeding little tern | 1 species of the Birds Directive. Amber listed. | Seaton Carew (36-38 breeding pairs ⁴). | | Chapter 8: Air Quality Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | | | |
| Teesmouth and Cleveland Coast SPA/ Ramsar Annex 1 qualifying species – non-breeding Sandwich tern | Bird species listed under Annex 1 of the Birds Directive. Amber listed. | Recorded >500 m from the former SSI Steelworks during AECOM surveys at Coatham Sands North Intertidal Count Sectors which overlaps with the SPA. Recorded <500 m from former SSI Steelworks in the Redcar and Coatham Sands South WeBS count sector which overlaps the SPA. The PCC is located 290 m south of the SPA/ | International, statutory protected | Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | C | | C, O |

⁴ Bell and Leakey (2019)

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|---|-----------------------------|--|------------------------------------|---|---|--|--|
| | | Network are located within the SPA / Ramsar. | | | | | |
| Teesmouth and Cleveland Coast SPA / Ramsar migratory (winter) qualifying species – knot | Bird species. Amber listed. | Recorded <500 m from the former SSI Steelworks in the Redcar and Coatham Sands South WeBs count sector which overlaps the SPA. The latter overlaps the SPA. SPA located within the northern CO ₂ Gathering Network, CO ₂ Export Pipeline and Water Connection Corridors. The PCC is located 290 m south of the SPA / Ramsar. The CO ₂ Export Pipeline; Water Connection Corridors; and CO ₂ Gathering Network are located within the SPA / Ramsar. | International, statutory protected | Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | C, O | | C |
| Teesmouth and Cleveland Coast SPA / Ramsar waterfowl <i>assemblage</i> qualifying feature (includes all species which are | | Over winter, the area regularly supports 21,406 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Sanderling | International, statutory protected | Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality | C, O | | C |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) Power, Capture and Compressor site (PCC) Proposed Connection corridors ² |
|--|------------------------|---|-----------------------------|--|---|
| qualifying or assemblage features of the SPA/Ramsar) | | <p><i>Calidris alba</i>, lapwing <i>Vanellus</i>, shelduck <i>Tadorna</i>, cormorant <i>Phalacrocorax carbo</i>, redshank and knot.</p> <p>The results of the AECOM surveys show that the Coatham Sand Dunes (Quarries & Lagoon) High Tide Count Sector is utilised by the SPA qualifying species (including lapwing, redshank, teal).</p> <p>The following assemblage and qualifying waterfowl species were recorded during the AECOM WeBS surveys: cormorant lapwing, little tern, redshank, ringed plover, sanderling, Sandwich tern, shelduck, shoveler, teal and common tern.</p> <p>SPA located within the northern CO₂ Gathering Network, CO₂ Export</p> | | | |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | |
|---|--|--|---|--|---|--|
| | | | | | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
| | | <p>Pipeline and Water Connection Corridor. The PCC is located 290 m south of the SPA / Ramsar. The proposed CO₂ Export Pipeline; Water Connection Corridors; and CO₂ Gathering Network are located within the SPA / Ramsar.</p> | | | | |
| <p>Teesmouth and Cleveland Coast SPA – avocet & ruff</p> | <p>Bird species. Both protected under Schedule 1 of the Wildlife & Countryside Act 1981 and listed under Annex 1 of the Birds Directive.</p> | <p>Ruff, recorded >500 m from the former SSI Steelworks in Coatham Marsh WeBS sector. There are no records of avocet returned from the WeBS sectors relevant to the AECOM desk study. Ruff and avocet were not recorded during the AECOM field surveys.</p> | <p>International, statutory protected</p> | <p>Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report</p> | <p>O</p> | <p>?</p> |
| <p>Teesmouth and Cleveland Coast SPA – foraging little tern & common tern</p> | <p>Bird species. Both listed under Annex 1 of the Birds Directive. Little tern protected under Schedule 1 of the</p> | <p>The results of the AECOM surveys show that common tern and little tern utilise the</p> | <p>International, statutory protected</p> | <p>Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality</p> | <p>O</p> | <p>C, O</p> |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) Power, Capture and Compressor site (PCC) Proposed Connection corridors ² |
|--|---|--|-----------------------------|---|---|
| | Wildlife & Countryside Act 1981. | AECOM Intertidal Count Sectors. Little tern and common tern were not recorded during the AECOM field surveys with the Quarries and Lagoons area. | | Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | |
| BoCC Red Listed Breeding Bird Assemblage (skylark, song thrush, mistle thrush, linnet) | Bird species on the Birds of Conservation Concern Red List. | A large proportion of the habitat immediately adjacent to the former SSI Steelworks within AECOM CBC survey areas consists of coastal dune, coastal grassland and wetland habitat. The results of the field surveys confirm that BoCC Red Listed bird species breeding in the habitat adjacent to the former SSI Steelworks include: Skylark (approx. 22 pairs), song thrush (2 pairs), mistle thrush (1 pair) linnet (7 pairs). | District | Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality | C, O C |

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) | Power, Capture and Compressor site (PCC) | Proposed Connection corridors ² |
|---------------------------------|---|--|-----------------------------|---|---|--|--|
| | | Breeding populations do not meet the criterion for Local Wildlife Site Selection of more than 0.1% of the national breeding population of a native species ⁵ | | | | | |
| All other breeding bird species | Bird species not included in the above designations or under Schedule 1 of the Wildlife & Countryside Act 1981. | Nineteen species were recorded breeding in the Coatham Sands & Gare Road area surveyed by AECOM, which partially overlaps the construction footprint of the CO ₂ Export Pipeline. | Local | Appendix 15C: Baseline Ornithological Report Chapter 8: Air Quality Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | C, O | | C |
| Schedule 1 Birds | Listed under Schedule 1 Part 1 Wildlife and Countryside Act identified within 1 km of the proposed former SSI Steelworks site and | Roosting recorded in study area during AECOM field survey in 2018 and nesting (1 pair) recorded at the | National, LBAP | Appendix 15C: Preliminary Ecological Appraisal Chapter 15: Ornithology | C, O | | C |

⁵ Tees Valley Biodiversity Partnership (2010). *Guidelines for the Selection of Local Wildlife Sites in the Tees Valley*.

| Relevant ecological feature | Description of feature | Relationship to the Proposed Development | Ecological value and status | See related Chapter or Appendix of this PEI Report (Volume I or III) | Relevance to Assessment of the Proposed Development (C = construction ¹ , O = operation ¹ , n/r = not relevant) Power, Capture and Compressor site (PCC) Proposed Connection corridors ² |
|-----------------------------|--|---|-----------------------------|---|---|
| | connection corridors from desk study and field survey. | same location by a third party in 2019 ⁶ . | | Appendix 15D: Habitats Regulations Assessment – Likely Significant Effects Screening Report | |

¹ For the purposes of this assessment, Operational and Maintenance activities are considered as part of the 'Operation' category. Routine maintenance activities will be localised (largely restricted to the built footprint of the Proposed Development), small-scale and are likely to be trivial relative to the worst-case construction activities that will represent the peak in human disturbance arising from the Proposed Development. As such, if adverse disturbance effects are not predicted as a result of construction activities, then it should be assumed that maintenance activities will also not be adverse. Similarly, decommissioning activities are considered to be suitably enveloped by the worst-case assessment of construction effects. Decommissioning is discussed in section 15.8.49 and section 15.8.50 supported by Chapter 4: Proposed Development (PEI Report, Volume I).

² CO₂ Export Pipeline, Natural Gas Connection, Electrical Connection Corridor, Water Connection Corridors, CO₂ Gathering Network.

³ Encompasses designations with potential to experience direct effects based on proximity to the Proposed Development, and additional designations identified in Chapter 8: Air Quality (PEI Report, Volume I) and Appendix 15D: Habitat Regulations Assessment – Likely Significant Effects Screening Report (PEI Report, Volume III) that may experience a potential air quality effect (to a maximum distance of 15 km for the operational assessment). A report to inform Habitats Regulations Assessment (HRA) of the Proposed Development is presented as Appendix 15D: HRA LSE Screening (PEI Report, Volume III). This will be updated as required and reported as an appendix in the final ES.

⁴ Encompasses designations with potential to experience direct effects based on proximity to the Proposed Development, and additional designations identified in Chapter 8: Air Quality (PEI Report, Volume I) that may experience a potential air quality effect (to a maximum distance of 50 m for the construction assessment, and a maximum distance of 2 km and 15 km for the operational assessment of local and national designations respectively). Designations identified in Appendix 12C: Preliminary Ecological Appraisal Report (PEI Report, Volume III) for which no pathways for impact are subsequently identified in the PEA or in Chapter 8: Air Quality (PEI Report, Volume I) are excluded from this table on the basis that they are not relevant for the purposes of assessment. This chapter only addresses impacts on SSSI and other sites with relevant ornithological features; for impacts on other designated sites see Chapters 12: Terrestrial Ecology and Nature Conservation and 14: Marine Ecology and Nature Conservation (PEI Report, Volume I).

⁵ All species identified as relevant in Appendices 12C: Preliminary Ecological Appraisal (PEA) Report and 15C: Baseline Ornithology Report (PEI Report, Volume III) are brought forward for impact assessment. Records of species vulnerable to persecution are treated as confidential and are included in a separate confidential appendix/chapter.

⁶ AECOM (2019a)

Future Baseline

15.6.5 This section summarises the foreseeable changes to the ornithological baseline over the short-term construction phase and the medium – long term operational phase and ultimately decommissioning.

Construction (2022 - 2026)

15.6.6 The ecological baseline in 2022-2026 is likely to be very similar to the existing baseline.

15.6.7 Semi-natural habitats within the Study Area are all currently managed to a greater or lesser degree, and this land management is unlikely to change over the short term. All existing habitats are likely to continue to be present, although some minor changes in habitat extent, composition and structure might occur as a result of ecological succession e.g. the gradual establishment of tree and shrub seedlings, minor changes in the extent and distribution of ruderal vegetation, or the balance between different agricultural cropping regimes. Therefore, the habitats and species present are very unlikely to undergo significant change prior to the period 2022-2026.

15.6.8 Changes in the distribution of some species would be likely to occur in line with changes in habitats as a result of ecological succession or other natural processes, but over the short term any such changes would be relatively minor.

Operation (2026 - 2051)

15.6.9 Based on available information, there are no grounds to expect that there would have been any marked change in local land management practice and the habitats by the time of first commercial operation. The short-term baseline described above for construction is equally applicable to the start of operation. Over the medium-term operational life of the Proposed Development, semi-natural habitats, including any new habitats provided as part of the Proposed Development, would be more mature or have experienced successional change e.g. grassland to scrub or scrub to woodland. Where land-use management practices remain unchanged, no substantive change in the habitat baseline would be reasonably anticipated.

15.6.10 It is possible that current and former industrial land adjacent to the Site would be released for new development. The nature of the development would represent a change in land-use but the previously developed context would be unchanged. However, the extent of ecologically valuable open mosaic habitats may decrease as a result of such development. Implementation of planning policy and legal requirements may mean that future adjacent developments incorporate features of value for biodiversity, resulting in small to moderate improvements in the future baseline over the operational life of the Proposed Development e.g. certain species may colonise or increase in number as a result of such enhancement.

15.6.11 Changes in the distribution of some species would be likely to occur in line with changes in habitats as a result of ecological succession or other natural processes, but over the short term any such changes would be relatively minor.



Decommissioning of the Power and Capture Site (circa 2051)

- 15.6.12 Strategic-level Climate Change Predictions (CCP), such as UKCP18 (The Met Office, 2018) have been reviewed to help inform a consideration of the future baseline; for this coastal location, predominant changes are likely to relate to sea level rise - up to 300 mm over the lifetime of the development (see Appendix 9A: Flood Risk Assessment, PEI Report, Volume III).
- 15.6.13 Ultimately, the decommissioning baseline would largely depend on future land-use and nature conservation regimes and this therefore limits the assumptions that could be made for the purposes of this assessment.
- 15.6.14 A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) will be produced and agreed with the Environment Agency as part of the Environmental Permitting and site surrender process, see Chapter 4: Proposed Development (PEI Report, Volume I).
- 15.6.15 Responses to consultation during PEI will be used to help inform a consideration of future baseline for the ES which will accompany the DCO application.

15.7 Development Design and Impact Avoidance

Development Design

- 15.7.1 The design process for the Proposed Development has included consideration of biodiversity constraints and has incorporated, where reasonably practical, measures to avoid and reduce the potential for adverse effects on these, in accordance with the 'mitigation hierarchy'⁷ (see Appendix 12B: Ecological Impact Assessment Methods, PEI Volume III) and relevant planning policy.
- 15.7.2 The measures identified and adopted include those that are inherent to the design of the Proposed Development, and those that could realistically be expected to be applied as part of construction or operational environmental best practice, or as a result of legislative requirements.
- 15.7.3 Specifically, measures to deliver compliance with industry good practice and environmental protection legislation during both construction and operation can be assumed in accordance with NPS EN-1 paragraph 4.10.3, or as a result of legislative requirements. e.g. prevention of surface and ground water pollution, fugitive dust management, noise prevention or amelioration. It must be assumed that measures available to regulators to secure such requirements will be properly applied and enforced by the relevant regulators. Many of the measures required are already committed as set out

⁷ The mitigation hierarchy is implemented to achieve no overall negative impact on biodiversity or a net gain and is based on sequential steps through the project life cycle. These are (in order of priority): Avoidance (measures taken to avoid creating impacts from the outset); Minimisation (measures taken to reduce the duration, intensity and/or extent of impacts which cannot be avoided); Rehabilitation/Restoration (measures taken to improve degraded or removed ecosystems following exposure to impacts which cannot be avoided); and Offsetting (measures taken to compensate for residual adverse impacts after implementation of the previous steps).



in the Framework CEMP which will form part of the ES which will accompany the DCO application.

- 15.7.4 Similarly, it must be assumed that all relevant protected species legislation will be complied with, as this is mandatory. However, to assist transparency on what is required and what would be provided, measures to comply with relevant protected species legislation, including attainment of necessary licences and permits are summarised in the Mitigation section of this chapter.

Impact Avoidance Measures

- 15.7.5 The development design and impact avoidance measures that have been, or would be, adopted during the construction, operation and decommissioning phases of the Proposed Development are described below. See also Chapter 5: Construction Programme and Management (PEI Report, Volume I) for further details.
- 15.7.6 Where it is reasonably possible/practicable to do so, routing of proposed connection corridors is to utilise existing infrastructure to limit the excavations and construction activities required and therefore disturbance to species and habitats present.
- 15.7.7 In the case of the CO₂ Export Pipeline, and in areas where replacement of other connection corridors is required, trenchless technologies will be utilised where possible to minimise effects on habitats and species. In areas where use of trenchless technologies is not technically feasible, consultation will be undertaken with Natural England to identify an appropriate habitat mitigation plan, the details of which will be submitted with the final ES.
- 15.7.8 Measures to deliver compliance with industry good practice and environmental protection legislation during both construction and operation would be applied to minimise the potential for environmental pollution, e.g. prevention of surface and ground water pollution, fugitive dust management, noise prevention or amelioration. In support of this, the construction contractor would prepare and implement a Construction Environmental Management Plan (CEMP) detailing all requirements for environmental protection and legal compliance. A Framework CEMP will be prepared and submitted with the DCO application alongside the final ES.
- 15.7.9 Construction temporary lighting would be arranged so that glare is minimised outside the construction site. Measures to minimise the impact of lighting will be detailed in the CEMP.
- 15.7.10 Measures to comply with relevant legislation regarding animal welfare, including attainment of necessary licences and permits are summarised in the Mitigation section of this chapter, to provide transparency on what is required and what would be provided.
- 15.7.11 To ensure legislative compliance in relation to nesting birds, all clearance of suitable vegetation during site preparation would be undertaken outside the breeding season (typically March-August inclusive for most species), where possible. In situations where this is not possible, an ecologist would check



the working area for nests before works commence. If nests were discovered, appropriate mitigation would be implemented to ensure that they are not disturbed or destroyed before any works can commence in that area. This would include imposing exclusion zones between the works and nest(s) and suspending vegetation clearance works within the area until any young had fledged.

- 15.7.12 An Ecological Clerk of Works (ECoW) would supervise all relevant site clearance and construction works, where required.
- 15.7.13 The final stack height for the Proposed Development would be determined at the detailed design stage and would be optimised along with emissions characteristics with consideration given to minimisation of ground-level air quality impacts on ecological receptors and other relevant factors such as landscape and visual effects. This would be dependent upon the final stack location and building heights for the Proposed Development. At PEI Report stage, dispersion modelling of emissions to air has been undertaken to determine the preliminary optimum stack height range through comparison of the maximum impacts at human health and ecological receptors, to ensure that the impacts at sensitive receptors are minimised and avoided where feasible (see Chapter 8: Air Quality, PEI Report, Volume I). This would be refined further, if required, for the final ES, taking account of consultation responses.
- 15.7.14 As detailed in Chapter 4: Proposed Development (PEI Report, Volume I), prior to the commissioning of the Proposed Development a detailed lighting scheme would be submitted to RCBC for approval. The external lighting scheme would be designed in accordance with relevant standards, such as the Guidance Notes for the Reduction of Obtrusive Light (2020) published by the Institute of Lighting Engineers and/ or Chartered Institution Building Services Engineers (CIBSE) requirements, as appropriate. The lighting strategy would set out how lighting impacts on sensitive ecological receptors, including birds, have been considered and addressed and minimised as far as possible, for example by directing lighting away from adjacent habitats.
- 15.7.15 Air impacts on designated sites will be minimised through the use of appropriate stack heights to aid dispersion of pollutants and emissions monitoring to demonstrate continued compliance with emission limit values set by the Environment Agency.
- 15.7.16 Surface water discharge would be attenuated to green-field run-off rates and therefore there would be no changes in the flow rate within any of the water courses within the Study Area.

15.8 Likely Impacts and Effects

Construction of Power, Capture and Compressor Site

- 15.8.1 This section describes the likely impacts and potential effects during the construction phase of the PCC on relevant ornithological features in the absence of any mitigation but including design and impact avoidance/minimisation measures included in the design of the Proposed



Development (see Chapter 5: Construction Programme and Management (PEI Report, Volume I) for further details on mitigation inherent to the design and Section 15.9 for relevant proposed mitigation and enhancement measures).

- 15.8.2 To enable a focussed impact assessment, screening was undertaken of potential impacts of the construction phase that are likely to result in adverse or beneficial effects on relevant ornithological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in effects are scoped out and not considered further.
- 15.8.3 As informed by pre-application engagement with Natural England, the following potential source-receptor pathways have been scoped out of the impact assessment:
- Noise/ visual disturbance to SPA/Ramsar qualifying bird species associated with the following BTO WeBS Count Sectors (refer to Appendix 15C: Ornithological baseline report (PEI Report, Volume III)): Coatham Sands North, Bran Sands North, Bran Sands South, Coatham Marsh and Haverton Hole North – these areas are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;
 - Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar – noise/ visual disturbance to the little tern colonies, which are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by these potential impacts of the Proposed Development;
 - Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar – noise/ visual disturbance to knot within Redcar and Coatham Sands South WeBS sector. Interrogation of the BTO WeBS data confirms a peak monthly count of 20 birds in the aforementioned WeBS Count Sector; however there were no records of knot during the AECOM WeBS surveys, including the part of Redcar and Coatham Sands WeBS sector which overlaps the AECOM WeBS sector. There is therefore no pathway by which these features could be affected by the Proposed Development.
 - Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar – noise/ visual disturbance to avocet and ruff within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector. Interrogation of the BTO WeBS data confirms that these species have not been recorded in Redcar and Coatham Sands South nor Quarries and Lagoons WeBS sectors respectively (the only WeBS count sectors to overlap a 500 m buffer from the Proposed Development). Additionally avocet and ruff were not recorded during the AECOM WeBS surveys. There is therefore no pathway by which these features could be



affected by noise or visual disturbance arising from the Proposed Development

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar – noise/ visual disturbance to foraging little tern and common tern within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector, which is immediately adjacent to the proposed development. Interrogation of the BTO WeBS data shows that these species have not been recorded in this count sector. This is consistent with the results of the AECOM WeBS surveys (there were no records of common tern or little tern in the Quarry and Lagoons AECOM count area). A five-year peak count of 115 common terns is a feature of the Redcar and Coatham Sands South BTO WeBS count sector, however the results of the AECOM WeBS survey show that common tern and little tern were recorded outside the potential Zol of noise and visual disturbance (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development.
- Vibration impacts on the SPA / Ramsar – this pathway was scoped out of assessment based on distance and baseline conditions (see Chapter 8: Noise and Vibration (PEI Report, Volume I)); and
- Air quality impacts on intertidal and subtidal habitats in the SPA/Ramsar – intertidal habitats are not susceptible to the effects of changes in air quality arising from construction (through dust deposition and smothering of habitats) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

15.8.4 Impacts during the construction period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment, are considered further below:

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar/ SSSI (noise/ vibration and visual disturbance and barrier to movement). The only BTO WeBS count sectors which are considered relevant to the impact assessment because they overlap with the potential Zol of noise and visual disturbance are: Redcar and Coatham Sands South and Quarries and Lagoons. The AECOM WeBS count survey areas are also relevant to the impact assessment because they overlap with the potential Zol of noise and visual disturbance (i.e. Within 500 m). This should be considered in terms of reviewing the narrative below;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 qualifying species – Sandwich tern (noise/ vibration and visual disturbance and barrier to movement). The five-year peak for Sandwich tern within Redcar and Coatham Sands South is 30 which represents >1% of the SPA population (1.6%). The results of the AECOM surveys show that Sandwich tern utilises intertidal habitat within the potential Zol of noise and visual disturbance i.e. within 500 m of the Proposed Development;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar migratory (winter) qualifying species – redshank (noise/ vibration and visual disturbance and barrier to movement). The five-year peak for



redshank within Redcar and Coatham Sands South BTO WeBS count sector is 220 which represents >1% of the SPA population (13.3%). The five-year peak for Quarries and Lagoons BTO WeBS count sector is 180 which represent >1% of the SPA population (10.9%). The results of the AECOM surveys show that redshank utilises intertidal habitat within the potential Zol of noise and visual disturbance i.e. within 500 m of the Proposed Development;

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar waterfowl *assemblage* qualifying feature (includes all species which are qualifying or assemblage features of the SPA/Ramsar) - noise/ vibration and visual disturbance and barrier to movement). The results of the AECOM WeBS surveys show that the following waterfowl species utilise habitat within the potential Zol of noise and visual disturbance, in areas which overlap the Redcar and Coatham Sands South BTO WeBS count sector, i.e. within 500 m of the proposed development: Sandwich tern, redshank, shelduck, teal, sanderling and lapwing;
- Potential effects of noise and disturbance relating to BoCC Red Listed Breeding Bird Breeding Bird Assemblage; and
- Potential effects on Schedule 1 breeding birds (barn owl) - disturbance.

[Noise and Visual Disturbance to Qualifying SPA / Ramsar Bird Assemblage – Redcar and Coatham Sands and South Quarries and Lagoons BTO WeBS count Sectors](#)

- 15.8.5 The Natural England Site Improvement Plan (SIP; Natural England, 2014) for the Teesmouth and Cleveland Coast SPA highlights that the site is sensitive to public access and disturbance, primarily as a result of recreational users accessing the beach. 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 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.
- 15.8.6 A study on recreational disturbance on the Humber (Fearnley *et al.*, 2012) assesses different types of noise disturbance on waterfowl referring to studies relating to aircraft (see Drewitt 1999), traffic (Reijnen, Foppen, & Veenbaas 1997), dogs (Lord, Waas, & Innes 1997; Banks & Bryant 2007) and machinery (Delaney *et al.* 1999; Tempel & Gutierrez 2003). These studies identified that there is still relatively little work on the effects of different types of water-based craft and the impacts from jet skis, kite surfers, windsurfers etc. (see Kirby *et al.* 1993 for a review). Some types of disturbance are clearly likely to invoke different responses. In general terms, both distance from the source of disturbance and the scale of the disturbance (noise level, group size) would influence the response (Delaney *et al.* 1999; Beale & Monaghan 2005). On UK estuaries and coastal sites, a review of WeBS data showed that, among the volunteer WeBS surveyors, driving of motor vehicles and shooting were the two activities most perceived to cause disturbance (Robinson & Pollitt 2002).



- 15.8.7 The degree of impact that varying levels of noise would have on different species of bird is relatively poorly understood. Research published by the Institute of Estuarine & Coastal Studies in 2013 (Institute of Estuarine and Coastal Studies, 2013) summarises the key evidence base relating to this impact pathway. Based on the observed responses of waterbirds to noise stimuli, an acceptable receptor dose (i.e. maximum noise level at the bird) of 69 dB(A) was identified by the authors in discussion with Natural England on schemes in other parts of England.
- 15.8.8 Natural England have agreed a noise threshold of 70 dB (Table 15-4) at the receptor for noise disturbance to be considered significant such that it would elicit behavioural responses in birds that would fundamentally alter distribution, behaviour and habitat use.
- 15.8.9 In the event that reuse of the existing infrastructure (the preferred option) is not viable, replacement of the Water Discharge Pipeline may include some sections of open cut trenching where use of trenchless technologies is not possible. This includes sections of dune system within the boundary of the SPA and Ramsar. Similarly, the CO₂ Export Pipeline may also be installed using open cut methods through the dune systems that lie within the boundary of the SPA and Ramsar⁸. These designated sites harbour qualifying species throughout the entire year (breeding and passage terns in summer; non-breeding terns; breeding waders in summer; and non-breeding waders in winter), and the potential impacts of visual and noise disturbance associated with construction work are therefore not restricted to individual seasons, rather they require consideration throughout the entire year.
- 15.8.10 Given that the SPA / Ramsar is directly adjacent to the PCC, the proposed Water Connection Corridors, and the proposed gas connection corridors, it is possible that construction activities associated with any of these infrastructure features would result in visual disturbance of the SPA / Ramsar waterfowl, should such activities take place during the passage or winter period (i.e. October to March inclusive) without mitigation measures such as visual screens. It is also possible that noise disturbance may occur depending on the level of noise emissions arising from the construction works.
- Piling will be required for construction of the PCC. As far as reasonably possible, the least noisy piling method, such as vibro-piling, would be used. In certain areas it may be necessary to employ impact piling (which is noisier) where difficult ground conditions are encountered, however such a requirement would be determined as the construction progressed. As a worst-case, and in line with the Rochdale Envelope approach the assessment has assumed that the noisiest piling method (sheet piling / other percussive piling) will be used, until it can be confirmed otherwise.
- 15.8.11 AECOM undertook winter daytime and night-time noise measurements of LAeq (provides information on the average noise) and L_{Amax} (provides information on sudden, peak noise events) at ecological a number of locations near the Site (see Chapter 11: Noise and Vibration (PEI Report,

⁸ Possibilities for direct drilling under the dunes are being explored but for the purposes of a precautionary assessment it is assumed here that open cut trenching would be required.



Volume I) and supporting Appendices (PEI Report, Volume III)). Location E1 was to the east of the PCC near the pools of the SPA / Ramsar. AECOM then modelled noise contours for L_{Amax} and L_{Aeq} arising from sheet piling, the noisiest activity that might be associated with the construction process.

- 15.8.12 The baseline noise measurements for the site show that at location E1, SPA / Ramsar birds are subjected to daytime noise levels of 81 dB(A) L_{Amax} and 56 dB(A) L_{Aeq} arising largely from existing industry. This indicates that the existing noise environment is very variable: average noise levels are not particularly high, but within a representative 15-minute period, high baseline noise levels exceeding 80 dB were recorded. This strongly suggests that birds in this area are exposed to (and thus likely to be habituated to) a highly variable noise environment with a significant impulsive sound element. This is well above the 70 dB noise threshold agreed by NE.
- 15.8.13 The noise modelling undertaken for this assessment demonstrates that impulsive sheet piling, results in noise levels of 145 dB(A) L_{Amax} and 133 dB(A) L_{Aeq} at the source, in this case the PCC. The contour maps (see Chapter 11: Noise and Vibration (PEI Report, Volume I) and supporting Appendices (PEI Report, Volume III)) show that this noise level would be naturally attenuated to a L_{Amax} of approx. 75-80 dB(A) at the pools of the SPA / Ramsar. This is less than the existing daytime L_{Amax} measured close to these pools. However, the L_{Aeq} resulting from the Proposed Development is modelled to be 65 dB(A) at this location, compared to an existing L_{Aeq} of 56 dB(A). This represents an approximate 10 dB(A) increase in the typical noise level experienced by the qualifying birds or an approximate doubling of the perceived loudness and would last for the duration of piling. Presently, details of the construction period are to be confirmed, however Chapter 5: Construction Programme and Management (PEI Report, Volume I) indicates that earthworks would be carried out over a period of 6 months. As a worst case, in line with the Rochdale Envelope, it is therefore considered that sheet piling might be carried out for that entire period. A potential ZoI of noise and visual disturbance of 500 m of the Proposed Development has been agreed with Natural England, is considered to be suitably precautionary and adopts the 'Rochdale Envelope' approach as it uses the worst-case (i.e. the most impactful) methods and parameters for the assessment.
- 15.8.14 Construction of the PCC would therefore result in a significant increase in the L_{Aeq} present at the pools of the Teesmouth and Cleveland Coast SPA / Ramsar (i.e. Quarries and Lagoons BTO WeBS Count Sector which overlaps the AECOM WeBS survey area). Therefore, in the absence of mitigation, the piling noise and vibration has the potential to cause moderate disturbance to waterbirds utilising the Quarries and Lagoons and waterfowl utilising parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development. **This is assessed as giving rise to a moderate adverse effect on the qualifying bird assemblage of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.** Mitigation is discussed in Section 15.10.



Noise and Visual Disturbance to Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 qualifying species (non-breeding) – Sandwich tern

- 15.8.15 In the absence of mitigation, during construction of the PCC piling noise and vibration have the potential to cause moderate disturbance to Sandwich tern utilising the parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development. **This is assessed as giving rise to a moderate adverse effect on Sandwich tern which is a qualifying feature of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.** Mitigation is discussed in Section 15.10.

Noise and Visual Disturbances to Teesmouth and Cleveland Coast SPA / Ramsar migratory (winter) qualifying species – redshank

- 15.8.16 In the absence of mitigation, during construction of the PCC piling noise and vibration would result in a significant increase in the LAeq present in the vicinity of Coatham Dunes and the dune ponds within Teesmouth and Cleveland Coast SPA and Ramsar, where redshank have been recorded as regularly occurring. Therefore piling noise and vibration have the potential to cause moderate disturbance to redshank utilising the Quarries and Lagoons and redshank utilising parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development. **This is assessed as giving rise to a moderate adverse effect on redshank which is a qualifying feature of the Teesmouth and Cleveland Coast SPA / Ramsar , which is significant.** Mitigation is discussed in Section 15.10.

Noise and Visual Disturbance to Teesmouth and Cleveland Coast SPA / Ramsar waterfowl assemblage qualifying feature (includes all species which are qualifying or assemblage features of the SPA/Ramsar)

- 15.8.17 In the absence of mitigation, construction of the PCC would result in a significant increase in the LAeq present in the pools of the Teesmouth and Cleveland Coast SPA / Ramsar (i.e. Quarries and Lagoons BTO WeBS Count Sector which overlaps the AECOM WeBS survey area). Therefore, piling noise and vibration have the potential to cause moderate disturbance to waterfowl present at Coatham Dunes and dune ponds and the intertidal areas along Coatham Sands within 500 m of the Proposed Development. **This is assessed as giving rise to a moderate adverse effect on the qualifying bird assemblage of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.** Mitigation is discussed in Section 15.10.

Noise and Visual Disturbance to BoCC Red Listed Breeding Bird Breeding Bird Assemblage (skylark, song thrush, mistle thrush, linnet)

- 15.8.18 Construction of the Proposed Development has the potential to disturb nesting birds through increased noise and visual disturbance if works are to be undertaken during the main breeding bird season (March 1st to mid-September inclusive). Visual and noise disturbance associated with construction work is likely to coincide with the breeding bird season however the potential effect on the conservation status of skylark, song thrush, mistle thrush and linnet arising from the required construction noise and visual disturbance is **not predicted to be significant** as it is considered likely that the breeding populations of these species within 500 m of the Proposed Development are habituated to existing noise and disturbance associated with the operational PCC. Furthermore, the 70 dB LAmax threshold is not



exceeded across the majority of the area within which breeding birds were recorded and the predicted LAeq is similar to or lower than the recorded baseline at these locations (Chapter 11: Noise and Vibration, PEI Report, Volume I).

Noise and Visual Disturbance to Schedule 1 breeding birds (barn owl)

- 15.8.19 A barn owl nest box was recorded within the environs of the proposed PCC, at which both nesting and roosting have been observed. This is approximately 330 m from any location where piling or other works would be carried out, and where predicted LAmax and LAeq do not exceed existing daytime levels and predicted LAmax does not exceed existing nighttime levels. LAmax is a critical noise parameter for barn owl, since they are more vulnerable to sudden and unpredictable noise than they are to established noise levels, to which they can readily adapt (as evidenced by the occurrence of breeding in this area). It is therefore highly unlikely that a noise response would be expected for this species during the construction phase of the Proposed Development. This judgement also takes into account that the nest is in a location protected from visual disturbance. Therefore, the potential effect on the conservation status of barn owl (1 pair) arising from construction noise and visual disturbance is predicted to be **negligible and not significant**.

Construction of CO₂ Export Pipeline

- 15.8.20 This section describes the impacts and potential effects during the construction phase of the CO₂ Export Pipeline on relevant ornithological features in the absence of any mitigation, over and above that which is inherent to the design (see Chapter 5: Construction Programme and Management (PEI Report, Volume I) for further details on mitigation inherent to the design and Section 15.9 for relevant proposed mitigation and enhancement measures).
- 15.8.21 To enable a focussed impact assessment, screening was undertaken of potential impacts of the construction phase that are likely to result in adverse or beneficial effects on relevant ornithological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in significant effects on the basis of consultation to date, professional judgement and/or peer-reviewed research are scoped out and not considered further. Receptors are scoped in or out for assessment of noise impacts on the basis of the noise models and contour maps provided in Chapter 11: Noise and Vibration (PEI Report, Volume I), which show where the significance threshold for noise impacts on birds (70dB at the receptor, as identified in consultation with Natural England; Table 15-4) is exceeded.
- 15.8.22 The following potential source-receptor pathways have been scoped out of the impact assessment:
- Noise/ visual disturbance to SPA / Ramsar qualifying bird species associated with the following BTO WeBS Count Sectors (refer to Appendix 15C: Baseline Ornithology Report, PEI Report, Volume III):

Coatham Sands North, Bran Sands North, Bran Sands South and Haverton Hole North – these areas are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;

- Noise/ visual disturbance to the little tern and common tern colonies, which are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e.>500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;
- Noise/ visual disturbance to knot within Redcar and Coatham Sands South WeBS sector. Interrogation of the BTO WeBS data confirms a peak monthly count of 20 birds in the aforementioned WeBS Count Sector; however, there were no records of knot during the AECOM WeBS surveys, including the part of Redcar and Coatham Sands WeBS sector which overlaps the AECOM WeBS sector. There is therefore no pathway by which these features could be affected by the Proposed Development.
- Noise/ visual disturbance to avocet and ruff within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector. Interrogation of the BTO WeBS data confirms that these species have not been recorded in Redcar and Coatham Sands South nor Quarries and Lagoons WeBS sectors respectively. Additionally avocet and ruff were not recorded during the AECOM WeBS surveys. There is therefore no pathway by which these features could be affected by the Proposed Development
- Noise/ visual disturbance to avocet within the potential SPA compartment associated with the Coatham Marsh BTO WeBS sector. Interrogation of the BTO WeBS data confirms that avocet has not been recorded within the Coatham Marsh WeBS count sector. There is therefore no pathway by which these features could be affected by the Proposed Development
- Noise/ visual disturbance to foraging little tern and common tern within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector, which is immediately adjacent to the Proposed Development. Interrogation of the BTO WeBS data shows that these species have not been recorded in this count sector. This is consistent with the results of the AECOM WeBS surveys (there were no records of common tern or little tern in the Quarry and Lagoons AECOM count area);
- Noise/ visual disturbance to Schedule 1 breeding birds (barn owl – 1 pair) due to the distance of the nest box from logging and piling works (>300 m) and the sheltered location of the nest box; and
- Air quality impacts on intertidal and subtidal habitats in the SPA/Ramsar – intertidal habitats are not susceptible to the effects of changes in air quality arising from construction (through dust deposition and smothering of habitats) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

15.8.23 Impacts during the construction period that have potential to result in significant effects on relevant ornithological features, and which were screened into the impact assessment, are considered further below:

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar / SSSI (noise/ vibration and visual disturbance). The only BTO WeBS count sectors which are considered relevant to the impact assessment because they overlap with the potential Zol of noise and visual disturbance are: Redcar and Coatham Sands South, Quarries and Lagoons and Coatham Marsh. The AECOM WeBS count survey areas are also relevant to the impact assessment because they overlap with the potential Zol of noise and visual disturbance. The CO₂ Export Pipeline construction footprint is sited within the SPA / Ramsar boundary and therefore the entire AECOM intertidal survey and all survey areas that overlap or are adjacent to Coatham Dunes have been considered as the potential Zol of noise and visual disturbance for the purposes of this assessment (i.e. includes all AECOM bird registrations and a Zol that is greater than 500 m); this precautionary approach to the assessment should be considered in terms of reviewing the narrative below;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 qualifying species (non-breeding) – Sandwich tern (noise/ vibration and visual disturbance). The five-year peak for Sandwich tern within Redcar and Coatham Sands South is 30 which represents >1% of the SPA population (1.6%). The results of the AECOM surveys show that Sandwich tern utilises intertidal habitat within the potential Zol of noise and visual disturbance, i.e. within the AECOM intertidal survey area, where a peak count of 74 birds was made in July 2018, representing approximately 3.9% of the SPA population;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar migratory (winter) qualifying species – redshank (noise/ vibration and visual disturbance). The five-year peak for redshank within Redcar and Coatham Sands South BTO WeBS count sector is 220 which represents >1% of the SPA population (13.3%). The five-year peak for Quarries and Lagoons BTO WeBS count sector is 180 which represent >1% of the SPA population (10.9%). The results of the AECOM surveys show that redshank utilises intertidal habitat within the intertidal survey area and that this species also occurs at the dune ponds in small numbers (peak count 22);
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar waterfowl *assemblage* qualifying feature (includes all species which are qualifying or assemblage features of the SPA / Ramsar) - noise/ vibration and visual disturbance and barrier to movement). The results of the AECOM WeBS surveys show that the following waterfowl species utilise habitats within the potential zone of impact for noise and visual disturbance as defined by the AECOM intertidal survey area, which includes areas overlapping the Redcar and Coatham Sands South BTO WeBS count sector: little tern, redshank, ringed plover, sanderling, Sandwich tern, and common tern;



- Noise/ visual disturbance to ruff within the potential SPA compartment associated with the Coatham Marsh BTO WeBS sector. Interrogation of the BTO WeBS data confirms that ruff has been recorded within the Coatham Marsh WeBS count sector (peak of 3), although this species was not recorded during AECOM surveys;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar - noise/ visual disturbance to foraging little tern and common tern. A five-year peak count of 115 common terns was returned within the Redcar and Coatham Sands South BTO WeBS count sector. The results of the AECOM WeBS survey show that common tern and little tern were recorded within the intertidal count sectors with respective peak counts of 21 and 4 respectively;
- Potential effects of noise/disturbance and habitat loss relating to BoCC Red Listed Breeding Bird Breeding Bird Assemblage associated with Coatham Sands & Gare Road AECOM breeding bird survey area: skylark (17 breeding pairs), song thrush (pair) and linnet (4 pairs); and
- Potential effects of destruction/damage of nests (all breeding bird species).

[Noise and Visual Disturbance to Qualifying SPA / Ramsar Bird Assemblage – Redcar and Coatham Sands and South Quarries and Lagoons BTO WeBS count Sectors \(which overlap the AECOM WeBS survey areas\)](#)

15.8.24 Construction of the CO₂ Export Pipeline is likely to result in a significant increase in the noise and visual disturbance within the Teesmouth and Cleveland Coast SPA / Ramsar. Therefore, in the absence of mitigation, the construction noise and vibration have the potential to cause moderate disturbance to waterbirds. **This is assessed as giving rise to a moderate adverse effect on the qualifying bird assemblage of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.**

[Noise and Visual Disturbance to Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 qualifying species \(non-breeding\) – Sandwich tern](#)

15.8.25 Construction noise and vibration have the potential to cause moderate disturbance to Sandwich tern utilising the SPA/Ramsar. **This is assessed as giving rise to a moderate adverse effect on Sandwich tern which is a qualifying feature of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.**

[Noise and Visual Disturbance to Teesmouth and Cleveland Coast SPA / Ramsar Annex 1 qualifying species \(non-breeding\) – redshank](#)

15.8.26 Construction noise and vibration have the potential to cause moderate disturbance to redshank utilising the SPA/Ramsar. **This is assessed as giving rise to a moderate adverse effect on redshank which is a qualifying feature of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.**



Noise and Visual Disturbance to Teesmouth and Cleveland Coast SPA / Ramsar waterfowl assemblage qualifying feature (includes all species which are qualifying or assemblage features of the SPA/Ramsar)

- 15.8.27 Construction noise and vibration have the potential to cause moderate disturbance to redshank utilising the SPA/Ramsar. **This is assessed as giving rise to a moderate adverse effect on assemblage qualifying features of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.**

Noise and Visual Disturbance to ruff within the potential SPA compartment overlapping Coatham Marsh

- 15.8.28 Construction noise and vibration have the potential to cause disturbance to ruff utilising the SPA/Ramsar. However, Coatham Marsh is located outside the construction footprint and therefore **this is assessed as giving rise to a minor adverse impact on this feature of the Teesmouth and Cleveland Coast SPA / Ramsar, which is not significant.**

Noise and Visual Disturbance to foraging little tern and common tern associated with Redcar and Coatham Sands BTO WeBS count Sectors (which overlap the AECOM intertidal WeBS survey areas)

- 15.8.29 Construction noise and vibration have the potential to cause disturbance to foraging little tern and common tern utilising the SPA/Ramsar. The construction footprint is located within the SPA/Ramsar areas and therefore **this is assessed as giving rise to a moderate adverse impact on this feature of the Teesmouth and Cleveland Coast SPA / Ramsar, which is significant.**

Noise and Visual Disturbance to BoCC Red Listed Breeding Bird Breeding Bird Assemblage (skylark, song thrush, linnet) and other bird species

- 15.8.30 Construction of the Proposed Development has the potential to disturb nesting birds through increased noise and visual disturbance if works are to be undertaken during the main breeding bird season (March 1st to mid-September inclusive). Visual and noise disturbance associated with construction work is likely to coincide with the breeding bird season however the potential effect on the conservation status of skylark, song thrush, mistle thrush and linnet arising from the required construction noise and visual disturbance is predicted to be no more than **minor adverse** and is **not predicted to be significant** as it is considered likely that the breeding populations of these species are habituated to existing noise and disturbance generated by operational industry within the surrounding area (as demonstrated by baseline noise levels recorded in support of the noise models within Chapter 11: Noise and Vibration (PEI Report, Volume I).

Loss of Nesting/Foraging Habitat for BoCC Red Listed Breeding Bird Breeding Bird Assemblage (skylark, song thrush, linnet) and other bird species

- 15.8.31 Construction of the CO₂ Export Pipeline, if this is done using open cut rather than using trenchless technologies, may necessitate the temporary removal of habitats that are currently used by breeding birds, which provide nesting and feeding habitats. Construction of the Proposed Development could adversely affect breeding birds if the works were to be undertaken during the



breeding bird season (March 1st to mid-September inclusive) and in the absence of mitigation could result in the displacement or killing/injuring of nesting birds and their dependant young. There would also be a reduction in the amount of habitat available to foraging birds. The potential worst case habitat loss is represented by the maximum length of the corridor (700 m) and an assumed working width of 36 m, which equates to an area measuring approximately 2.5 ha, within an area of available habitat that includes approximately 165 ha of coastal dune and 100 ha of mixed grassland, marsh and scrub habitats. This equates to a proportionate loss of approximately 0.95% of the available habitat on a temporary basis.

15.8.32 Construction of the CO₂ Export Pipeline alone could therefore result in a **minor adverse** effect on breeding birds **that is not significant**, through disturbance and habitat loss during construction.

Construction of Proposed Water Connections

15.8.33 This section describes the impacts and potential effects during the construction phase of the proposed Water Connection Corridors on relevant ornithological features in the absence of any mitigation, over and above that which is inherent to the design (see Chapter 5: Construction Programme and Management (PEI Report, Volume I) for further details on mitigation inherent to the design and Section 15.9 for relevant proposed mitigation and enhancement measures).

15.8.34 To enable a focussed impact assessment, screening was undertaken of potential impacts of the construction phase that are likely to result in adverse or beneficial effects on relevant ornithological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Impacts were scoped in/out on the basis of distance from the Proposed Development and availability of an impact pathway. Those impacts that are considered unlikely to result in significant effects are scoped out and not considered further.

15.8.35 The following potential source-receptor pathways have been scoped out of the impact assessment:

- noise/ visual disturbance to SPA / Ramsar qualifying bird species associated with the following BTO WeBS Count Sectors (refer to Appendix 15C: Baseline Ornithology report, PEI Report, Volume III): Coatham Marsh and Haverton Hole North – these areas are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;
- noise/ visual disturbance of the little tern and common tern colonies, which are outside the potential Zol of noise and visual disturbance arising from the construction of the Proposed Development (i.e.>500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;



- noise/ visual disturbance to knot within Redcar and Coatham Sands South WeBS sector. Interrogation of the BTO WeBS data confirms a peak monthly count of 20 birds in the aforementioned WeBS Count Sector; however, there were no records of knot during the AECOM WeBS surveys, including the part of Redcar and Coatham Sands WeBS sector which overlaps the AECOM WeBS sector. There is therefore no pathway by which these features could be affected by the Proposed Development.
- noise/ visual disturbance to avocet and ruff within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector. Interrogation of the BTO WeBS data confirms that these species have not been recorded in Redcar and Coatham Sands South nor Quarries and Lagoons WeBS sectors respectively. Additionally, avocet and ruff were not recorded during the AECOM WeBS surveys. There is therefore no pathway by which these features could be affected by the Proposed Development
- noise/ visual disturbance to foraging little tern and common tern within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector, which is immediately adjacent to the proposed development. Interrogation of the BTO WeBS data shows that these species have not been recorded in this count sector. This is consistent with the results of the AECOM WeBS surveys (there were no records of common tern or little tern in the Quarry and Lagoons AECOM count area);
- Noise/ visual disturbance to Schedule 1 breeding birds (barn owl – 1 pair) due to the distance of the nest box from construction locations (>300 m) and the sheltered location of the nest box; and
- air quality impacts on intertidal and subtidal habitats in the SPA/Ramsar – intertidal habitats are not susceptible to the effects of changes in air quality arising from construction (through dust deposition and smothering of habitats; nitrogen deposition and acidification) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

15.8.36 Impacts during the construction period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment, are considered further below:

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar / SSSI (noise/ vibration and visual disturbance). The following BTO WeBS count sectors are considered relevant to the impact assessment because they overlap with the potential Zol of noise and visual disturbance: Bran Sands South, Bran Sands North, Quarries and Lagoons, Coatham Sands North and Redcar & Coatham Sands South. The AECOM WeBS count survey areas are also relevant to the impact assessment because they overlap the north-south orientated 'spur' of the Proposed Corridor. However, the east-west orientated 'spur' of the Proposed Corridor, which extends into the Bran Sands intertidal area, was not included within the AECOM WeBS survey area (the survey area was informed by earlier iterations of the design). Therefore, in the

absence of comprehensive primary (i.e. field) data for the proposed Water Abstraction and Discharge Corridor, the following receptors, which are qualifying or assemblage features of the SPA/Ramsar, have been informed by the available secondary data sources (i.e. BTO WeBS data from the aforementioned BTO WeBS count sectors which are potentially relevant to the Zol of noise and visual disturbance): shelduck, teal, cormorant, ringed plover, lapwing, knot, sanderling, redshank, turnstone, Sandwich tern, common tern, shoveler, greenshank, common scoter, red-throated diver, great northern diver, whimbrel, scaup, black-tailed godwit and velvet scoter.

- Potential effects of noise/disturbance and habitat loss relating to breeding birds. Further field surveys are required to determine the breeding bird population within the potential Zol of noise and visual disturbance arising from the construction of the proposed Water Abstraction and Discharge Corridor with the purpose of informing a robust impact assessment.
- Potential effects of destruction/damage of nests (all breeding bird species). Further field surveys are required to determine spatial distribution and abundance of breeding bird species within the potential Zol of noise and visual disturbance arising from the construction of the proposed Water Abstraction and Discharge Corridor with the purpose of informing a robust impact assessment.

Operation

15.8.37 This section describes the impacts and potential effects during the operational and maintenance phase of the Proposed Development on relevant ornithological features in the absence of any mitigation, over and above that which is inherent to the design.

15.8.38 To enable a focussed impact assessment, screening was undertaken of potential impacts of the operational phase that are likely to result in adverse or beneficial effects on relevant ornithological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in significant effects are scoped out and not considered further.

15.8.39 The following potential source-receptor pathways have been scoped out of the impact assessment:

- Noise/ visual disturbance to SPA / Ramsar qualifying bird species associated with the following BTO WeBS Count Sectors (refer to Appendix 15C: Baseline Ornithology Report, PEI Report, Volume III): Coatham Sands North, Bran Sands North, Bran Sans South, Coatham Marsh and Haverton Hole North – these areas are outside the potential Zol of noise and visual disturbance arising from the operation of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar - noise/ visual disturbance to the little tern colonies, which are outside the

potential ZoI of noise and visual disturbance arising from the operation of the Proposed Development (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;

- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar - noise/ visual disturbance to avocet and ruff within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector. Interrogation of the BTO WeBS data confirms that these species have not been recorded in Redcar and Coatham Sands South nor Quarries and Lagoons WeBS sectors respectively (the only WeBS count sectors to overlap a 500 m buffer from the proposed development). Additionally, avocet and ruff were not recorded during AECOM's surveys. There is therefore no pathway by which these features could be affected by the Proposed Development;
- Potential effects on Teesmouth and Cleveland Coast SPA / Ramsar - noise/ visual disturbance to foraging little tern and common tern within the potential SPA compartment associated with the Quarries and Lagoons BTO WeBS sector, which is immediately adjacent to the proposed development. Interrogation of the BTO WeBS data shows that these species have not been recorded in this count sector. This is consistent with the results of the AECOM WeBS surveys (there were no records of common tern or little tern in the Quarry and Lagoons AECOM count area). A five-year peak count of 115 common terns is a feature of the Redcar and Coatham Sands South BTO WeBS count sector, however the results of the AECOM WeBS survey show that common tern and little tern were recorded outside the potential ZoI of noise and visual disturbance (i.e. >500 m). There is therefore no pathway by which these features could be affected by the Proposed Development;
- Air quality impacts on prey resources and habitat quality within intertidal and subtidal habitats, which are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen and acid deposition) because of their regular tidal inundation; and
- The barrier effect of tall structures and the energetic costs to birds of flying around such structures when moving between feeding, roosting and breeding habitats. Large structures (e.g. tall buildings, bridges, wind turbines) could change the behaviour of birds by affecting their sight- and flight lines. This may result in a collision risk, barrier effect or displacement, which could make birds more vulnerable to predation; increase the energetic costs to birds when foraging (for instance by increasing the effective distance flown between nesting and foraging sites); or result in the loss of foraging habitat. The maximum building height and the average building height of the Proposed Development are the main parameters to consider regarding the potential impact of tall buildings. Depending on results from air dispersion modelling, the stacks for the PCC could have a height of 90 m. while the average building

height for the frontage (calculated from all individual components) would be 8 m. However, based on survey and third party data it is considered that the qualifying species of the Teesmouth and Cleveland Coast SPA / Ramsar do not routinely use functionally linked habitats inland from the designated sites, where this overlaps or is immediately adjacent to the PCC. Instead, it is expected that most of these birds would move between foraging areas along the coastline/shore and across open waters, therefore this potential impact is scoped out of further assessment.

15.8.40 Impacts during the operational period that have potential to result in significant effects on relevant ornithological features, and which were screened into the impact assessment are considered further below:

- Potential effects on Teesmouth and Cleveland Coast SPA, Ramsar and SSSI resulting from noise and visual disturbance, surface water pollution and discharge of heated cooling water); and
- Impacts of aerial stack emissions from operational PCC plant on vulnerable species for which the SPA are designated. Site – specific information provided by the Air Pollution Information System (APIS) shows that breeding little terns are vulnerable to this potential impact. Note that aerial emissions modelling is ongoing alongside further investigations of PCC design and therefore the assessment of this potential impact is preliminary and highly precautionary.

Potential Effects on Teesmouth and Cleveland Coast SPA, Ramsar and SSSI (noise and visual disturbance)

15.8.41 The Proposed Development would be operational up to 24 hours a day. The noise modelling undertaken by AECOM demonstrates that the operational site would not contribute any significant increases in noise above baseline levels. It is considered that the combined effects of distance and visual screening of the dunes afforded by natural relief would minimise the potential impacts of visual disturbance arising from operation of the PCC. Furthermore, the Proposed Development sits within an industrial landscape that presents a baseline characterised by relatively high levels of noise and visual disturbance. It is therefore considered that the overwintering birds of the designated sites would be habituated to human and industrial activities. Overall, visual disturbance is unlikely to cause any significant impacts on species for which the sites are designated.

15.8.42 The components of the Proposed Development that are most likely to result in a continuous level of operational noise disturbance are at the PCC, given that the PCC directly abuts the boundaries of the SPA/Ramsar. Regular noise disturbance could impact the qualifying species of the Teesmouth and Cleveland Coast SPA/Ramsar. Therefore, further evidence regarding this impact pathway is considered below.

15.8.43 AECOM undertook baseline measurements of existing noise levels (measured as LAeq) near the ecological receptors in the SPA / Ramsar (see Chapter 11: Noise and Vibration and associated Appendices, PEI Report, Volumes I and III). The average (LAeq) noise level is considered to be most relevant in relation to the continued 24-hour operation of the PCC. At



location E1, the measurement location closest to the pools of the SPA / Ramsar, LAeq daytime LAeq was 56 dB(A), compared to a night-time LAeq of 47 dB(A). Noise modelling undertaken for the PCC indicate that the operational noise of the plant would result in result in a maximum noise level of 50 dB L_{Aeq} in the dune system of the Teesmouth and Cleveland Coast SPA / Ramsar. This is below the existing daytime (56 dB L_{Aeq}) and in line with the night-time (47 dB L_{Aeq}) noise levels measured at location E1. Furthermore, it is considerably lower than the acceptable regular noise threshold of 70 dB (at receptor birds), which was identified in research undertaken for congregations of similar birds in the Humber Estuary. Therefore, regarding the impact pathway noise disturbance, **this is assessed as giving rise to a neutral effect on the qualifying bird assemblage of the Teesmouth and Cleveland Coast SPA / Ramsar, which is not significant.**

Water Quality/Discharge of Heated Water

- 15.8.44 Terns are specialists that feed on several species of small fish, which are likely to be vulnerable to changes in dissolved oxygen that could occur as a result of releases of heated discharge water into the subtidal environment. Furthermore, such discharges may result in changes in water turbidity through disturbance and release of fine particulates (silt) into the water column. Changes to the distribution and availability of prey species to foraging terns may occur as a result of these processes, with energetic costs for adult terns and knock on effects on the ability of these species to provision their dependent young.
- 15.8.45 The thermal plume model results are presented within Appendix 9B: Coastal Modelling Report (PEI Report, Volume III). The impact assessments for subtidal habitats and species are set out in detail in Chapter 14: Marine Ecology (PEI Report, Volume I). The visual output of the modelling process is a series of isolines radiating from an indicative discharge point, delineating the extent of warming in 1-degree increments. Dilution of the thermal plume results in decreasing excess temperature with distance from the outfall. Thus the area within an isoline decreases for each stepwise increase in temperature. The model predicts plume extent under ebb and flood tide conditions, which in the scenario modelled produces elliptical plumes that radiate northwest and southeast from the discharge point (Figure 14.2).
- 15.8.46 The extent of the thermal plume within the water column will be highly localised. For instance, a small thermal plume with an uplift of $\sim 1^{\circ}\text{C}$ is predicted to extend approximately 179 m and 235 m for a mean spring tide under peak flood and ebb conditions, respectively (equivalent to respective plume areas of 7,500 m^2 and 1,455 m^2). Thermal effluent generated by the Proposed Development will be of lower salinity and lower density than the surrounding water column and therefore will be naturally buoyant. Therefore the footprint of the thermal plume is predicted to be very small, the potential effects of reduced levels of dissolved oxygen and turbidity highly localised. On this basis, the marine ecology chapter predicts negligible effects that are not significant on fish abundance and diversity. Similarly, the potential impacts on intertidal habitats and communities, subtidal habitats and plankton are predicted to be of such a low magnitude that they are not



significant. The impacts of thermal plume on foraging terns are therefore predicted to be **negligible and not significant**.

- 15.8.47 During operation there is the potential for treated effluent to be discharged to the Tees Bay, with possible effects on marine water quality that may produce indirect effects on marine organisms and therefore the availability and distribution of prey resources for foraging terns. It is assumed at this stage that the preferred wastewater treatment design will be on-site wastewater treatment, however other options being considered include wastewater disposal via Northumbrian Water's wastewater treatment facilities and outfall.
- 15.8.48 The wastewater generated during operation of the Proposed Development is expected be made up of predominantly treated water used within the cooling water system, with some demineralised water which has been utilised in the steam cycle, plus smaller contributions of contaminants from other on-site processes and surface water run-off. The principle source of chemical contaminants would be from the direct contact cooler blowdown which will comprise water primarily containing dissolved CO₂ and elevated concentrations of ammonia. In all other cases, chemical concentrations are expected to be below consent limits or will be collected and disposed of off-site.
- 15.8.49 It is proposed that water from the direct contact cooler blowdown will be sent to an on-site effluent treatment plant where it will be subject to biological treatment to a standard that is compliant with Environmental Permitting Requirements. The treated process effluent will then be transferred along with other process water streams to an outfall retention pond before being discharged to the Tees Bay. The predicted worst-case rate of effluent discharge is 1.83 m³/s.
- 15.8.50 The potential for adverse effects to marine water quality is considered to be low in light of the low discharge rate and the nature of the coastal marine environment, which is expected to facilitate rapid dispersion of contaminated wastewater (see Chapter 9: Surface Water, Flood Risk and Water Resources (PEI Report, Volume I)). Consequently, the marine ecology assessment predicts a permanent but highly localised deterioration in marine water quality with no detectable effects on marine species or habitats. As such there is anticipated to be no discernible effect of wastewater on the abundance or distribution of prey stocks that serve foraging terns and the effects on these SPA species are predicted to be **negligible and not significant, both for individual and assemblage qualifying species and for the SPA and Ramsar Sites**.

Aerial Deposition of Compounds of Nitrogen and Acidification

- 15.8.51 The interest features of the Teesmouth & Cleveland Coast SPA / Ramsar are not sensitive to acid deposition. The nitrogen deposition isopleths for the stack emissions from the PCC plant Figure 8.9 (Appendix 8B: Air Quality Operational (PEI Report, Volume III)) show that there will be an additional nitrogen deposition process contribution (PC) of approx. 0.25 kg N/ha/yr, due to the Proposed Development alone, at one location (BC5) where little terns have been recorded and where a small amount habitat suitable for breeding



remains. This would represent an additional deposition equivalent to more than 3% of the critical nitrogen load for the most sensitive habitat associated with the tern species (as identified on APIS – fixed dunes with a minimum critical load of 8 kgN/ha/yr). However confirmed breeding has not recently been recorded at this location and the habitat here is not regarded as sufficient to support a viable breeding colony (Bond, I, engagement correspondence on the 4th June 2020). Two other locations north of the Tees Estuary - one regular historic colony (BC7) and one location where breeding was recorded for the first time in 2019 (BC8) - will receive an insignificant dose of nutrient nitrogen as a result of the Proposed Development, as will a further location (BC6) north of the River Tees where adult and juvenile little terns have been recorded (this being conservatively assumed, for the purposes of assessment, to have potential to support breeding little terns). The impact of nutrient nitrogen deposition on breeding little terns will therefore be **negligible and not significant**. Confidence in this assessment is limited by the unpredictable patterns of nesting site selection shown by little terns on Teesside, which means that reversion to breeding at previously used nest sites or at locations not used in previous years cannot be ruled out in future.

15.8.52 Common tern breeding colonies are largely within Saltholme RSPB Reserve (BC1), where nitrogen deposition process contributions are below the lower limits of the air quality model (i.e. they are insignificant). Furthermore these colonies are, by virtue of their location, afforded elevated levels of protection and nesting habitats are likely to be maintained in optimal condition through active management undertaken by RSPB. Other colonies in the Cowpen Bewley area will also be subject to insignificant process contributions of nutrient nitrogen. The impact assessment for common tern breeding colonies will therefore be **negligible (not significant)**.

15.8.53 The operational phase of the Proposed Development will also be associated with site traffic (e.g. vehicles transporting staff or machinery within the site) and commuter traffic. However, Chapter 16: Traffic & Transport (PEI Report, Volume I) identifies that the Proposed Development will have approx. 60 full-time staff working in three shifts and around 40 corporate staff working on site during normal working hours (09:00-17:00). Assuming a conservative car occupancy of 0.7 this equates to 70 cars driving to the Proposed Development per day and a total of 140 2-way vehicle movements. Furthermore, to deliver operational and maintenance plant, 4 Heavy Duty Vehicles (HDVs) will be on site per day. The traffic flow generated during the operational phase of the Proposed Development is well below the threshold for defining an 'Affected Road' in Highways England terms and is therefore considered to have a **negligible** effect on air quality that is **not significant**.

15.9 Decommissioning

15.9.1 It is currently assumed that noise and visual disturbance impacts during the decommissioning phase will be of a similar magnitude and spatial extent to those experienced during the construction phase, and therefore the same species will be affected by them. It is also assumed that infrastructure buried within trenches or excavations, and below mean low water will be left in situ.



This is anticipated to be the case for pipelines including those installed for natural gas connections, the CO₂ Gathering Network, CO₂ Export Pipeline, Abstraction and Discharge (and outfall/intake structures). It is also anticipated that electricity connections will be left in situ in a non-functional state or will continue to serve the electricity grid in another capacity.

15.9.2 On the basis of the assumptions set out above and without mitigation, the following impacts of noise and visual disturbance are expected to cause moderate disturbance over a highly-limited time period to:

- the qualifying bird assemblage of the Teesmouth and Cleveland Coast SPA / Ramsar, which is **significant**;
- non-breeding Sandwich tern within the Teesmouth and Cleveland Coast SPA / Ramsar, which is **significant**;
- non-breeding redshank within the Teesmouth and Cleveland Coast SPA / Ramsar, which is **significant**.

15.9.3 Significant noise and visual disturbance to other species of the SPA and Ramsar, SSSI and breeding birds not associated with the designations (BoCC red list species and barn owl) will be negligible and Not Significant for the reasons set out in paragraphs 15.8.20 and 15.8.21.

15.9.4 A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) will be produced and agreed with the Environment Agency and other stakeholders, as required, as part of the Environmental Permitting and site surrender process.

15.9.5 This is discussed further within PEI Volume I Chapter 4 (Proposed Development).

15.10 Mitigation and Enhancement Measures

15.10.1 The potential effects of the Proposed Development on the ecological features identified in Section 12.5 during construction, operation and decommissioning requires further assessment to determine specific mitigation requirements. Detailed consideration is required during development design process and the need for additional mitigation would be determined prior to submission of the DCO application, taking account of consultation responses.

Construction Mitigation

15.10.2 Construction impact avoidance measures are detailed in Section 15.7.

Breeding Birds

15.10.3 The following approach would be taken to deliver legislative compliance in relation to nesting birds:

- All clearance of habitats suitable for bird breeding activity would be undertaken outside the breeding season (the breeding season is typically March-August inclusive for most species), where possible;



- In situations where this is not possible an ecologist would check the working area for nests before works commence. If active nests are discovered during this process, then the ecologist would advise on appropriate mitigation to ensure that these are not impacted by construction activities. All relevant works would be completed in accordance with this advice and under the supervision of an ECoW; and
- If Schedule 1 species are found breeding within or next to the proposed development site construction, works will stop immediately, and the local authority and Natural England would be informed. A licence may be required before works could continue.

Loss and Fragmentation of Terrestrial Bird Habitat

15.10.4 Ground nesting species may be dissuaded from nesting in construction areas/access routes by removing the surface vegetation from the desired area (Jackson & Alan, 2000) before the breeding season commences. Removing the stony substrate/bare areas or artificially covering these open habitats would reduce the attractiveness of the proposed construction area for ground nesting birds e.g. waders.

Noise and Visual Disturbance to Feeding, Roosting and Loafing^{9,10} Waterfowl

15.10.5 Mitigation is necessary to reduce effects of construction disturbance on feeding, roosting and loafing waterfowl populations occurring on the coastal habitats and designated sites associated with the Proposed Development.

15.10.6 Based on a worst-case assumption that sheet piling is used as the main or sole piling method, an environmental (noise and visual) barrier may need to be erected in predetermined locations along boundaries of the working area prior to the onset of construction works, to address, as a minimum, the impacts of piling activities at the PCC. Barriers may be required at other locations where impacts are expected on SPA, Ramsar and SSSI birds, such as the Water Connection Corridors and CO₂ Export Pipeline, however these needs will be reviewed and updated to address the final scheme design. The barrier would be of a suitable height and specification such that construction activity would not be visible to feeding/loafing/roosting waterfowl populations utilising coastal habitats and designated sites. The barrier would function as an effective barrier to noise caused by construction activity.

15.10.7 Phasing of construction will be planned, where reasonably practicable, so that those activities with potential to cause noise and/or visual disturbance of receptors, and those that would result in habitat losses, are carried out at a time of year when the likelihood of birds being present is minimised. This would require careful consideration given the wide range of ornithological receptors present and the year-round ornithological sensitivity of the area, the spatial extent of the Proposed Development and the multi-phase and multi-process nature of the Proposed Development. As a guiding principle, Natural England have commented during engagement to-date that the

⁹ Loafing is defined as behaviour not connected with feeding or breeding. The term encompasses activities such as preening and resting and allows birds to digest food, socialise and rest. Loafing behaviour can be exhibited by a range of species, but is relatively common in gulls, waders and wildfowl.

¹⁰ Loafing is defined as behaviour not connected with feeding or breeding. The term encompasses activities such as preening and resting and allows birds to digest food, socialise and rest. Loafing behaviour can be exhibited by a range of species, but is relatively common in gulls, waders and wildfowl.



avoidance of the wintering bird period is preferable as an avoidance measure for impacts on birds associated with statutory designated sites, and that north of the River Tees wintering birds are not of concern to Natural England (but breeding birds may be of concern). Consequently, where it can be ascertained that other measures (for example construction techniques, noise barriers) are not effective on their own for sufficiently mitigating noise and visual disturbance impacts, it may be necessary to consider phasing of the noisiest and most disruptive work and this is most likely to be required at the PCC, Water Connection Corridors and CO₂ Export Pipeline. This will need to be considered in detail following scheme design updates towards the submission of the final ES and DCO application.

- 15.10.8 Potential effects on barn owl will be avoided by siting infrastructure and working areas sensitively and by timing works where practicable to minimise disruption during the breeding season for this species (mid-March to the end of September as a minimum).
- 15.10.9 Any works associated with construction of the proposed infrastructure that have the potential for significant noise or disturbance effects will not be undertaken during extreme weather conditions that coincide with spring tides or other extreme tide conditions, because SPA and other water birds are more likely to roost or seek shelter on land in such conditions.

Operational Mitigation

- 15.10.10 Operational impact avoidance measures are detailed in Section 15.7.

Emissions

- 15.10.11 As detailed in Chapter 4: Proposed Development (PEI Report, Volume I) would comply with the Industrial Emissions Directive (IED) under its Environmental Permit so that any impacts of emissions to air, soil, surface and groundwater, to the environment and human health would be minimised so as to be not significant.
- 15.10.12 The Proposed Development would be operated in line with appropriate standards and the operator would implement and maintain an Environment Management System (EMS) which would be certified to International Standards Organisation (ISO) 14001. The EMS would outline requirements and procedures required to ensure that the Site is operating to the appropriate standard.
- 15.10.13 Sampling and analysis of pollutants would be carried out where required including monitoring of exhaust emissions levels using CEMS, prior to discharge from the stacks, in accordance with the Environmental Permit (See Chapter 5: Construction Programme and Management, PEI Report, Volume I).

Water Abstraction and Discharge Operation

- 15.10.14 The potential impacts and proposed operation mitigation for water abstraction and discharge are considered in detail in Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I). No specific mitigation is considered necessary to minimise the potential effects on birds.



Decommissioning Mitigation

- 15.10.15 Any necessary mitigation requirements would be determined and agreed at a future date prior to decommissioning. As part of this process, the Applicant would provide a DEMP. Relevant habitat and protected species surveys would be undertaken to inform the specification of relevant working methods and mitigation in the DEMP.

Enhancement

- 15.10.16 National policy documents emphasise the need to achieve no net loss of biodiversity, and to maximise opportunities for the enhancement of biodiversity. The requirement for biodiversity enhancement is dependent on the final design of the Proposed Development and the outcome of a formal Biodiversity Assessment which will be undertaken within the ES, if required.
- 15.10.17 Should biodiversity enhancement be required, an outline Landscape and Biodiversity Strategy would be developed in consultation with stakeholders and provided with the final ES. This would set out biodiversity enhancement proposals and the habitat management prescriptions necessary to deliver these. The details of the enhancement measures shall be discussed and agreed with the relevant stakeholders and secured within the Draft DCO application.
- 15.10.18 This would set out biodiversity mitigation and compensation measures, enhancement proposals and the habitat management prescriptions necessary to deliver these.

Ecological Monitoring

- 15.10.19 The measures proposed to avoid and reduce, where possible, significant adverse effects on ecological features are set out above. Monitoring requirements to track compliance with these commitments during construction phase would be set out in the Framework CEMP. In particular, an Ecological Clerk of Works would be employed to oversee the delivery of all necessary mitigation, including any mitigation to be completed under protected species mitigation licences.
- 15.10.20 Monitoring may also be necessary during operation to ensure the successful establishment and management of habitats restored or enhanced during/after construction. This would be specified in an Indicative Landscape and Biodiversity Strategy at a future date prior to submission of the DCO.

15.11 Residual Effects

- 15.11.1 Residual effects identified to date are summarised below, however it must be acknowledged that further work is required (and is ongoing) to establish further details for the Proposed Development (detailed scheme design, construction methods, construction areas and timings) and to update the baseline information. It is anticipated that further consultation will be carried out with stakeholders as part of this process. As such, the assessments presented in this chapter are likely to be updated for the final ES and it is anticipated that some of the residual impacts identified can be partly or fully



addressed during the process. Equally, it is possible that additional impacts and residual effects could be identified.

Construction and Decommissioning

15.11.2 It is not anticipated that the effects of construction will lead to any residual effects that are more than short term, since the impacts identified are temporary for the duration of the construction phase. As far as possible, all habitats affected will be reinstated or restored to their pre-development condition. All habitats affected temporarily during construction and decommissioning phases of the Proposed Development will be reinstated or restored to their pre-development condition where it is possible and practicable to do so and therefore the impacts of habitat losses on ornithological receptors are not anticipated to persist beyond the short term. Habitats that cannot be restored satisfactorily will be treated in the same way as those that are permanently lost and a formal biodiversity assessment and enhancement plan would be submitted with the DCO application, should one be required.

Operation

15.11.3 Permanent losses of habitat resulting from the presence of infrastructure over the long term will be addressed through commitments to habitat restoration and enhancement as described in paragraphs 15.9.16 – 15.9.18, such that permanent losses are addressed through enhancements to existing habitat and/or replacement of habitat lost. This is likely to be particularly relevant to habitat losses at the site of the PCC. Therefore, there will be no residual effects on ornithological receptors, arising from this impact. No other significant residual impacts on ornithological receptors are predicted.

15.11.4 The predicted aerial emissions of nitrogen arising from the processes of power generation and carbon capture do not, under current baseline conditions, present any risk of significant impacts on breeding little tern colonies. However should the little tern colony relocate for 2020 or beyond, this might expose them to doses of nutrient nitrogen that are detrimental to their nesting habitat, with the potential for significant adverse impacts in the long term.

15.12 Limitations or Difficulties

15.12.1 Baseline conditions and relevant ecological features have been determined using appropriate methods. Further baseline surveys are being carried out in Spring/Summer 2020 in order to collect data to complete the assessment of likely impacts and effects of the Proposed Development on some ecological receptors. It is considered that a sufficient level of survey effort could be completed to assess fully the impact of the Proposed Development prior to submission on the DCO.

15.12.2 For some ecological receptors, the impact of increased stack emissions has not been thoroughly investigated. In this assessment, worst-case assumptions have been made (see section 15.2.9 regarding the Rochdale Envelope) and expert knowledge used to provide an evidence base for

classifying the potential impact of the Proposed Development on these receptors.

- 15.12.3 Where the full assessment of impacts from the construction/operation of the Proposed Development is not possible due to reliance on ongoing modelling or analysis, this has been made clear in the text in the relevant section.
- 15.12.4 Little terns show varying levels of site-faithfulness to breeding locations, the colony on Teesside having moved for 2019 to a previously unused location. Future breeding locations cannot be reliably predicted, therefore confidence in the assessment of nutrient nitrogen deposition on breeding little tern is limited in the long term.

15.13 Conclusions

- 15.13.1 The impact assessments presented in this chapter predict significant impacts on several of the ornithological interest features of the Teesmouth and Cleveland Coast SPA and Ramsar during construction of the Proposed Development, without mitigation. Pending further assessment and investigation of scheme design updates to address airborne nitrogen emissions from the PCC, development of a package of mitigation, enhancement and compensation measures and ongoing baseline data gathering and , there is considered to be potential for a long term significant adverse effect (moderate adverse) on a qualifying bird feature (breeding little tern) of the Teesmouth and Cleveland Coast SPA / Ramsar as a result of operation of the PCC. This assessment assumes that other external factors do not render the breeding colony unviable in the short-medium term.
- 15.13.2 All significant impacts predicted to arise as a result of the Proposed Development can be controlled, mitigated or compensated for through appropriate design and mitigation measures, around which details will be developed alongside ongoing scheme design updates. Therefore, the Proposed Development is not predicted to have any significant residual effects on ornithological receptors or sites designated for their ornithological importance based on the baseline conditions presented in this chapter. Further work to update the baseline in light of changes to the proposed design and ongoing routine monitoring of bird populations carried out by third parties may result in revisions to the assessments presented in this chapter.

15.14 References

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