

LIGHTHOUSE GREEN FUELS PROJECT

**Preliminary Environmental
Information Report**

Chapter 7: Terrestrial Ecology

The Inspectorate Reference: **EN010150**

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Volume 1

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7. TERRESTRIAL ECOLOGY

7.1. INTRODUCTION

- 7.1.1. This Chapter reports the preliminary assessment of likely significant effects of the Proposed Scheme on terrestrial ecology during construction and operation. It sets out the methodology and scope for the terrestrial ecology assessment, based on currently available information. Where necessary, further assessment will be presented in the ES.
- 7.1.2. Based on the scoping exercise undertaken, and surveys and assessment completed to date, this Chapter considers all possible terrestrial ecology receptors for the various Study Areas defined for the Site. The receptors identified include statutory and non-statutory designated sites, other habitats of conservation importance, and a range of protected and notable species (including invasive non-native species).
- 7.1.3. This Chapter is intended to be read as part of this wider PEIR, with particular reference to:
- **Chapter 2: Site and Proposed Scheme Description (Volume 1);**
 - **Chapter 5: Air Quality (Volume 1);**
 - **Chapter 6: Noise and Vibration (Volume 1);**
 - **Chapter 8: Freshwater and Marine Ecology (Volume 1);**
 - **Chapter 9: Water Environment and Flood Risk (Volume 1);**
 - **Chapter 10: Landscape and Visual (Volume 1);**
 - **Appendix 7A: Preliminary Ecological Appraisal (PEA) Report (Volume 3);**
 - **Appendix 7B: Information to Inform Habitats Regulations Assessment (HRA) Screening (Volume 3);** and
 - **Appendix 7C: National Vegetation Classification (NVC) Survey Report (Volume 3).**
- 7.1.4. The terrestrial ecology and marine and freshwater ecology assessments comprise two distinct assessments. Some brief references are made in this Chapter to freshwater and marine ecological receptors. However, overall, the information presented in this Chapter does not duplicate information set out in **Chapter 8: Freshwater and Marine Ecology (Volume 1)**.
- 7.1.5. There is overlap between this Chapter and **Chapter 6: Noise and Vibration (Volume 1)** due to the potential effects of noise and vibration on ecological receptors. **Chapter 6: Noise and Vibration (Volume 1)** presents the baseline noise survey methodology and results in relation to ecological receptors. The methodology for the assessment of potential likely significant effects on terrestrial ecology associated with noise and vibration, including proposed mitigation measures are presented in this Chapter in relevant sections below.
- 7.1.6. There is also overlap between this Chapter and **Chapter 5: Air Quality (Volume 1)**, which assesses potential deposition impacts on designated ecological sites and notable

habitats (areas of ancient woodland). It is not possible to assess all air quality impacts at this stage of the Proposed Scheme. As such, only air quality impacts arising from dust deposition, road traffic and marine vessel movements have therefore been included within this Chapter. Full details of the air quality assessment in relation to designated ecological sites and habitats is provided in **Chapter 5: Air Quality (Volume 1)**.

- 7.1.7. In line with the assessment undertaken at the EIA Scoping Stage, the terrestrial ecology assessment incorporates an arboriculture assessment. Information is presented below in relation to relevant policy, legislation and guidance, the methodology and scope for the arboriculture assessment, and the result of the assessment completed to date. The current arboriculture baseline (both from desk study and field survey) is presented in **Section 7.5** and the preliminary assessment of likely significant effects to any arboricultural receptors is presented in **Section 7.7**.

MATTERS SCOPED OUT

- 7.1.8. Based on the findings of the terrestrial ecology assessment completed to date, including the provision of the EIA Scoping Opinion¹ from the Planning Inspectorate, the following elements are to be scoped out of the assessment from hereon.

Decommissioning Phase

- 7.1.9. Although reference to assessment of the decommissioning phase of the Proposed Scheme was included in Chapter 7: Terrestrial Ecology of the EIA Scoping Report², the intention is to scope out the decommissioning phase from the terrestrial ecology assessment going forward. Due to the operational lifespan of the Proposed Scheme (50 years), the future baseline conditions in regard to key sensitive receptors and locations on/adjacent to the Site have too much uncertainty to allow for an informed and robust assessment. It is assumed there will be potential for likely significant effects similar to those identified for the construction phase (as assessed in **Section 7.7**, below), but these are not anticipated to be greater than any significant effects incurred during construction. Notwithstanding this, it is intended to scope out the decommissioning phase from this assessment, completing the assessment of likely significant effects as part of the proposed decommissioning plan.

Statutory Designated Sites - Local

- 7.1.10. No significant effects to Local Statutory Designated Sites are anticipated during either construction or operation of the Proposed Scheme. Berwick Hills Local Nature Reserve (LNR) is the only site that was identified as a potential sensitive receptor during the EIA Scoping Stage and, as discussed further in **Table 7-2** (ID 3.3.1) below, the only potentially significant impact anticipated is habitat degradation resulting from emissions to air. This is discussed in **Section 5.8 of Chapter 5: Air Quality (Volume 1)** and the assessment is not replicated here. Therefore, impacts to Berwick Hills LNR have been scoped out of the terrestrial ecology assessment.

UPDATES SINCE SCOPING

7.1.11. Since the EIA Scoping Stage, there have been a number of amendments to the design of the Proposed Scheme. Full details are provided in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, with additional and removed Site areas shown on **Figures 1-1, 1-2 and 2-5 (Volume 3)**. However, for ease of reference, a summary of these changes and their potential implications in relation to terrestrial ecology are summarised in **Table 7-1**, below:

Table 7-1: Updates to Design of the Proposed Scheme since Scoping

Design Change	Comments	Potential Implications
Additional areas to the east and south of the 'SAF Plant Site' and to the northeast and west of the Teesside Bio Mass plant	To be used to accommodate potential construction activities (such as construction compounds or fabrication) and some utilities works.	Some additional 'land take' compared to the previous Site Boundary, resulting in habitat loss (either temporary or permanent). Has the potential to result in increased indirect disturbance and habitat degradation impacts, such as, noise, vibration, dust deposition, and artificial lighting. These areas are therefore scoped into the assessment.
Additional utility connections to the north, east and west for power and water	Located partly along existing pipeline and cable routes, including an existing pipeline corridor underneath the River Tees. Also located along the A178 Seaton Carew Road, the unnamed road north of the SAF Plant Site, and access roads to the south and east of Bran Sands Wastewater Treatment Works	Utility connection works are anticipated to be temporary, short term and largely restricted to below ground (within existing tunnels). The works are not anticipated to result in any additional habitat loss. However, works may result in indirect disturbance impacts, such as those from noise and vibration.
Exclusion of certain areas located within the DCO Application Boundary from the Site	Exclusion of buildings within Wilton Engineering Wharf, the N + P Materials Recovery Facility on Huntsman Drive, and part of the 'former reclamation pond area', north of Hunstman Drive.	Reduction of land take in these areas.

7.2. POLICY, LEGISLATION, AND GUIDANCE

7.2.1. The policy, legislation and guidance relevant to the assessment of Terrestrial Ecology for the Proposed Scheme is detailed in **Appendix 4A: Policy, Legislation and Guidance (Volume 3)**. The policy, legislation and guidance relevant to this Chapter is outlined below:

- Policy:
 - Overarching National Policy Statement (NPS) for Energy (EN-1) 2023³;
 - The National Planning Policy Framework (NPPF) 2023⁴;
 - Stockton-on-Tees Local Plan 2019⁵;
 - Redcar & Cleveland Local Plan 2018⁶;
 - Tees Valley Biodiversity Action Plan (TVBAP)⁷;
 - The UK Post-2010 Biodiversity Framework (2011-2020)⁸;
- Legislation:
 - The Wildlife and Countryside Act 1981 (as amended) (WCA)⁹;
 - The Countryside and Rights of Way Act 2000¹⁰;
 - The Natural Environment and Rural Communities (NERC) Act 2006¹¹;
 - The Conservation of Habitats and Species Regulations 2017 (as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019)¹² ('the Habitats Regulations');
 - The Ramsar Convention¹³;
 - The Environment Act 2021¹⁴;
 - Protection of Badgers Act 1992¹⁵;
- Guidance:
 - CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland (Version 1.2 – Updated April 2022)¹⁶;
 - BS 42020: 2013 Biodiversity — Code of practice for planning and development¹⁷;
 - BS 8683: Process for designing and implementing biodiversity net gain – Specification¹⁸;
 - BS 5837:2012 – Trees in relation to design, demolition and construction – Recommendations¹⁹; and
 - Natural England/Forestry Commission (2022). Ancient woodland, ancient trees and veteran trees: advice for making planning decisions²⁰.

7.3. SCOPING OPINION AND CONSULTATION

SCOPING OPINION

7.3.1. The Scoping Opinion for the Proposed Scheme was received by the Applicant from the Planning Inspectorate on 01 September 2023¹. A summary of the matters raised by the

Planning Inspectorate and relevant stakeholders in relation to terrestrial ecology, along with the Applicant's responses, are provided in **Table 7-2**, below.

Table 7-2: Summary of EIA Scoping Opinion in Relation to Terrestrial Ecology

ID	Description	Scoping Opinion Comments	Response
Planning Inspectorate			
3.3.1	Local statutory designated sites	<p><i>“The Applicant proposes to scope out impacts to the local statutory designated site Berwick Hills Local Nature Reserve (LNR) which is located 1.7km to the south. It is stated that the LNR is located on the opposite site of the River Tees to the Proposed Development site and therefore there is a lack of connectivity between the LNR and the Proposed Development site.</i></p> <p><i>The Inspectorate is content to scope out impacts resulting from noise, vibration, lighting, or visual disturbance to this LNR on the basis that the separation distance means significant effects are unlikely to occur. However, the ES should assess the potential for habitat degradation to occur from emissions to air.”</i></p>	<p>Berwick Hills LNR is one of the ecological receptors scoped into the air quality assessment. The assessment of air quality impacts on ecological receptors is provided in Chapter 5: Air Quality (Volume 1) and this will be developed in the ES when further baseline information has been collected.</p> <p>As detailed in Table 7-3, below, consultation has been undertaken with Natural England to help agree the scope of the air quality assessment in relation to ecological receptors.</p>
3.3.2	Bats	<p><i>“The Applicant proposes to scope out impacts to bats on the basis that there is limited roosting potential due to the industrial usage of the site and surrounding buildings and the limited vegetation on site.</i></p> <p><i>It is stated that there are some suitable areas beyond the site that may offer commuting and foraging habitats however it is also stated that these are “not expected to be directly affected”. No further information is provided, such as the distance of these potentially suitable habitats from the Proposed Development site or how these habitats would not be directly affected.</i></p>	<p>A ‘daytime bat walkover’ survey will be undertaken in accordance with current good practice guidelines (Collins, 2023²¹). The purpose of this walkover survey will be to determine the roosting suitability of buildings, structures and trees within the Site and an appropriate buffer zone, as well as the suitability of habitats present to support foraging and commuting behaviour. The results of the daytime bat walkover will be presented in the ES. This is currently</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>Furthermore, bat surveys have not been conducted as part of the Interim Ecological Information Report (Appendix 7-A of the Scoping Report)² and so the presence/absence of commuting, foraging, or roosting bats has not been confirmed.</i></p> <p><i>It is also stated that standard mitigation measures would be incorporated to minimise the impacts on foraging and commuting bats which suggests there is some potential for significant effects should mitigation not be secured and implemented.</i></p> <p><i>In the absence of bat surveys confirming the presence or absence of bats utilising the Proposed Development site, the Inspectorate is not content to scope this matter out at this stage. The ES should assess the potential for likely significant effects to occur on bat species or demonstrate the absence of a likely significant effect based on survey results and/or agreement from relevant consultation bodies.”</i></p>	<p>proposed to be undertaken in spring 2024.</p> <p>Further surveys to determine presence/likely absence of bats (if considered necessary) will be undertaken during the appropriate survey period (May – August, inclusive) following the daytime bat walkover.</p> <p>The suitability of habitats for foraging and commuting bats has been (and is being) assessed during ongoing surveys. Preliminary information is presented in Section 7.5, below, and a full assessment will be provided in the ES. As an overview, large proportions of the Site are considered to be of low foraging and commuting suitability for bats, but there are certain vegetated habitats within the Site that may offer some foraging opportunities.</p>
3.3.3	Study area	<p><i>“Table 7-2 of the Scoping Report² proposes a 10km Study Area for internationally designated sites and 2km for nationally and non-statutory designated sites.</i></p>	<p>Further clarification on the determination of Zones of Influence (Zol) will be provided in the ES. In summary, the Zol have been established in line with guidance provided by CIEEM (2017²² and 2020²³).</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>It is unclear how these Zone of Influence (ZOI) have been established. Table 1 within Appendix 5-A of the Scoping Report lists the ‘Scoped in Designated Nature Conservation Sites’, many of which are located beyond the Study Areas defined within Table 7-2 of the Scoping Report. Furthermore, Paragraph 5.3.5 of the Scoping Report states that a “conservative Study Area of 15km” is applied for ecological receptors in relation to impacts from air quality.</i></p> <p><i>The ES should clarify the methodology for determining the project’s ZOI based on the potential for likely significant effects rather than being based on a fixed distance. The ES should be clear on whether the designated sites listed within Table 1 within Appendix 5-A of the Scoping Report² are scoped into the assessment. The ES should ensure a consistent approach has been applied for assessing impacts on ecological receptors within each aspect chapter of the ES. Effort should be made to agree the Study Area(s) with relevant consultation bodies.”</i></p>	<p>A 10km Zol Is considered sufficient to capture the majority of potential impacts beyond the Site, based on the nature and scale of the Proposed Scheme. However, in the case of the air quality assessment (Chapter 5: Air Quality, Volume 1), a conservative 15km Zol has been applied in relation to statutory designated sites (international, European and national), and a 2km Zol for local statutory and non-statutory designated sites, and areas of ancient woodland to ensure that a sufficient geographical area is assessed to ensure that all potential habitats and designated sites that could be affected are taken into account.</p> <p>With regard to the habitats and designated sites listed in Appendix 5-A of the EIA Scoping Report², further clarification will be provided in the ES. However, the current intention would be to scope in all of the habitats/sites listed in Appendix 5-A to ensure a consistent approach between the terrestrial ecology and air quality assessments.</p> <p>The scope of the air quality assessment in relation to ecological receptors has been discussed and</p>

ID	Description	Scoping Opinion Comments	Response
			<p>agreed in principle with Natural England.</p> <p>Several other key stakeholders have also been consulted. These include the Industry Nature Conservation Association (INCA), the Royal Society for the Protection of Birds (RSPB), and Teesmouth Bird Club (TBC). At the time of writing, no responses have been received. Contact has also been made with STBC, with a response pending.</p>
3.3.4	Confidential annexes	<p><i>“Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable ecological features. Specific survey and assessment data relating to the presence and locations of species such as badgers, rare birds and plants that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a confidential annex. All other assessment information should be included in an ES chapter, as normal, with a placeholder explaining that a confidential annex has been submitted to the Inspectorate and may be made available subject to request.”</i></p>	Confidential annexes for the terrestrial ecology assessment will be provided where necessary alongside the ES.

ID	Description	Scoping Opinion Comments	Response
Appendix 2 Environment Agency Page 1	Terrestrial ecology assessment	<i>“The impact of the development on otters and water voles has been scoped in. An Invasive Non-Native Species (INNS) Management Plan will also be prepared to prevent the spread of INNS. This approach is welcomed.”</i>	No action required.
Appendix 2 Natural England Page 1	Basis of assessment	<i>“A robust assessment of environmental impacts and opportunities, based on relevant and up to date environmental information, should be undertaken prior to an application for a Development Consent Order.”</i> <i>“Natural England and the applicant are engaged in ongoing discussions on a number of impacts that we have highlighted as having the potential to adversely affect the nearby designated sites of nature conservation. Based on these discussions, we are confident that the applicant will undertake the required assessments and surveys to identify where impacts are likely, which will inform any further mitigation measures.”</i>	A robust assessment of potential impacts has been (and will continue to be) undertaken in line with the methodology described in the sections below. The Applicant will continue to engage with Natural England and will undertake the terrestrial ecology assessment in line with any agreed scope as a result of these discussions.
Appendix 2 Natural England Page 2	General principles	<i>“Through ongoing discussions with the Applicant and a review of the Lighthouse Green Fuels Environmental DCO: Impact Assessment Scoping Report (July 2023) Natural England is confident that the general principles (set out below) will be addressed through the ES.</i> <i>Regulation 11 of the Infrastructure Planning Regulations 2017-- (The EIA Regulations) sets out the information that should be included in an</i>	The Applicant can confirm that the principles set out by Natural England will be included in the ES.

ID	Description	Scoping Opinion Comments	Response
		<p><i>environmental Statement (ES) to assess impacts on the natural environment. This includes:</i></p> <ul style="list-style-type: none"> ■ <i>A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases</i> ■ <i>Appropriately scaled and referenced plans which clearly show the information and features associated with the development</i> ■ <i>An assessment of alternatives and clear reasoning as to why the preferred option has been chosen</i> ■ <i>A description of the aspects and matters requested to be scoped out of further assessment with adequate justification provided.</i> ■ <i>Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation etc.) resulting from the operation of the Proposed Development</i> ■ <i>A description of the aspects of the environment likely to be significantly affected by the development including biodiversity (for example fauna and flora), land, including land</i> 	

ID	Description	Scoping Opinion Comments	Response
		<p><i>take, soil, water, air, climate (for example greenhouse gas emissions, impacts relevant to adaptation, cultural heritage and landscape and the interrelationship between the above factors</i></p> <ul style="list-style-type: none"> ■ <i>A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium, and long term, permanent and temporary, positive, and negative effects. Effects should relate to the existence of the development, the use of natural resources (in particular land, soil, water and biodiversity) and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment</i> ■ <i>A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment</i> ■ <i>An outline of the structure of the proposed ES”</i> 	

ID	Description	Scoping Opinion Comments	Response
Appendix 2 Natural England Page 2	Cumulative and in-combination effects	<p><i>“A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.</i></p> <p><i>The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out.”</i></p>	<p>Cumulative effects of the Proposed Scheme are considered in Chapter 19: Cumulative Effects (Volume 1) of this PEIR and will be developed further in the ES. The cumulative assessment in the ES will include consideration of effects resulting from the Proposed Scheme in combination with other projects and activities and will take into account all supporting infrastructure, including the Affected Road Network (ARN).</p>
Appendix 2 Natural England Page 3	Biodiversity and Geodiversity	<p><i>“The assessment will need to include potential impacts of the proposal upon sites and features of nature conservation interest as well as opportunities for nature recovery through biodiversity net gain (BNG). There might also be strategic approaches to take into account.</i></p> <p><i>“Ecological Impact Assessment (EclA) is the process of identifying, quantifying, and evaluating the potential impacts of defined actions on ecosystems or their components. EclA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal. Guidelines have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM).”</i></p>	<p>The assessment within this PEIR considers impacts on sites and features of nature conservation interest, and this will be developed further in the ES when additional baseline information is available. A BNG assessment is to be undertaken for the Proposed Scheme, and a BNG technical appendix detailing the results of the assessment completed will be provided with the ES. The BNG assessment will follow the Good Practice Principles²⁴, and a local strategic approach will be taken, if determined to be necessary.</p> <p>The terrestrial ecology assessment is being carried out in line with CIEEM’s Guidelines for Ecological Impact Assessment¹⁶.</p>

ID	Description	Scoping Opinion Comments	Response
Appendix 2 Natural England Page 4	International Habitats and Sites	<p><i>“The development site is within or may impact on the following nature conservation sites, which are part of the National Site Network or have been internationally designated:</i></p> <ul style="list-style-type: none"> ■ Teesmouth and Cleveland Coast Special Protection Area ■ Teesmouth and Cleveland Coast Ramsar site <p><i>The ES should thoroughly assess the potential for the proposal to affect internationally designated sites of nature conservation importance / Habitats sites, including marine sites where relevant. This includes Special Protection Areas (SPA), Special Areas of Conservation (SAC), listed Ramsar sites, candidate SAC and proposed SPA.</i></p> <p><i>Article 6 (3) of the Habitats Directive requires an appropriate assessment where a plan or project is likely to have a significant effect upon a European Site, either individually or in combination with other plans or projects.”</i></p>	<p>Potential impacts to the Teesmouth and Cleveland Coast SPA/Ramsar are assessed in this PEIR Chapter and will be developed further in the ES when full baseline information from completed surveys is available. Potential impacts to marine qualifying features of the designated sites are assessed in Chapter 8: Freshwater and Marine Ecology (Volume 1) of this PEIR and will again be developed further in the ES when full baseline information is available.</p> <p>An HRA screening assessment has been undertaken and is appended to this PEIR (Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)). The screening assessment has concluded Likely Significant Effects to internationally designated sites; therefore, an Appropriate Assessment (AA) will be undertaken, and an AA report will be submitted alongside the ES.</p>

ID	Description	Scoping Opinion Comments	Response
		<p>Potential Noise/Visual Disturbance Impacts <i>The Proposed Development has the potential to result in noise and visual to the qualifying features of the SPA/Ramsar. Natural England recommends an approach to noise assessments that considers the likely maximum noise levels, as well as the change from average baseline noise. Where there is a 3dB change from the baseline, we recommend that further investigation should be undertaken to determine which of the site’s qualifying features could be affected and what those effects would be. This should consider the frequency and duration of likely impacts.</i></p> <p><i>Visual disturbance could occur where construction or operational activities are located in close proximity to important areas of the SPA/Ramsar for the qualifying features. Natural England recommends that any significant short-term activities or long-term operations that would create new source of visual disturbance should be considered in the assessment.</i></p>	<p>The methodology for the noise and vibration assessment is being developed in consultation with Natural England (discussed further in Table 7-3, below). A preliminary assessment of potential likely significant effects on SPA/Ramsar qualifying features (and other ecological receptors) resulting from noise and vibration is provided in Section 7.7, below, and will be developed further in the ES and HRA process when full baseline information is available.</p> <p>Similarly, an assessment of potential likely significant effects on SPA/Ramsar qualifying features (and other ecological receptors) from visual disturbance is provided in Section 7.7, below, and will be developed further in the ES and HRA process when full baseline information is available.</p>

ID	Description	Scoping Opinion Comments	Response
		<p>Potential Air Quality Impacts <i>The Proposed Development is likely to result in emissions of pollutants and nutrients that have the potential to adversely affect the supporting habitats of the site’s qualifying features. Therefore, a robust approach to assessing these impacts should be taken in the ES.</i></p>	<p>The methodology for the air quality assessment in relation to designated sites, along with an assessment of potential likely significant effects, is provided in Chapter 5: Air Quality (Volume 1). This will be developed further in the ES when full baseline data from the air quality assessment is available.</p>

ID	Description	Scoping Opinion Comments	Response
		<p>Potential Water Quality Impacts <i>The Proposed Development has the potential to result in the discharge of process-related wastewaters, which may contain nitrogen and/or other pollutants that could negatively impact the water quality of the SPA.</i></p> <p><i>In March 2022, Natural England issued advice to all competent authorities regarding the impacts of excess levels of nitrogen and phosphorous on certain Habitats Sites. The Teesmouth and Cleveland Coast SPA/Ramsar is subject to this advice as a result of excess levels of nitrogen in the Tees Estuary, which have resulted in the growth of opportunistic macroalgae on key foraging grounds for the site’s qualifying features.”</i></p>	<p>The methodology for the water environment assessment has been developed in consultation with Natural England and is described in Chapter 9: Water Environment and Flood Risk (Volume 1). An assessment of potential likely significant effects on SPA qualifying features (and other ecological receptors) resulting from impacts to water quality is provided in Section 7.7, below, and will be developed further in the ES when full baseline information is available.</p> <p>A Nutrient Neutrality Assessment and Mitigation Strategy (NNAMS) for the Proposed Scheme is being prepared and discussed with Natural England (see Table 7-3, below). A preliminary nutrient neutrality assessment in relation to ecological receptors has been provided in Section 7.7, below. This will be refined further at the ES stage, informed by a standalone NNAMS.</p>

ID	Description	Scoping Opinion Comments	Response
Appendix 2 Natural England Page 6	Nationally Designated Sites – Sites of Special Scientific Interest	<p><i>“The development site is within or may impact on the following Site of Special Scientific Interest (SSSI):</i></p> <ul style="list-style-type: none"> ■ <i>Teessmouth and Cleveland Coast SSSI</i> <p><i>The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSI and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects.</i></p> <p><i>Features which the ES will need to consider:</i></p> <ul style="list-style-type: none"> ■ <i>Aggregations of breeding birds;</i> ■ <i>Aggregations of non-breeding birds;</i> ■ <i>Common seal, Phoca vitulina</i> ■ <i>Fixed dune grassland</i> ■ <i>Humid dune slacks</i> ■ <i>Invertebrate assemblage</i> ■ <i>Sand dune; strandline, embryo and mobile dunes</i> 	The Applicant can confirm that ES will include a full assessment of direct and indirect effects of the Proposed Scheme on features of special interest within the SSSI and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects.

ID	Description	Scoping Opinion Comments	Response
		<p><i>Our advice regarding the potential impact pathways on the Teesmouth and Cleveland Coast SSSI broadly coincides with those set out (in relation to the SPA/Ramsar). However, we highlight that Teesmouth and Cleveland Coast SSSI is designated for a wider range of birds, Common Seal, coastal dune habitats, and geological features. Therefore, potential impacts on these features should also be considered in the relevant assessment. In particular, we would like to highlight the following potential impacts:</i></p>	

ID	Description	Scoping Opinion Comments	Response
		<p>Noise and Visual Disturbance <i>Common Seal are particularly vulnerable to impacts from noise and disturbance during the pupping season and to a lesser extent during the moulting season. Therefore, any activities located in a relevant location that are likely to cause disturbance should be scheduled to take place outside of these periods.</i></p>	<p>Potential impacts to common seal from noise and visual disturbance (and other factors) are covered in Chapter 8: Freshwater and Marine Ecology (Volume 1) and will be developed further in the ES.</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>Air Quality</i> <i>Coastal dune and grassland habitats are sensitive to changes in air quality and the deposition of pollutants (nutrient nitrogen and ammonia). The applicant has stated that a full air quality assessment will be undertaken and will have regard to the relevant critical loads and levels.”</i></p>	<p>An assessment of impacts to habitat features of the SSSI is provided in Chapter 5: Air Quality (Volume 1) and will be developed further in the ES.</p>

ID	Description	Scoping Opinion Comments	Response
Appendix 2 Natural England Page 7	Protected Species	<p><i>“The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law. Records of protected species should be obtained from appropriate local biological record centres, nature conservation organisations and local groups. Consideration should be given to the wider context of the site, for example in terms of habitat linkages and protected species populations in the wider area</i></p>	<p>The method of assessment of potential likely significant effects arising from the Proposed Scheme (during construction and operation) is detailed in Section 7.4, below. This will be developed and refined, where necessary, for the ES. Records of protected species have been obtained from the local biological record centre (obtained in April 2023) and bird records for the Site and a surrounding 1km radius have been obtained from TBC (December 2023). Due to changes in the design of the Proposed Scheme and consequent extensions to the DCO Application Boundary since the desk study data was provided, further data needs to be obtained in order to undertake a robust assessment. The assessment relating to acquisition and review of this data will be presented in the ES.</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>The area likely to be affected by the development should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and, where necessary, licensed, consultants.”</i></p>	<p>The Site and a wider Study Area are being assessed by competent, experienced ecologists, with surveys being carried out during appropriate seasonal windows, where necessary, following current best practice guidance. Licensed surveyors will be used where necessary. Any currently known limitations to the completion of surveys are provided in Section 7.12, below. These limitations will be updated, if necessary, as survey effort progresses, and a full list will be included in the ES. A full impact assessment and recommendations for mitigation measures will also be included in the ES.</p>
<p>Appendix 2 Natural England Page 8</p>	<p>Priority Habitats and Species</p>	<p><i>“Consideration should... be given to the potential environmental value of brownfield sites, often found in urban areas and former industrial land. Sites can be checked against the (draft) national Open Mosaic Habitat (OMH) inventory published by Natural England.</i></p> <p><i>An appropriate level habitat survey should be carried out on the site, to identify any important habitats present. In addition, ornithological, botanical,</i></p>	<p>Due to the geographic location and historical use of the Site, consideration has been (and is being) given to the presence of brownfield habitats within the Study Area, along with their potential ecological value. Publicly available information on OMH habitat published by Natural England has been reviewed as part of the terrestrial ecology assessment (highlighted in Section 7.5, below).</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present.</i></p> <p><i>The Environmental Statement should include details of:</i></p> <ul style="list-style-type: none"> ■ Any historical data for the site affected by the proposal (e.g. from previous surveys) ■ Additional surveys carried out as part of this proposal ■ The habitats and species present ■ The status of these habitats and species (e.g. whether priority species or habitat) ■ The direct and indirect effects of the development upon those habitats and species ■ Full details of any mitigation or compensation measures ■ Opportunities for biodiversity net gain or other environmental enhancement 	<p>A UK Habitat Classification (UKHab) survey has been carried out across the Site (where accessible to date) as part of the PEA to classify the habitats present and is proposed to continue to cover the entire Site (see Appendix 7A: PEA Report (Volume 3)). In addition, an NVC survey has been undertaken to further assess notable vegetation communities recorded across the Site, with further survey visits to be completed if considered necessary. Invertebrate surveys are proposed to be undertaken in 2024, following a full review of baseline information.</p> <p>The ES will include information relating to all of the points listed by Natural England.</p>
Appendix 2 Natural England Page 8	Biodiversity Net Gain	<p><i>The Environment Act 2021 includes NSIPs in the requirement for Net Gain but the implementation details including what marine net gain means is not yet clear and not likely to come into force until November 2025.</i></p>	<p>The Applicant can confirm that a BNG assessment will be completed for the Proposed Scheme using the Biodiversity Metric 4.0 (BM4.0). The 'biodiversity baseline' for the Site is being informed by the UKHab surveys</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>National Policy Statements are also being reviewed to incorporate these changes. Some developers also have made commitments e.g. National Grid to deliver a 10% BNG. Others have overarching KPIs within their funding periods.</i></p> <p><i>The ES should use an appropriate biodiversity metric such as Biodiversity Metric 4.0 together with ecological advice to calculate the change in biodiversity resulting from Proposed Development and demonstrate how proposals can achieve a net gain.</i></p> <p><i>The metric should be used to:</i></p> <ul style="list-style-type: none"> ■ <i>Assess or audit the biodiversity unit value of land within the application area</i> ■ <i>Calculate the losses and gains in biodiversity unit value resulting from Proposed Development</i> ■ <i>Demonstrate that the required percentage biodiversity net gain will be achieved</i> <p><i>Biodiversity Net Gain outcomes can be achieved on-site, off-site or through a combination of both. On-site provision should be considered first. Delivery should create or enhance habitats of equal or higher value. When delivering net gain, opportunities should be sought to link delivery to relevant plans or strategies e.g. Green</i></p>	<p>and subsequent condition assessments. The survey data and finalised design for the Proposed Scheme (post development design), will be used to determine the extent of compensation and enhancement measures required to deliver the BNG target percentage. In the first instance, compensation and enhancement measures will be implemented on Site as part of the project design. However, if offsite compensation is required, options will be explored to determine the most appropriate strategy to deliver the BNG target percentage.</p> <p>The BNG assessment will be completed during the ES stage and will be provided in the form of a technical appendix alongside the ES.</p>

ID	Description	Scoping Opinion Comments	Response
		<p><i>Infrastructure Strategies or Local Nature Recovery Strategies. These are prepared by local planning authorities.”</i></p>	
	<p>Climate Change</p>	<p><i>“The England Biodiversity Strategy²⁵ published by DEFRA establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development’s effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment ‘by establishing coherent ecological networks that are more resilient to current and future pressures’ (NPPF Para 174), which should be demonstrated through the ES.”</i></p>	<p>Section 7.6 outlines the terrestrial ecology assessment’s approach to future baseline, which includes a consideration of the future climate change trends and their implications on biodiversity.</p>

7.3.2. As mentioned in **Table 7-2**, further to the above responses from the Planning Inspectorate, the Environment Agency and Natural England, Scoping Opinions have also been requested from STBC, the RSPB, TBC, and INCA, but no responses have been received at the time of writing.

CONSULTATION

7.3.3. Consultation undertaken to date is summarised in **Table 7-3**, below:

Table 7-3: Summary of Consultation Undertaken

Date and Method of Consultation	Consultee	Summary of Key Topics Discussed and Key Outcomes
February 2023, e-mails	Natural England	<p>Discretionary Advice Service (DAS) agreement set up. Initial meeting proposed to further discuss scope of bird surveys and requirements for HRA.</p> <p>The extent of wintering bird survey effort was discussed. Natural England confirmed that one year of survey data would be suitable, to be supplemented by relevant desk study data. Natural England also confirmed that they would be happy for the wintering season to be split and completed within non-consecutive survey windows of January – March and October – December.</p>
26 April 2023, DAS meeting (online)	Natural England	<p>The Applicant proposed to reduce the wintering bird survey effort from weekly surveys (completed between January and March 2023) to fortnightly visits for the October to December period, in accordance with typical requirements. Suitability to be confirmed by a specialist ornithologist at Natural England (later confirmed via e-mail , 12 May 2023) as being an acceptable change to the approach, with low tide and high tide surveys to be completed each month as a minimum.</p> <p>The Applicant requested comments on the suitability of the 500m Zol being utilised for bird surveys. The Applicant highlighted that it was a precautionary Zol to account for all reasonably foreseeable impacts based on information available on the Proposed Scheme at the time. Natural England later indicated via e-mail (12 May 2023) that there is no standard approach, but the Zol used should be a precautionary distance based on likely noise impacts from the Proposed Scheme.</p> <p>Natural England highlighted the need for a summary, to be provided within the HRA report, of key locations within the Teesmouth and Cleveland Coast Special Protection Area (SPA) for SPA qualifying species. This is to be provided mainly from available literature, supplemented by findings of bird surveys being undertaken and data and information available from TBC.</p>

Date and Method of Consultation	Consultee	Summary of Key Topics Discussed and Key Outcomes
		<p>Applicant requested comments on further survey effort required in relation to great crested newt (GCN) <i>Triturus cristatus</i>, due to the general unsuitability of waterbodies in the area to support them. No specific comments were provided by Natural England.</p> <p>The scope of the HRA was also discussed. This covered air quality, water quality, noise, lighting, and nutrient neutrality. Potential mitigation options in relation to nutrient neutrality were briefly discussed. Feedback received included the threshold for Likely Significant Effects being where there is a <i>reasonable</i> pathway to effect from the various potential impacts specified. Potential mitigation in relation to nutrient neutrality was also suggested, which included reversion of arable land within the Tees catchment and/or wetland creation.</p> <p>BNG was also briefly discussed, including some principles to be taken into account for compensation and enhancement measures.</p>
08 June 2023	Natural England	<p>A meeting was held to confirm the approach to deliver the required NNAMS.</p> <p>Natural England confirmed that the only offsite water discharge that should be considered in the NNAMS is the treated industrial process effluent discharged to Bran Sands wastewater treatment works (WWTW) for further treatment prior to being discharged to the River Tees.</p> <p>Natural England also confirmed that the nitrogen load calculation should be based on the total nitrogen discharge concentration (27mg/l) in treated effluent discharged from Bran Sands WWTW.</p>
10 August 2023, DAS meeting (online)	Natural England	<p>The scope of the noise assessment in relation to birds was discussed. Natural England suggested monitoring locations along the River Tees to monitor noise levels in relation to shipping movements and wharf activity. Applicant and Natural England agreed that proposed noise monitoring locations would be presented to Natural England prior to the start of monitoring to confirm their suitability.</p> <p>The Applicant presented the proposed methodology of assessing noise impacts on birds and Natural England advised that the key measure of significant impacts would be a 3dB change at the receptor above the current baseline.</p>

Date and Method of Consultation	Consultee	Summary of Key Topics Discussed and Key Outcomes
		<p>The proposed air quality assessment methodology was presented by the Applicant. Natural England advised that they would defer to an air quality specialist to confirm, but in general it was considered that the methodology was in line with what they would expect.</p> <p>Contour plots for both noise and air quality monitoring were highlighted by Natural England as being key deliverables.</p>
10 October 2023, DAS meeting (online)	Natural England	<p>The Applicant provided an update on terrestrial and aquatic ecology surveys completed to date. This included the results of surveys undertaken in late August 2023, which included the discovery of several notable habitats within a parcel of land owned by North Tees Limited, which forms part of the former reclamation pond, part of the SAF Plant Site. Habitats recorded in this location included areas of saltmarsh habitat, as well as reedbed, open mosaic habitat on previously developed land (OMHPDL), and a series of freshwater ditches and channels. The value of these habitats is discussed in Section 7.5, below.</p> <p>The majority of the discussion was centred around the above findings, as this introduced a new receptor to the assessment that wasn't known at the EIA Scoping Stage. Furthermore, the current landowner is proposing to develop this parcel of land under an extant planning permission. Advice was requested on how this is factored into the baseline for the Proposed Scheme and the basis of assessment, given that this area may potentially be infilled under this permission and the existing habitats lost prior to the commencement of the Proposed Scheme. Natural England acknowledged the effects on several elements of the terrestrial ecology assessment, including the BNG assessment and HRA. It was agreed that the Applicant would draft a note to provide further information and allow Natural England to explore the issue in greater detail. The note was produced and was issued to Natural England on 01 December 2023.</p> <p>Passage/wintering bird surveys were discussed further. The Applicant queried whether wintering surveys would need to be repeated between January and March 2024. The scope has changed to incorporate two new transects for the September – December 2023 surveys, which were not included in the January – March 2023 surveys. This includes transects along the River Tees to cover the North Tees Mudflat section of the Teesmouth</p>

Date and Method of Consultation	Consultee	Summary of Key Topics Discussed and Key Outcomes
		<p>and Cleveland Coast SSSI/SPA/Ramsar and the former reclamation pond area mentioned above. These transects were included due to the known or potential bird interest in these areas. In the case of the North Tees Mudflat, it was considered necessary to include this area in the event that any disturbance from marine vessel movements as part of the Proposed Scheme impacted any qualifying species of the SPA. For the former reclamation pond area, it was considered necessary to undertake surveys in this area due to the habitats recorded during the August 2023 survey visits and the potential for them to support a range of bird species. Natural England later confirmed in writing (via e-mail on 5 December 2023) that further wintering bird surveys to include these two new transects would be required between January and March 2024. These surveys are ongoing at the time of writing.</p> <p>The Applicant provided an overview of the proposed approach in relation to bat surveys. Natural England considered the approach to be sensible.</p> <p>Noise monitoring locations were discussed, and Natural England confirmed that they were happy with the proposed locations. Further to e-mail correspondence following the previous DAS meeting, the Applicant requested further clarity on the 3dB change against which noise impacts would be screened into the assessment.</p> <p>Regarding the air quality assessment, Natural England advised on a recent change in critical load values for certain habitats on the Air Pollution Information System (APIS). Natural England indicated that there was still a lack of clarity on some of values, and that this should be considered as part of the assessment.</p> <p>An Evidence Plan for the HRA was also briefly discussed to assist in determination of scope. Natural England to provide further information following on from the meeting.</p>
07 March, DAS meeting (online)	Natural England	<p>For Natural England’s reference, the Applicant provided an update on extensions to the DCO Application Boundary since the previous meeting with Natural England, and an overview of proposed works within these extended areas. This included utilities connections to the east and west of the SAF Plant Site, along the A178 Seaton Carew Road, access roads to the south and east of Bran Sands Wastewater Treatment Works, and the additional</p>

Date and Method of Consultation	Consultee	Summary of Key Topics Discussed and Key Outcomes
		<p>construction laydown area to the north of Clarence Wharf. An update was also provided in relation to the former reclamation pond area, with the Applicant highlighting that this area is proposed to be used as an additional construction laydown area for the Proposed Scheme if the area is infilled by the current landowner under their extant permission and the existing habitats are lost prior to the commencement of the Proposed Scheme. However, if infilling works are not undertaken and the existing habitats remain in place, the Applicant will not undertake any works within the former reclamation pond area.</p> <p>The Applicant queried, in light of the extensions to the DCO Application Boundary, whether additional breeding and wintering bird surveys would be required to determine potential constraints, or if a commitment to specific mitigation measures (such as timing works to avoid sensitive periods and the use of screening, where required) would be sufficient to avoid significant effects. Natural England were still considering a response at the time of writing, further discussions / consultation will be undertaken.</p> <p>Further clarification was requested on Natural England’s noise assessment guidance and the 3dB criteria that was previously discussed. Natural England advised that a 3dB increase above baseline was considered to be the threshold to screen in potentially significant noise effects to ecological receptors. Where potential significant effects are identified, more detailed assessment would then be required.</p> <p>Nutrient neutrality was also briefly discussed in relation to changes in processes associated with the Proposed Scheme and consequent effects on the Applicant’s existing nutrient neutrality assessment. It was determined that more detailed assessment would be required, which will be presented in the ES.</p>

7.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.4.1. The terrestrial ecology assessment for the Proposed Scheme has been undertaken in line with the policy, legislation and guidance summarised in **Section 7.2**.

POTENTIALLY SIGNIFICANT EFFECTS

7.4.2. As identified in the EIA Scoping Report², the following effects are considered to be potentially significant, and have been considered further in this assessment:

- Construction phase:
 - Habitat loss and fragmentation;
 - Killing or injury of protected/notable species;
 - Noise and vibration disturbance;
 - Visual disturbance;
 - Dust deposition;
 - Water pollution;
 - Air pollution; and
 - Artificial lighting.
- Operation phase:
 - Noise and vibration disturbance;
 - Visual disturbance;
 - Dust deposition;
 - Water pollution;
 - Air pollution; and
 - Artificial lighting.

SENSITIVE RECEPTORS

7.4.3. Following on from the scoping undertaken (as detailed in the EIA Scoping Report²), the following sensitive ecological receptors will be considered as part of the terrestrial ecology assessment.

Designated Sites

Statutory Designated Sites

- Teesmouth and Cleveland Coast Ramsar;
- Teesmouth and Cleveland Coast SPA;
- Teesmouth and Cleveland Coast SSSI; and
- Teesmouth National Nature Reserve (NNR).

Non-statutory Designated Sites

- Teessaurus Park LWS;
- Berwick Hills and Ormesby Beck Complex LWS;

- Greatham Creek North Bank Saltmarsh LWS; and
- Greenabella Marsh LWS.

Habitats

Habitats of Principal Importance (HPI)

- Open Mosaic Habitat on Previously Developed Land (OMHPDL);
- Coastal and Floodplain Grazing Marsh;
- Mudflats;
- Deciduous Woodland;
- Saline Lagoons;
- Lowland Fens; and
- 'No main habitat but additional habitats present'.

Other Habitats

- Ancient woodland and ancient trees; and
- Habitats recorded in the Study Area during the UKHab survey (28 in total) as listed in **Section 7.5**, below.

Protected and Notable Species

- Badger *Meles meles*;
- Bird species – breeding and overwintering;
- Otter *Lutra lutra*;
- Water Vole *Arvicola amphibius*;
- Amphibians;
- Reptiles;
- Other notable terrestrial mammal species (hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus*);
- Terrestrial invertebrates; and
- Invasive non-native species (INNS).

7.4.4. As highlighted previously in the Scoping Report², the quantity and extent of receptors may be subject to change as a result of the progression of the terrestrial ecology assessment. Additional sensitive receptors scoped in since the Scoping Report was completed include:

- Additional statutory designated sites (international and local):
 - North York Moors SPA;
 - North York Moors SAC; and
 - Cowpen Bewley Woodland Country Park LNR.
- Local statutory designated sites;

- Non-statutory designated sites^a;
- Lowland Fen HPI;
- ‘Other habitats’ within the Study Area; and
- Bats.

BASELINE DATA COLLECTION

Overview

7.4.5. The terrestrial ecology baseline has been (and is being) determined through a combination of desk study and field surveys. The extent of individual receptor Study Areas applied during the baseline data gathering exercise have also been identified. Further information on this is provided in **Section 7.5**, below. Information on baseline data collection in relation to individual receptors is also included within **Appendix 7A: PEA Report (Volume 3)** (being submitted alongside this PEIR Chapter, with an updated version to be provided alongside the ES) and in species-specific technical reports to be provided as appendices to the ES.

Desk Study

7.4.6. A desk study has been completed as part of the PEA Report (**Appendix 7A (Volume 3)**) following best practice guidelines^{14, 15}. The desk study has included a review of publicly available resources and databases to determine the presence of protected sites, Habitats of Principal Importance (HPI) (as defined by the NERC Act 2006) and notable trees and woodland listed on the Ancient Tree Inventory ATI^b) and Ancient Woodland Inventory (AWI)^c respectively. In addition, records of protected and notable species and non-statutory designated sites have been obtained from relevant third parties. The following data sources have been (and are being) consulted to inform the desk study:

- The Multi Agency Geographic Information for the Countryside (MAGIC) website^d for information on statutory designated sites and HPI;
- ATI and AWI;
- Information on Tree Preservation Orders (TPOs) and Conservation Areas, available publicly via Redcar and Cleveland Borough Council (RCBC) and obtained directly from STBC;
- Records of protected/notable species and non-statutory designated sites have been obtained from the Environmental Records Information Centre (ERIC) North East;

^a Non-statutory designated sites were scoped in previously, but information on specific sites within the Study Area was not available at the time the Scoping Report² was issued.

^b The ATI is a database of ancient and veteran trees administered by the Woodland Trust and is not a definitive database for these receptors. Desktop study of this source is dated 16/06/2023.

^c The AWI in England lists areas over two hectares in size which have been continuously wooded since at least 1600.

^d www.magic.defra.gov.uk (Accessed May 2023).

- Wetland Bird Survey (WeBS) data provided by the British Trust for Ornithology (BTO) has also provided count data for recent surveys (previous five years^e) for birds within the following targeted WeBS survey ‘sectors’ within or immediately adjacent to the Site:
 - ~ Dorman’s Pool (part of RSPB Saltholme, enveloped by the Site);
 - ~ Reclamation Pond (within the Site; mentioned in **Table 7-2**); and
 - ~ Tees Estuary opposite Smiths Dock and Hargreaves Quarry.
- Further bird survey data has been obtained from TBC for the Site and a surrounding 1km area.

7.4.7. The search radii are outlined in **Table 7-7** below.

7.4.8. It should be noted that desk study data from ERIC North East, WeBS and STBC was obtained during the EIA Scoping Stage. However, subsequent design changes to the Proposed Scheme and associated amendments to the Site Boundary have extended the Study Areas relevant to these data sets. As such, it will be necessary to obtain additional desk study data to support the terrestrial ecology assessment at the ES stage.

Field Surveys

- 7.4.9. Field surveys are ongoing to gather data which will inform the terrestrial ecology assessment. Surveys commenced in January 2023 and may continue until early 2025. Depending on the outcomes of the completion of the baseline assessment and/or any further changes to the design of the Proposed Scheme, further surveys may be required beyond this. Any additional surveys completed will be detailed in the ES.
- 7.4.10. Baseline habitat conditions have been (and are being) established through a series of preliminary surveys. These surveys include UKHab surveys, a walkover survey for badger, a daytime walkover survey for bats, and Habitat Suitability Index (HSI) assessments of waterbodies and watercourses in relation to GCN. These baseline surveys have helped to identify the need for further detailed surveys in relation to particular receptors in order to inform the design of the Proposed Scheme and support the EIA. Surveys will continue until a full baseline data set is available to inform the EIA.
- 7.4.11. Surveys are being, and will continue to be, completed in line with relevant current good practice guidelines. Where there are deviations from best practice, approaches to survey effort will be discussed with relevant consultees and survey methods and/or limitations detailed within the ES.
- 7.4.12. The surveys that have been (and are being) undertaken, along with the good practice survey guidance used, are summarised in **Table 7-4**, below. The Zol that comprise the overall Study Area for the field surveys are detailed in **Table 7-7**.

^e The five most recent years in which data has been recorded.

7.4.13. The extent of survey completion at the time of writing is summarised in the various sub-sections in **Section 7.5**, below.

Table 7-4: Details of Terrestrial Ecology Surveys

Survey	Dates	Scope and Method Detail	Good Practice Guidance Reference
Wintering birds	January to March 2023; September 2023 to February 2024; requirement for further surveys to be confirmed (TBC) with Natural England	Surveys of a number of walked and driven transects across the Study Area to determine assemblages of passage and overwintering bird species	Fuller (1980) ²⁶ Bibby <i>et al.</i> (2000) ²⁷ Gilbert <i>et al.</i> (1998) ²⁸ Hardey <i>et al.</i> (2009) ²⁹
UKHab	April 2023 to January 2024 (ongoing)	Surveys of all habitats within the Study Area to classify them based on their characteristics and/or plant species composition present.	UK Habitat Classification (UKHab) Working Group (2020a) ^{6 30} UKHab Working Group (2020b) ³¹ UKHab Working Group (2020c) ³²
Badger	April to September 2023; further surveys to be determined (TBD) based on findings of UKHab surveys in new Site areas	Carried out as part of the PEA in combination with the UKHab surveys. Assessment of suitable habitat for badgers within and surrounding the Site and checking for any evidence of their presence.	Harris <i>et al.</i> (1989) ³³ Roper (2010) ³⁴ Andrews (2013) ³⁵
Amphibians	April to September 2023; further surveys in spring 2024 TBD	Carried out as part of the PEA in combination with the UKHab surveys. Assessment of suitable terrestrial habitat within the Study Area, and an	Oldham <i>et al.</i> (2000) ³⁶ English Nature (2001) ³⁷ Gent and Gibson (2003) ³⁸

⁶ Updated UKHab guidance was released in July 2023. However, as the UKHab assessment for the Proposed Scheme commenced in April 2023, the guidance that was current at the time the assessment commenced has continued to be used for continuity and consistency purposes.

Survey	Dates	Scope and Method Detail	Good Practice Guidance Reference
	based on findings of UKHab surveys in new Site areas	assessment of waterbodies and watercourses for their suitability to support breeding GCN.	Amphibian and Reptile Groups of the United Kingdom (ARG UK) (2010) ³⁹
Riparian mammals (otter and water vole)	April to June 2023; September to October 2023; further surveys in 2024 TBD based on findings of UKHab surveys in new Site areas	Surveys of watercourses and waterbodies within the Study Area to determine the presence or likely absence of riparian mammals	Chanin (2003) ⁴⁰ Strachan <i>et al.</i> (2011) ⁴¹ Dean <i>et al.</i> (2016) ⁴²
Reptiles	May 2023; May to June 2024	Surveys of suitable reptile habitat within the Site using artificial refugia (bitumen felt mats) to determine the presence or likely absence of reptiles	Froglife (1999) ⁴³ Gent and Gibson (2003) ⁵⁵
Breeding birds	April to August 2023; requirement for further surveys TBC with Natural England	Surveys of a number of walked and driven transects across the Study Area to determine assemblages of breeding bird species	Fuller (1980) ⁴³ Bibby <i>et al.</i> (2000) ⁴⁴ Gilbert <i>et al.</i> (1998) ⁴⁵ Hardey <i>et al.</i> (2009) ⁴⁶
Other mammals	April to September 2023; further surveys TBD based on findings of UKHab surveys in new Site areas	Carried out as part of the PEA in combination with the UKHab surveys and badger survey. Assessment of suitable habitat for two Species of Principal Importance (SPI): brown hare <i>Lepus europaeus</i> and hedgehog <i>Erinaceus europaeus</i> .	N/A
NVC	August 2023	Detailed surveys of areas of habitat within the Site to help determine the presence of any notable vegetation communities present	Rodwell (2006) ⁴⁴

Survey	Dates	Scope and Method Detail	Good Practice Guidance Reference
Bats	Walkover to be completed in spring 2024. Further surveys to be undertaken May-September 2024 if determined to be necessary.	Assessment of buildings, structures and trees within the Study Area likely to be affected by the Proposed Scheme, to determine their suitability to support roosting bats. An assessment of suitable foraging and commuting habitat within the Study Area will also be carried out.	Collins (2023) ⁴¹ Reason and Wray (2023) ⁴⁵
Terrestrial invertebrates	Spring, summer and autumn 2024	Suitable habitat for terrestrial invertebrates has been incidentally assessed as part of the PEA. Detailed surveys of suitable terrestrial habitat to be undertaken if completion of baseline assessment determines notable species likely to be present.	Kirby (2001) ⁴⁶ Drake <i>et al.</i> (2007) ⁴⁷

- 7.4.14. This list has evolved since the EIA Scoping Stage, to now include reference to other mammals (brown hare and hedgehog). In addition, surveys for bats and terrestrial invertebrates have been included separately.
- 7.4.15. Once completed, the surveys detailed above will define the requirements for any further surveys and assessment which may necessitate a revision of the Zol. The Zol may also be subject to change as a result of refinement to the design of the Proposed Scheme.

ASSESSMENT METHODOLOGY

- 7.4.16. The assessment methodology is common across all elements of the Proposed Scheme and will be undertaken in accordance with the CIEEM EclA guidelines¹⁶. These guidelines represent the current best practice for assessing the ecological impact of development projects. Other industry best practice guidance that will be followed when undertaking the assessment is referenced in **Section 7.2**.
- 7.4.17. Standard EIA terminology will be used where the significance level attributed to each effect has been assessed based on the sensitivity of the affected ecological receptors and the magnitude of change arising from the Proposed Scheme, as well as a number of other factors that are outlined in (as presented in **Chapter 3: Approach to EIA (Volume 1)**). The sensitivity of the affected receptor is assessed on a scale of **high, medium, low, and negligible** (as summarised in **Table 7-5**, below). The magnitude of change is also assessed on the same scale. This is discussed further under **Significance of Effects Criteria**, below.
- 7.4.18. The assessment of likely significant environmental effects as a result of the Proposed Scheme will consider the construction and operation phases. The impact process involves:
- Identifying and characterising impacts and their effects;
 - Incorporating measures to avoid and mitigate adverse effects;
 - Assessing the significance of any residual effects after embedded mitigation;
 - Identifying appropriate additional mitigation measures and any compensation measures to offset significant residual effects; and
 - Identifying opportunities for ecological enhancement (including assisting in delivering BNG).
- 7.4.19. This assessment will be presented in the form of an ES Chapter and adjacent assessments, including an HRA (included at this stage as **Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)**) and a BNG assessment (for further details see **Chapter 2: Site and Proposed Scheme Description (Volume 1)**). Following on from the HRA screening assessment and as outlined in **Table 7-2** an AA report will be submitted alongside the ES. In addition, once all necessary habitat baseline data has been compiled and assessed, a BNG assessment report will be provided as a Technical Appendix to the ES.

7.4.20. This PEIR Chapter summarises key information from the terrestrial ecology assessment completed to date. Further details of the assessment are included in **Appendix 7A: PEA Report (Volume 3)** and **Appendix 7C: NVC Survey (Volume 3)** and will be included in species-specific technical appendices to be submitted with the ES.

Appendix 7A: PEA Report (Volume 3) expands on the information presented in the Interim Ecological Information Report⁴⁸ submitted as an Appendix to the Scoping Report². As mentioned previously, an updated PEA report, containing finalised baseline information, will also be provided as a Technical Appendix to the ES.

7.4.21. The terrestrial ecology assessment includes potential impacts on each ecological receptor identified as an 'Important Ecological Feature' (IEF) discussed below under **Determining Importance**. The assessment will identify potential impacts and effects during the construction and operation phases of the project, with impacts and effects characterised in accordance with the following criteria:

- Beneficial or adverse – whether the impact/effect will improve or reduce the quality of the baseline habitat present.
- Extent – the spatial or geographical area over which the impact/effect may occur.
- Magnitude – the size, amount, intensity or volume of the impact/effect, defined on a quantifiable basis, such as an area or percentage of habitat to be lost.
- Duration – the length of time an impact/effect is expected to last, relative to the particular timeframe for the species/habitat being considered. This is defined in **Chapter 3: Approach to EIA (Volume 1)** as short, medium or long term and permanent or temporary. In general, short term is considered to be up to one year; medium term is considered to be between one and 10 years and long term is considered to be greater than 10 years.
- Frequency and timing – the frequency of a particular activity may change its impact/effect, e.g., one-off or infrequent disturbance is less likely to significantly affect a particular species present within a habitat, whereas regular disturbance is more likely to have a significant effect. Similarly, the impact/effect of a particular activity may change significantly depending on its timing, e.g. tree felling outside of bird nesting season is highly unlikely to directly impact nesting birds, whereas carrying out the same work within nesting season is more likely to have impacts.
- Reversibility – an irreversible (permanent) effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible (temporary) effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

Determining Importance

7.4.22. A number of characteristics contribute to the importance of ecological features. These include, for example (but not exclusively):

- The rarity of a species or habitat;
- Legal protection/conservation status;
- Ability to resist or recover from environmental change;

- Whether the species population size is notable in a wider context;
- The richness of assemblages of plants and animals; and
- The presence of species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

7.4.23. The CIEEM EclA guidelines state that ecological features should be considered within a ‘defined geographical context’ (i.e. spatial scale), with International and European importance being the highest level, followed by National; Regional; Metropolitan, County, Vice-county or other Local Authority-wide areas; River Basin District; Estuarine system/Coastal cell; and Local. For the purpose of this assessment, ecological features of Site-level importance are also taken into consideration.

7.4.24. Assigning importance to ecological features is based on professional judgement informed by available guidance and information and expert advice. At the time of writing, it has not been possible to evaluate the importance of all ecological receptors for the Proposed Scheme. Further baseline work is still required, and this will be included in the ES.

7.4.25. **Table 7 5** below, summarises the classification of sensitivity of ecological features, based on the CIEEM EclA guidelines. The level of sensitivity assigned to an IEF is related to its level of importance (on a geographic scale) taking into consideration the various factors listed in **Paragraph 7.4.21**.

Table 7-5: Example Classification of Important Ecological Features (IEF)

Importance	Sensitivity	Criteria Examples
International and European	High	A site forming part of the National Site Network, as designated by the <i>Habitats Regulations</i> (SAC, SPA ⁹), or site meeting criteria for international designation (Ramsar).
		Species present in internationally important numbers (>1% of biogeographic population)
National (England/UK)	High	A nationally designated site (SSSI or NNR), or sites meeting the criteria for national designation
		Species present in nationally important numbers (>1% of UK population)
		Viable areas of priority habitat listed on Annex I of the Habitats Directive and smaller areas of such habitat that is essential to maintain the viability of that ecological resource. Areas of ancient semi-natural woodland.
Regional (north-east)	Medium	Regionally significant and viable areas of key habitat identified as being of regional value

⁹ Includes candidate SACs (cSACs) and potential SPAs (pSPAs).

Importance	Sensitivity	Criteria Examples
		Species present in regionally important numbers
Borough (Stockton-on- Tees)	Medium	LNR
		Habitat areas identified as being important at the county scale (for example those identified by the Tees Valley Nature Partnership (related to previous Local Biodiversity Action Plan Habitats). Non-statutory designated sites, e.g. Local Wildlife Sites (LWS) (depending on circumstances)
		Species present in populations considered to be important at the county scale (for example those identified by the Tees Valley Nature Partnership (related to previous Local Biodiversity Action Plan Habitats)
District	Low	Non-statutory designated sites, e.g. LWS (depending on circumstances)
		Habitats considered to be important at the district level, and populations of a species considered to be important at the district level
Local (surrounding areas)	Low	Non-statutory designated sites, e.g. LWS (depending on circumstances)
		Areas of ancient semi-natural woodland less than 0.25ha in size
		Areas of habitat or species considered to appreciably enrich the ecological resource within a local context, e.g. species-rich flushes or hedgerows
Site	Negligible	Usually widespread and common habitats and species

7.4.26. For the purpose of this assessment, ecological receptors of Local importance or higher are considered to constitute IEFs.

SIGNIFICANCE OF EFFECT CRITERIA

Overview

7.4.27. The CIEEM EclA guidelines¹⁶ define a significant effect in the context of an ecological impact assessment as “an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general”. Significant effects, as defined by the CIEEM guidelines, are determined by assessing any deviation in the baseline conditions of a feature of ecological importance that may occur as a result of individual and cumulative impacts during the construction and operation phases of the Proposed Scheme. These effects will be expressed in terms of geographical scale (as outlined in **Table 7-5**); however, the geographical scale at which an effect is significant can vary from the geographical importance of the ecological feature being assessed. In accordance with the CIEEM guidelines, this will be a function of the assessment.

Magnitude

- 7.4.28. The magnitude of an impact relates to the level of change that an ecological receptor will incur relative to baseline conditions. The magnitude of impact is evaluated in accordance with its extent, duration, frequency and timing, and reversibility (as described in **Paragraph 7.4.21**), which are quantified where possible, e.g. total area of a habitat to be lost.
- 7.4.29. The criteria used to define the magnitude of impacts for the purpose of this assessment are provided in Table 7-6, below.

Table 7-6: Magnitude of Change Classes

Magnitude of Change	Definition
High	Total loss or large alteration to one or more key elements/features of baseline conditions
Medium	Partial loss or alteration to one or more key elements/features of baseline conditions
Low	Small change from baseline conditions
Negligible	Imperceptible change from baseline conditions

Significance

- 7.4.30. Significant effects will be determined through a review of the existing baseline and professional judgement, and significance will be concluded as either Negligible, Minor, Moderate or Major, as outlined in **Table 7-7**, below. For each IEF, the significance would also be determined as either ‘beneficial’ or ‘adverse’.

Table 7-7: Scale and Significance of Residual Effects

Geographic scale of significance in line with the CIEEM guidelines	Category of significant effect
International and European, National or Regional	Major – Where the Proposed Scheme is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity.
Regional, Metropolitan, County, Vice-county, or other Local Authority-wide area, River Basin District, Estuarine system/Coastal cell	Moderate – Where the Proposed Scheme is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability.
Local	Minor – Where the Proposed Scheme is likely to cause a small but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability, or is of the highest sensitivity or a considerable change from the baseline

Geographic scale of significance in line with the CIEEM guidelines	Category of significant effect
	conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change.
Effects on features of Site-scale importance or limited effects on features of greater importance. No significant effects on key nature conservation features	Negligible – No perceptible change.

- 7.4.31. The level of significance will be determined using the matrix in **Table 3-2 in Chapter 3: Approach to EIA (Volume 1)**, assessing the sensitivity of the receptor against the magnitude of change, both on a scale of **high, medium, low, and negligible**. The CIEEM EclA Guidelines¹³ discourage the use of a matrix-based approach to assigning significance to ecological receptors. However, they acknowledge that it is commonly used in EIA and is required to provide a consistent approach across all topics of an ES.
- 7.4.32. Where the extent of baseline data currently available is not considered sufficient to make a detailed assessment, a precautionary approach will be taken to assigning the level of significance where possible. In addition, where the level of significance determined falls into a range, e.g. moderate to minor, a precautionary approach will also be taken and the higher level of significance will be assigned. This methodology will be refined for the purpose of the impact assessment in the ES, when more detailed information on which to base the assessment will be available.
- 7.4.33. Effects will be defined as either ‘significant’ or ‘not significant’. As set out in **Chapter 3: Approach to EIA (Volume 1)**, effects that are classified as **Moderate** or **Major** are considered significant. Effects classified as **Minor** or **Negligible** are considered not significant.

STUDY AREA

- 7.4.34. The Site covers a total area of 274.49 hectares, which includes the main construction areas forming part of the Proposed Scheme, as well as access routes, pipeline corridors, temporary compounds and working areas required to undertake the Proposed Scheme.
- 7.4.35. The Study Area for the various ecological receptors is defined as the area in which impacts arising from construction and/or operation could lead to significant effects on the identified receptors. As such, it is necessary to apply Study Areas of varying sizes depending on the ecological receptor/feature under assessment and, in most cases, these will extend beyond the Site. These will hereafter be referred to as Zol.
- 7.4.36. Zol have been defined based on current best practice guidelines (CIEEM, 2017³⁸ and 2020³⁹, and as summarised in **Table 7-8**, below), currently available project information and consultation undertaken. In some cases, Zol have been defined on a precautionary

basis using professional judgement alongside current guidance and available project information. This is to ensure a sufficient geographical area has been assessed to allow all reasonably foreseeable impacts to be taken into account.

- 7.4.37. The Zol were originally determined during the EIA Scoping Stage and have been refined during this PEIR stage based on design changes to the Proposed Scheme and associated Site Boundary changes. The Zol specified below are still considered appropriate at the time of writing; however, due to further recent design changes and extension of the Site Boundary, the Zol will now extend to wider areas not previously covered by the initial assessment.
- 7.4.38. As the terrestrial ecology assessment progresses and further information becomes available, both in terms of survey results and project details/design, it is considered that one or more of the Zol may be subject to refinement later in the project lifecycle.
- 7.4.39. As mentioned in **Table 7-2**, Natural England were consulted on the suitability of the Zol (500m around the Site) for bird surveys. This Zol has been implemented for the surveys, based on the feedback provided. The search area for WeBS data was also discussed and agreed with Natural England.

Table 7-8: Terrestrial Ecology Zones of Influence

Receptor	Zone of Influence (inclusive of the Site)
Statutory designated sites of international and European importance ^h	Within 10km of the Site (extended to 15km in relation to air quality impacts (Chapter 5: Air Quality (Volume 1)) and for the HRA (Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3))).
Statutory designated sites of national importance ⁱ ;	Within 2km of the Site.
Non-statutory designated sites ^j	Within 2km of the Site.
HPI and woodland listed on the AWI ^k	Within 1km of the Site.
Historic European Protected Species (EPS) licences granted	Within 2km of the Site.

^h Special Area of Conservation (SAC), SPA and Ramsar site.

ⁱ SSSI, Local Nature Reserve (LNR) and National Nature Reserve (NNR).

^j Local Wildlife Sites (LWS).

^k The ancient woodland inventory in England lists areas over two hectares in size which have been continuously wooded since at least 1600.

Receptor	Zone of Influence (inclusive of the Site)
Mapped waterbodies and watercourses	Within 500m of the Site.
Habitats (all)	Within 50m of the Site. NVC survey undertaken within the Site only.
Protected and notable species	<ul style="list-style-type: none"> ■ Desk study: <ul style="list-style-type: none"> – General: within 2km of the Site – WeBS data: relevant sectors within and immediately adjacent to the Site <ul style="list-style-type: none"> ■ Surveys – within various distances of the Site: <ul style="list-style-type: none"> – Badger: 30m – Bats: 50m – Birds (breeding and wintering): 500m – Riparian mammals: 250m – Reptiles: Site – Amphibians: 500m – Terrestrial invertebrates: 50m – INNS: Site
Trees (arboriculture), including ancient/veteran trees listed on the ATI, Conservation Areas, and TPOs	Within 15m of the Site

7.5. BASELINE CONDITIONS AND FUTURE BASELINE

EXISTING BASELINE

- 7.5.1. The baseline conditions for the terrestrial ecology assessment have been defined through a desk study and a series of field surveys (many of which are ongoing). Information on the current baseline available at the time of writing is presented below.
- 7.5.2. This assessment does not duplicate information set out in Chapter 8: Freshwater and Marine Ecology (Volume 1). Baseline information for the freshwater and marine ecology assessment can be found in the aforementioned Chapter. This includes a review of statutory and non-statutory designated sites with features relevant to freshwater and marine biodiversity; a review of relevant Water Framework Directive waterbodies; a review of publicly available desk study data in relation to protected/notable freshwater and marine macrophyte and fish species; and the results of freshwater and marine habitat walkover surveys completed.

Designated Sites

7.5.3. The designated sites described within this section are shown on **Figures 2-2 (Volume 2)** and **Appendix 7A: PEA Report (Volume 3)**.

Table 7-9: Designated Sites within the Study Area

Designation	Approx. distance and direction from Site	Summary of features for site designation
Statutory Designated Sites – International and European (within 10km of the Site)		
Teesmouth and Cleveland Coast SPA	Partly within the Site in several locations and immediately adjacent to the south and west	<p>Wetlands of European importance, covering 12km² in total, and comprising a variety of habitats. These include intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh, saline lagoons, sand dunes, and estuarine and coastal waters on and around the Tees Estuary.</p> <p>The qualifying features of the SPA comprise a range of breeding and non-breeding bird species, including:</p> <ul style="list-style-type: none"> ■ Avocet <i>Recurvirostra avosetta</i> (breeding); ■ Common tern <i>Sterna hirundo</i> (breeding); ■ Knot <i>Calidris canutus</i> (non-breeding); ■ Little tern <i>Sterna albifrons</i> (breeding); ■ Redshank <i>Tringa totanus</i> (wintering); ■ Ruff <i>Calidris pugnax</i> (non-breeding); ■ Sandwich tern <i>Thalasseus sandvicensis</i>, syn. <i>Sterna sandvicensis</i> (non-breeding); and ■ An overall notable wintering waterbird assemblage (over 20,000).
Teesmouth and Cleveland Coast Ramsar	Partly within the Site in several locations and immediately adjacent to the south and west	<p>The Ramsar site has overlapping reasons for designation with the SPA and is designated for the following bird features:</p> <ul style="list-style-type: none"> ■ Passage redshank and sandwich tern; ■ Wintering knot; and ■ An overall significant wintering waterbird assemblage.
North York Moors SAC	9.9km to the south-east	The North York Moors are designated as an SAC due to the presence of a range of notable habitat

Designation	Approx. distance and direction from Site	Summary of features for site designation
		types, including wetland, scrub, grassland, and woodland. Annex I habitats that are present and are a reason for designation as an SAC include Northern Atlantic wet heaths with <i>Erica tetralix</i> and European dry heaths. In addition, the Annex I habitat blanket bog is also a qualifying feature.
North York Moors SPA	9.9km to the south-east	The North York Moors qualify as an SPA as the habitats present regularly support 1% or more of Great Britain's population of breeding Merlin <i>Falco columbarius</i> and Golden Plover <i>Pluvialis apricaria</i> .
Statutory Designated Sites – National (within 2km of the Site)		
Teesmouth and Cleveland Coast SSSI	Partly within the Site in several locations and immediately adjacent to the south and west	<p>There are several 'units' designated as SSSI surrounding and located partly within the Site, which each form part of the SPA.</p> <p>The SSSI as a whole is of special interest for the following nationally important features that are present within and are supported by the wider mosaic of coastal and freshwater habitats:</p> <ul style="list-style-type: none"> ■ Sand dunes; ■ Saltmarshes; ■ Breeding harbour seals <i>Phoca vitulina</i>; ■ Breeding Avocet, Little Tern and Common Tern; ■ A diverse assemblage of breeding birds of sand dunes, saltmarsh and lowland open waters and their margins; ■ Non-breeding Shelduck <i>Tadorna tadorna</i>, Shoveler <i>Spatula clypeata</i>, Gadwall <i>Mareca strepera</i>, Ringed Plover <i>Charadrius hiaticula</i>, Knot, Ruff, Sanderling <i>Calidris alba</i>, Purple Sandpiper <i>Calidris maritima</i>, Redshank and Sandwich tern; ■ An assemblage of more than 20,000 waterbirds during the non-breeding season; and ■ A diverse assemblage of invertebrates associated with sand dunes.
Teesmouth National Nature Reserve (NNR)	720m to the north-west at its nearest point	Teesmouth NNR comprises a range of habitats, including sand dunes, grazing marsh, intertidal sand and mudflats. The area known as Seal

Designation	Approx. distance and direction from Site	Summary of features for site designation
		<p>Sands is one of the largest areas of intertidal mudflat on the north-east coast.</p> <p>Wildlife interest includes the presence of harbour seals and grey seals <i>Halichoerus grypus</i>. The harbour seals haul out on the sand banks at low tide, and pups are born here each summer. This makes Seal Sands the only regular breeding colony of these animals on the north-east coast. In addition, thousands of migratory waterbirds feed on the mudflats, including Redshank.</p>
Statutory Designated Sites – Local (within 2km of the Site)		
Cowpen Bewley Woodland Country Park LNR	1.6km to the north-west	Designated as an LNR due to the presence of a range of habitats of biodiversity value, including areas of grassland, a lake, a series of ponds, and a beck. These habitats support a range of wildlife, including amphibians, invertebrates, and a wide range of bird species.
Non-statutory Designated Sites (within 2km of the Site)		
Teessaurus Park LWS	720m to the west	A sculpture park and recreational area, largely comprising an area of urban grassland.
Berwick Hills and Ormesby Beck Complex LWS	1.8km to the south	Designated due to the presence of a range of habitats of biodiversity value, including wildflower meadows, woodland, ponds, reedbeds, and running water in the form of Ormesby Beck. Habitats present are known to support a range of amphibians, and water vole are noted to be present.
Greatham Creek North Bank Saltmarsh LWS	1.5km to the north-west	The Site is sandwiched between the mudflats of Greatham Creek and the sea wall with no room for expansion. The vegetation is dominated by saltmarsh grass <i>Puccinellia</i> sp. with a narrow fringe of glasswort <i>Salicornia</i> sp.
Greenabella Marsh LWS	1.6km to the north-west	A large area of rough grassland but with several areas of wetlands, including four pools of open water and several ditches.

7.5.4. Based on their designations, all of the designated sites listed above are considered to constitute IEFs, with their levels of importance summarised in **Table 7-10**, below:

Table 7-10: Designated Site Levels of Importance

Designated Site	Importance
Teesmouth and Cleveland Coast SPA	International/European

Designated Site	Importance
Teesmouth and Cleveland Coast Ramsar	International/European
North York Moors SAC	International/European
North York Moors SPA	International/European
Teesmouth and Cleveland Coast SSSI	National
Teesmouth NNR	National
Cowpen Bewley Woodland Country Park LNR	Borough
Teessaurus Park LWS	Borough
Berwick Hills and Ormesby Beck Complex LWS	Borough
Greatham Creek North Bank Saltmarsh LWS	Borough
Greenabella Marsh LWS	Borough

Habitats

Habitats of Principal Importance

Desk Study Data

- 7.5.5. The habitats described within this section, determined from a review of publicly available desk study information, are shown on **Figure 5 of Appendix 7A: PEA Report (Volume 3)**.
- 7.5.6. A review of available information on MAGIC highlighted the presence of several HPs located within 1km of the Site, as detailed in **Table 7-11**:

Table 7-11: HPs within 1km of the Site

Designation	Approx. distance from Site	Comments
Open Mosaic Habitat on Previously Developed Land (OMHPDL)	Within and immediately adjacent	A proportion of the Site and surrounding area is designated as OMHPDL. However, this is noted on MAGIC as “ <i>probably the priority habitat but some uncertainty of interpretation,</i> ” and the reliability of the habitat interpretation is considered to be low.

Designation	Approx. distance from Site	Comments
Coastal and Floodplain Grazing Marsh (CFGM)	Within and immediately adjacent	Extensive areas of CFGM are present within 1km of the Site, mainly to the west within RSPB Saltholme. Some of this habitat also located within the Site itself, mainly in areas around Dorman's Pool.
Mudflats	Within and immediately adjacent	An area of Mudflat falls within the Site Boundary where it crosses the River Tees. In addition, several areas of Mudflat are located along the river adjacent to the Site.
Lowland Fens	Immediately adjacent	Several areas of lowland fen are located around large waterbodies associated with RSPB Saltholme. This includes areas immediately to the west of Dorman's Pool and east of the A178 Seaton Carew Road.
Deciduous Woodland	Immediately adjacent to the west	Several areas of Deciduous Woodland are present within 1km of the Site, but none within the Site itself. The nearest is an area of woodland located directly adjacent to the Site Boundary east of the A1085 Trunk Road.
Saline Lagoons	Immediately adjacent	An area of Saline Lagoon is present within RSPB Saltholme, immediately adjacent to the A178 Seaton Carew Road to both the east and west.
Coastal Saltmarsh	765m to the north-west	Areas of Coastal Saltmarsh are located downstream of the Site along the River Tees
'No main habitat but additional habitats present'	Immediately adjacent	There are several areas highlighted on MAGIC as 'no main habitat but additional habitats present'. These include areas noted to have Reedbed present, with the nearest area located immediately adjacent to the A178 Seaton Carew Road. In addition, an area with CFGM is located approximately 420m to the west at its nearest point. For the purpose of the assessment, Reedbed and CFGM present in these areas will be considered in combination with the same habitats listed above.

Evaluation

7.5.7. Based on their designation and their established presence in the area, the HPI noted during the desk study have all been evaluated as being IEFs at Borough level.

Ancient Woodland

7.5.8. No Ancient Woodland is present within 1km of the Site, according to the AWI. Ancient woodland is, therefore, not considered to constitute an IEF and is not considered further in this assessment.

Ancient/Veteran Trees

7.5.9. No ancient or veteran trees are present within 15m of the Site, according to the ATI.

Conservation Areas

Desk Study Data

- 7.5.10. There are no Conservation Areas on or within 15m of the parts of the Site located within the borough of Stockton-on-Tees, according to the information provided by STBC.
- 7.5.11. A review of publicly available information from RCBC did not identify any Conservation Areas within 15m of the parts of the Site that fall within the Borough of Redcar and Cleveland.

Evaluation

- 7.5.12. No Conservation Areas have been identified in the assessment completed to date. However, due to data gaps at the time of writing, Conservation Areas are scoped in as an IEF on a precautionary basis, pending further assessment. Based on their geographical scale of importance, Conservation Areas are considered to be an IEF at a Borough level.

Terrestrial Habitats

Survey Data

- 7.5.13. At the time of writing, UKHab surveys have not been completed for the whole of the Study Area. As such, a full habitat baseline is not available. This also includes the completion of a Habitat Condition Assessment (HCA) for each habitat (a requirement of the BNG assessment). The findings mentioned below are therefore subject to change and modification following further survey information being collated. Further UKHab survey information will inform the ES.
- 7.5.14. The below is a summary of habitats recorded across the areas where a UKHab survey has been completed. Descriptions for each habitat type are provided in **Appendix 7A: PEA Report (Volume 3)** accompanying this PEIR Chapter. Habitats recorded are shown on **Figure 5 of Appendix 7A: PEA Report (Volume 3)**.
- 7.5.15. The habitats recorded during the UKHab surveys undertaken so far include:
- f2e reedbeds;
 - f2f other swamps;
 - g1c bracken;
 - g2a lowland calcareous grassland;
 - g3c other neutral grassland;
 - g3c5 *Arrhenatherum* neutral grassland;
 - g3c6 *Lolium-Cynosurus* neutral grassland;
 - g3c8 *Holcus-Juncus* neutral grassland;
 - g4 modified grasslands;
 - h3 dense scrub;
 - h3c sea buckthorn scrub;
 - h3c6 other sea buckthorn scrub;

- h3d bramble scrub;
- h3h mixed scrub;
- r1 standing open water and canals;
- r1a eutrophic standing waters;
- r1e canals or ditch;
- r2a rivers (priority habitat);
- s1d other inland rock and scree;
- t2a coastal saltmarsh;
- t2a5 glasswort and other annuals colonising mud and sand;
- u1 built-up areas and gardens;
- u1a open mosaic habitats on previously developed land;
- u1b developed land, sealed surface;
- u1c artificial unvegetated, unsealed surface;
- u1e built linear features;
- w1d wet woodland; and
- w1g other woodland, broadleaved.

7.5.16. Of the habitats recorded, the following were assessed to qualify as HPI, as they were considered to meet the relevant criteria^{49,l}:

- f2e reedbeds (Reedbeds HPI);
- g2a lowland calcareous grassland (Lowland Calcareous Grassland HPI);
- r1a eutrophic standing waters (Eutrophic Standing Waters HPI);
- r2a rivers (priority habitat) (the River Tees) (Rivers and Streams HPI);
- u1b open mosaic habitats on previously developed land (OMHPDL) (OMHPDL HPI); and
- w1d wet woodland (Wet Woodland HPI).

7.5.17. The habitats determined to qualify as HPI were also determined to qualify as priority habitats under the TVBAP, as detailed in **Table 7-12**, below. In addition, other habitats present were not assessed to qualify as HPI but did meet the criteria to qualify as TVBAP priority habitats. These included:

- t2a coastal saltmarsh (Mudflats and Saltmarsh TVBAP); and
- t2a5 glasswort and other annuals colonising mud and sand (Mudflats and Saltmarsh TVBAP).

7.5.18. The areas designated as OMHPDL that were identified during the desk study (highlighted in **Table 7-11**), were not representative of current (at the time of the surveys) land uses within the Study Area. The desk study information on OMHPDL is

^l Criteria are based on the descriptions for UK BAP Priority Habitats (JNCC, 2008), which are analogous for the most part to HPI.

therefore considered to be superseded by the UKHab survey information for the purpose of this assessment. Any further references to OMHPDL within this Chapter are only referring to the habitat recorded during the UKHab survey. The extent of habitat recorded is shown on **Figure 6 of Appendix 7A: PEA Report (Volume 3)**.

7.5.19. Further to the UKHab survey, an NVC survey has been carried out in parts of the Study Area that were considered to potentially comprise areas of higher botanical interest. In summary, a range of NVC habitat types were recorded, as detailed in **Appendix 7C: NVC Report (Volume 3)**. The NVC survey confirmed the presence of several HPI on the Site, including Lowland Calcareous Grassland, Reedbed, and OMHPDL (already identified above). In addition, an area of saltmarsh vegetation was recorded, which overlaps with the t2a coastal saltmarsh mentioned above. It was not considered to meet the criteria for Coastal Saltmarsh HPI, but was indicative of Inland Salt Meadows, which is an Annex I habitat type designated under the *Habitats Regulations*.

Evaluation

7.5.20. Based on the information gathered to date, the majority of habitats recorded within the Study Area are considered to be of Site importance. However, the habitats listed in **Table 7-12** are considered to constitute IEFs (at Local level or above). All habitats that are considered to qualify as TVBAP priority habitats have been designated a level of importance on a precautionary basis in accordance with the criteria in **Table 7-5**.

Table 7-12: Habitats Considered to Constitute IEFs

Habitat	Comments	Importance
f2e reedbeds	Qualifies as Reedbeds HPI and TVBAP	Borough
g2a lowland calcareous grassland	Qualifies as Lowland Calcareous Grassland HPI	Borough
r1a eutrophic standing waters	Qualifies as Eutrophic Standing Waters HPI and Ponds, Lakes and Reservoirs TVBAP	Borough
r2a rivers (priority habitat) (River Tees)	Qualifies as Rivers and Streams HPI and TVBAP	Borough
u1b OMHPDL	Qualifies as OMHPDL HPI and Brownfields TVBAP	Borough
w1d wet woodland	Qualifies as Wet Woodland HPI and Semi-natural Broadleaved Lowland Woodland TVBAP	Borough
t2a coastal saltmarsh	Not considered to qualify as Coastal Saltmarsh HPI but meets criteria for Inland Salt Meadows Annex I habitat. Also qualifies as Mudflats and Saltmarsh TVBAP	National
t2a5 glasswort and other annuals colonising mud and sand	Qualifies as Mudflats and Saltmarsh TVBAP	Borough

Arboriculture

- 7.5.21. An arboricultural walkover survey of the Site was undertaken 18 October 2023. No notable trees or areas of woodland were recorded within the arboriculture ZOI at the time of the survey. However, changes to the DCO Application Boundary since the survey was undertaken have resulted in a number of areas where no survey information has been recorded and the baseline for the Site is therefore incomplete.
- 7.5.22. Due to the gaps in the baseline information, trees are scoped into the assessment as an IEF on a precautionary basis. Further assessment in relation to arboriculture is proposed to be undertaken and presented in the ES.

Protected/Notable Species

Overview

- 7.5.23. This section provides a summary of key findings to date in relation to protected and notable species. Further details are included in **Appendix 7A: PEA Report (Volume 3)**. As mentioned previously, further surveys are proposed to be undertaken and additional desk study data will be required in order to carry out a full baseline assessment. The below findings are therefore subject to change and additional information will be presented in the ES.
- 7.5.24. The following protected/notable species information is currently known:

Badger

Desk Study Data

- 7.5.25. There are no records of badger within 2km of the Site.

Survey Data

- 7.5.26. No evidence of badger has been recorded within areas of potentially suitable habitat that have been accessed at the time of writing. A series of mammal holes were recorded adjacent to the River Tees, but these were determined to be indicative of rabbit *Oryctolagus cuniculus* rather than badger.
- 7.5.27. No evidence of badger has been recorded during surveys completed to date. However, further surveys to be undertaken may identify evidence of badger and/or suitable habitat to support them. Based on the information available at the time of writing, they are considered to be an IEF on a precautionary basis.

Bats

Desk Study Data

- 7.5.28. Four EPS mitigation licences in relation to bats have been granted within 2km of the Site. These are summarised in **Table 7-13**:

Table 7-13: EPS Licences for Bats within 2km of the Site

Distance and Direction from Site	Date Valid	Species Affected	Comments
520m to the west	2014-2015	Common pipistrelle <i>Pipistrellus pipistrellus</i>	Located in Port Clarence. Granted in relation to the destruction of a maternity roost
580m to the east	2011-2012	Common pipistrelle	Located in Dormanstown, Redcar. Granted in relation to the destruction of a non-breeding roost
665m to the east	2021-2016	Common pipistrelle	Located in Dormanstown, Redcar. Granted in relation to the destruction of a non-breeding roost
1.9km to the south-west	2013-2016	Common pipistrelle	Located in Middlesbrough. Granted in relation to the destruction of a maternity roost

7.5.29. There are 19 records of bats within 2km of the Site. Records were provided of common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, noctule *Nyctalus noctula*, and an unconfirmed species. Three records of roosts were provided, including one in Port Clarence from 2013 (considered likely to be related to the above EPS licence, based on the grid reference provided). Several of the records were from RSPB Saltholme, but there were no records from the Site itself.

Survey Data

- 7.5.30. No detailed surveys have been completed in relation to bats. Large proportions of the Site itself comprise developed land; sealed surface, which would typically be of low foraging and commuting suitability for bats. However, there are habitats within the Site and wider Study Area that are likely to attract sufficient invertebrate activity to provide foraging opportunities for bats, such as, grassland, scrub, OMHPDL, reedbed, and standing water.
- 7.5.31. A combined bat suitability walkover of the Site and bat roost external inspection of all trees and buildings within the Study Area to assess the suitability to support foraging and commuting and roosting bats is to be undertaken. The results of this walkover will inform the requirement of further surveys/ecological input. The results of the surveys will be provided in the ES.
- 7.5.32. Sufficient information is not available at this stage to make an assessment of the level of importance of bats in relation to the Study Area. However, as there are records of bats in the Study Area and some suitable habitat is present to support them, they are considered to be an IEF on a precautionary basis.

Birds

Desk Study Data

- 7.5.33. The WeBS data obtained for Dorman's Pool, Reclamation Pond and the Tees Estuary opposite Smiths Dock and Hargreaves Quarry has been reviewed. In brief, there are records of numerous bird species (both breeding and overwintering) within these survey sectors. This includes records of the notable/qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar.
- 7.5.34. The desk study identified over 67,000 bird records. The records comprised largely of more common and widespread species, as well as regular records of the species noted as qualifying features of the SSSI/SPA/Ramsar. The large number of records returned as part of the desk study is likely due to the presence of the RSPB Saltholme and the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar site.
- 7.5.35. Data provided by TBC largely overlapped the data obtained from ERIC North East (above). The data provided was from between 2016 and 2023, with the majority of this data being from between 2020 and 2023. A number of areas of interest for bird activity were highlighted, which again largely related to areas of RSPB Saltholme and established areas of suitable wintering bird habitat within the Teesmouth and Cleveland Coast SPA and Ramsar site.

Survey Data

- 7.5.36. Breeding bird surveys were undertaken between April and August 2023, inclusive. Wintering surveys have been completed between January and March 2023, continuing in autumn 2023 and early 2024. A summary of the results available to date is provided below. Due to the amount of survey data to be compiled and assessed, it has not been possible to undertake a detailed assessment at the time of writing. A detailed assessment will be provided in the bird survey report to be submitted alongside the ES.
- 7.5.37. During the breeding bird surveys, activity was largely recorded in areas of known suitable habitat forming part of RSPB Saltholme and/or the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar, which largely comprise areas of grassland, reedbed and large waterbodies.
- 7.5.38. A peregrine *Falco peregrinus* was recorded nesting and foraging within the Site. Peregrines are listed on Schedule 1 of the WCA, making it illegal to damage or destroy the nest of a peregrine, and also disturb the species whilst nesting. Overall, the Site is considered to offer suitable nesting habitat for a range of species, in the form of areas of reedbed, grassland, scrub, and woodland.
- 7.5.39. During the overwintering surveys, the main areas of bird activity were again the areas of known suitable habitat, including around the large waterbodies present within RSPB Saltholme and areas of mudflat along the River Tees. Two SPA qualifying species, Redshank and Avocet, were recorded within the Site (albeit outside of the breeding season with regard to Avocet). In addition, passage/overwintering activity has been recorded on Site within the areas of saltmarsh, reedbed and OMHPDL in the former

reclamation pond area. Further assessment is required to determine whether this area is ‘functionally linked’ to the Teesmouth and Cleveland Coast SPA/Ramsar. This will be covered as part of the HRA.

Evaluation

7.5.40. Based on desk study information, qualifying species of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar are known to be present in the Study Area, and some of these species have been recorded during the completed surveys. However, further assessment is needed to determine the abundance of these species within the Study Area. As such, a precautionary assessment of their level of importance has been provided in **Table 7-14**

Table 7-14: Assessment of Importance in Relation to Breeding and Wintering Birds

Receptor	Comments	Importance (Precautionary)
Breeding birds (SSSI/SPA/Ramsar qualifying species)	Qualifying species are known to be present adjacent to the Site and some have been recorded on the Site during surveys, but further assessment needed to determine what proportion of their assemblages may be impacted by the Proposed Scheme.	International/European
Breeding birds (general)	Bird species that receive general protection during nesting season under the WCA. Not including species associated with the SSSI/SPA/Ramsar (above) or species listed under Schedule 1 of the WCA. Suitable nesting habitat for a range of species present across the Site.	Local
Peregrine	Assessed as a separate receptor due to its conservation status under Schedule 1 of the WCA and confirmed nesting on the Site.	District
Wintering birds (SPA/Ramsar/SSSI qualifying species)	As above, qualifying species are known to be present adjacent to the Site and some have been recorded during surveys, but further assessment needed to determine what proportion of their assemblages may be impacted by the Proposed Scheme.	International/European
Wintering birds (general)	Wintering birds that would not constitute qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. Suitable overwintering habitat is absent from much of the Site, but some suitable habitat present within the former reclamation pond area.	Local

Otter

Desk Study Data

- 7.5.41. No EPS mitigation licences for otters have been granted within 2km of the Site.
- 7.5.42. One otter record within 2km of the Site was provided in the desk study data. This pertained to some otter footprints recorded approximately 1.3km to the south of the Site, along Ormesby Beck.

Survey Data

- 7.5.43. Surveys of the majority of watercourses within the Study Area, at the time of survey, have been completed. Subsequent change to the DCO Application Boundary has increased the Study Area which now includes additional watercourses yet to be assessed. The results of further surveys completed will be included in the ES.
- 7.5.44. Suitable commuting and foraging habitat for otter has been recorded throughout the area surveyed, largely in the form of a network of ditches. In addition, the section of the River Tees located immediately adjacent to the south of the Site provides suitability to support foraging and commuting habitat, with otters known to be present along this watercourse (based on desk study records and local knowledge). To date, no signs of otters have been recorded within surveyed areas.

Evaluation

- 7.5.45. Although otters are known to be present in the wider area, surveys to date have not revealed the presence of otter in the Study Area. As such, even if otters are present, it is considered unlikely that they are present in large numbers within the Study Area. However, due to the sensitivity of this species, on a precautionary basis, they are considered to be an IEF at a District level.

Water Vole

Desk Study Data

- 7.5.46. A total of 32 records of water vole were identified within 2km of the Site. The majority of the records were from within RSPB Saltholme (immediately adjacent to the western extent of the Site), with the nearest record located approximately 470m to the west of the Site.

Survey Data

- 7.5.47. Surveys of the majority of waterbodies and watercourses within the Study Area, at the time of survey, have been completed. Subsequent change to the DCO Application Boundary has increased the Study Area, which now includes additional watercourses yet to be assessed. The results of further surveys completed will be included in the ES.
- 7.5.48. During the initial surveys, potential signs of water vole were recorded across the Study Area within the ditches present, such as droppings and grazed grass. Some ditches in the Study Area have been assessed as being suitable for water vole due to them being vegetated with tall grass and having areas suitable for burrow building within the banks

of the ditches. However, no active burrows or water voles themselves have been recorded.

Evaluation

- 7.5.49. Presence of water vole within the Study Area has been assumed due to the presence of droppings and feeding evidence, but this has been recorded in limited areas overall, and current findings suggest that there will be no direct impacts to any active burrows.
- 7.5.50. Water vole are known to be present in the wider area, but the Study Area itself is considered unlikely to support a significant population. Based on the findings to date and the sensitivity of this species, they have been assessed as an IEF at a District level.

Reptiles

Desk Study Data

- 7.5.51. There are no records of reptiles within 2km of the Site.

Survey Data

- 7.5.52. Suitable reptile habitat was present across parts of the Site in the form of unmanaged grassland and areas of dense scrub. However, survey effort to confirm the presence or likely absence of reptiles has not been completed at the time of writing. Survey effort in relation to reptiles will be addressed in detail in the ES.

Evaluation

- 7.5.53. Sufficient information is not available at this stage to make an assessment of the level of importance of reptiles in relation to the Study Area. However, as suitable habitat is present across the Study Area to support them, they are considered to be an IEF on a precautionary basis.

Amphibians

Desk Study Data

- 7.5.54. No EPS mitigation licences for GCN have been granted within 2km of the Site.
- 7.5.55. There are no records of GCN within 2km of the Site.
- 7.5.56. A total of 13 records of common toad *Bufo bufo* were identified within 2km of the Site, the majority of the records being located within RSPB Saltholme. None of the records were from within the Site.

Survey Data

- 7.5.57. Ponds and other waterbodies have been identified on Site and within 500m of the Site, based on aerial imagery and mapping, with further waterbodies being discovered during the completion of surveys. Surveys have been undertaken on the majority of waterbodies that fell within the Study Area at the time of the surveys. However, due to subsequent DCO Application Boundary extensions, the Study Area has increased in size, which has incorporated a number of additional waterbodies that are yet to be assessed. The results of further surveys completed will be included within the ES.

- 7.5.58. In summary, the majority of waterbodies fully assessed to date have been assessed to be of either poor or below average suitability to support GCN. Four have been assessed to be of average suitability, four have been assessed to be of good suitability, and one has been assessed to be of excellent suitability. Impacts are expected to be largely avoid, particularly in relation to the 'good' and 'excellent' waterbodies as these are located outside of the DCO application boundary, but several ditches located within or directly adjacent to the DCO Application Boundary may be impacted by the Proposed Scheme.
- 7.5.59. Grassland and scrub habitats identified on Site potentially offer suitable shelter and foraging habitat for amphibian species, including GCN. However, these habitats are poorly connected to waterbodies and suitable terrestrial habitats surrounding the Site due to man-made modifications to the landscape and active industrial areas.
- 7.5.60. No common toads have been recorded during surveys completed to date, but suitable habitat to support them is present throughout the Study Area, in the form of ponds, reedbed, grassland and scrub.

Evaluation

- 7.5.61. There are no records of GCN in the Study Area and the waterbodies and watercourses assessed to date have been determined to be largely sub-optimal to support breeding GCN. However, a full assessment of breeding habitat has not yet been able to be undertaken and there is suitable terrestrial habitat within the Study Area to support sheltering and foraging opportunities. This includes areas of grassland, woodland and scrub.
- 7.5.62. Sufficient information is not available at this stage to make an assessment of the level of importance of GCN in relation to the Study Area. However, as suitable habitat is present across the Study Area to support them, they are considered to be an IEF on a precautionary basis.
- 7.5.63. Common toads have less strict habitat requirements than GCN. Suitable terrestrial habitat to support foraging and sheltering is present across much of the Study Area, and waterbodies that they could utilise for breeding are present. There are also a number of existing records of their presence in close proximity to the Site. As such, they are considered likely present on Site. Common toad is a Species of Principal Importance (SPI) designated under the NERC Act. However, due to a lack of confirmed presence, they are considered to be of importance at a Site level only and so are not considered in further detail in this assessment.

Terrestrial Invertebrates

Desk Study Data

- 7.5.64. Over 700 terrestrial invertebrate records were identified within 2km of the Site. These comprised a range of protected and notable species of butterfly, moth, dragonfly, and true fly.

7.5.65. A large proportion of the records were from RSPB Saltholme, with numerous records for Dorman's Pool. There were no confirmed records for the Site itself. There was one record of a cinnabar moth *Tyria jacobaeae*, with the location stated as 'Reclamation Pond/ Dorman's Pool'. However, only a four-figure grid reference was provided, so the exact location of the record could not be determined. Furthermore, the record was from 2013, with historic aerial imagery indicating that the habitats present on the Site at the time of writing differ significantly from those present in 2013 due to re-grading works that have been carried out in the area.

Survey Data

- 7.5.66. No notable terrestrial invertebrate species have been recorded on the Site to date. However, findings have come from incidental observations only. No dedicated survey effort in relation to terrestrial invertebrates has been undertaken. Depending on the outcome of a full evaluation of habitats recorded within the Study Area, specific terrestrial invertebrate surveys will be undertaken in spring 2024.
- 7.5.67. Potentially suitable habitat to support a range of invertebrate species has been recorded on Site in the form of OMHPDL. Other habitats present within the Site and ZOI are also likely to support a range of invertebrates. These include areas of reedbed, swamp, grassland, and scrub. Areas of unmanaged grassland present across the Study Area would be suitable to support butterfly and moth species identified in the desk study.
- 7.5.68. In addition, the Teesmouth and Cleveland Coast SSSI located partly within and immediately adjacent to Site, is partly designated for its important invertebrate assemblage. Despite the record of a cinnabar moth on or surrounding the Site, habitats favoured by this species (sand dune and short, grazed grassland) are absent from the Site.

Evaluation

7.5.69. Sufficient evaluation of baseline information has not been completed to fully determine the level of importance of terrestrial invertebrates within the Study Area. However, on a precautionary basis, they are considered to be an IEF.

Other Mammals

Desk Study Data

- 7.5.70. A total of 38 records of brown hare were identified within 2km of the Site. None of the records are located on the Site itself, but several are within close proximity, including two records for Dorman's Pool, with one immediately adjacent to the Site.
- 7.5.71. A total of 36 records of hedgehog were identified within 2km of the Site, several of which are located in Port Clarence and RSPB Saltholme. There are no records within the Site itself. The nearest records are one in Port Clarence, immediately adjacent to the Site, and one in Dorman's Pool, also immediately adjacent to the Site.

Survey Data

- 7.5.72. No brown hare have been recorded during the surveys completed to date. However, given the presence of numerous records in the area and the suitable habitat throughout the Site, they are considered to be likely present on the Site.
- 7.5.73. No hedgehogs have been recorded during the surveys completed to date. However, again given the presence of numerous records in the area and the suitable habitat throughout the Site, they are considered to be likely present on the Site.

Evaluation

- 7.5.74. There are records of both brown hare and hedgehog within the Study Area, including in close proximity to the Site, and suitable habitat is present on Site to support them. However, no evidence of either species has been recorded during surveys. Both species are designed as SPI under the NERC Act 2006. Brown hare is also listed as TVBAP priority species. However, due to a lack of confirmed presence, they are considered to be of importance at a Site level only and so are not considered in further detail in this assessment.

Invasive Species

Desk Study Data

- 7.5.75. A total of 11 records of invasive plant species were provided by ERIC North East. These included records for Himalayan cotoneaster *Cotoneaster simonsii*, Japanese knotweed *Reynoutria japonica*, Indian balsam (syn. Himalayan balsam) *Impatiens glandulifera*, and Japanese rose *Rosa rugosa*. None of the records were on the Site itself.
- 7.5.76. One record of invasive animal species was provided. This was a record of a grey squirrel *Sciurus carolinensis*, located approximately 1.3km to the south-west of the Site.

Survey Data

- 7.5.77. INNS recorded to date include Japanese knotweed, giant hogweed *Heracleum mantegazzianum*, montbretia *Crocsmia x crocosmiiflora*, Indian balsam, wall cotoneaster *Cotoneaster horizontalis*, and Himalayan cotoneaster. These species have been found in areas subject to regular human disturbance, including areas of Port Clarence close to Wilton Engineering Wharf, around industrial facilities along Huntsman Drive, and adjacent to the Augean waste management site, south of Huntsman Drive. Full details are provided in **Appendix 7A: PEA Report (Volume 3)**.

Evaluation

- 7.5.78. Whilst INNS are not considered to be 'important' as such within a biodiversity context, the above plant species still require further consideration within this assessment due to their potential detrimental impacts on protected/notable species and habitats within the Study Area.
- 7.5.79. Due to the presence of only a single INNS animal record being provided in the desk study data (located over 1km from the Site) and no INNS of animal being recorded

during surveys carried out, INNS of animal are not considered further in this assessment.

Evaluation Summary

7.5.80. **Table 7-15** provides a summary of the evaluation of ecological receptors, detailing the scale at which they are considered important.

Table 7-15: Ecological Receptors Evaluation Summary

Ecological Receptor	Importance	Sensitivity
Teesmouth and Cleveland Coast SPA	International/European	High
Teesmouth and Cleveland Coast Ramsar	International/European	High
North York Moors SAC	International/European	High
North York Moors SPA	International/European	High
Teesmouth and Cleveland Coast SSSI	National	High
Teesmouth NNR	National	High
Cowpen Bewley Woodland Country Park LNR	Borough	Medium
Teessaurus Park LWS	Borough	Medium
Berwick Hills and Ormesby Beck Complex LWS	Borough	Medium
Greatham Creek North Bank Saltmarsh LWS	Borough	Medium
Greenabella Marsh LWS	Borough	Medium
Coastal and Floodplain Grazing Marsh (CFGM) HPI	Borough	Medium
Mudflats HPI	Borough	Medium
Lowland Fens HPI	Borough	Medium
Deciduous Woodland HPI	Borough	Medium
Saline Lagoons HPI	Borough	Medium
Coastal Saltmarsh HPI	Borough	Medium

Ecological Receptor	Importance	Sensitivity
Lowland calcareous grassland HPI	Borough	Medium
Eutrophic Standing Waters HPI; Ponds, Lakes and Reservoirs TVBAP	Borough	Medium
Rivers HPI; Rivers and Streams TVBAP	Borough	Medium
Mudflats and Saltmarsh TVBAP	Borough	Medium
OMHPDL HPI; Brownfields TVBAP	Borough	Medium
Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP	Borough	Medium
Conservation Areas	Borough	Medium
Trees	Precautionary IEF	N/A
Inland salt meadow	National	High
Badger	Precautionary IEF	N/A
Bats	Precautionary IEF	N/A
Breeding birds (SSSI/SPA/Ramsar)	International/European	High
Breeding birds (general)	Local	Low
Peregrine	Local	Low
Wintering birds (SSSI/SPA/Ramsar)	International/European	High
Wintering birds (general)	Local	Low
Otter	District	Low
Water vole	District	Low
Reptiles	Precautionary IEF	N/A
GCN	Precautionary IEF	N/A
Terrestrial invertebrates	Precautionary IEF	N/A

7.5.81. In addition, the following INNS are considered further in this assessment:

- Japanese knotweed;
- Giant hogweed;
- Montbretia;
- Indian balsam;
- Wall cotoneaster; and
- Himalayan cotoneaster.

FUTURE BASELINE

Overview

- 7.5.82. Climate change is the single most prevalent factor when attempting to predict the future baseline of an ecosystem or species community; not least as it affects ecology via multiple pathways. Impacts on species are considered to include changes in distribution and abundance, the timing of seasonal events and habitat use and, consequently, there are likely to be changes in the composition of plant and animal communities. Habitats and ecosystems are also likely to change in character.
- 7.5.83. Assessing the potential impacts of climate change on ecological features is problematic as species trends in distribution and population size are influenced by numerous factors. These include environmental considerations (such as atmospheric pollution and land use) and population biology (such as density dependence). These different factors can work in combination to bring about change.
- 7.5.84. Moorcroft and Speakman (2015)⁵⁰ present a study that summarises key research on the impacts of climate change on habitats and species in the UK, concluding that there is strong evidence that climate change is affecting UK biodiversity. Importantly, impacts are expected to increase as the magnitude of climate change increases.
- 7.5.85. The distributions of many species are shifting northwards, including some species which have colonised the UK from mainland Europe, while some species are seen to be utilising habitats at a higher altitude than known previously.
- 7.5.86. It is difficult to predict with confidence the likely response of ecological receptors (as described in **Section 7.5**) to climatic change. However, the following section presents known information on the medium and long-term trends in distribution and abundance for such features.
- 7.5.87. The future baseline assumes that existing industrial facilities within the Study Area that do not form part of the Proposed Scheme would remain at their current locations should the Proposed Scheme not proceed, other than where specified below and elsewhere in this PEIR. Exceptions include those described under Land Use Changes, below.

Habitats

- 7.5.88. Grassland habitats are common across the Study Area, including areas of CFGM within and directly adjacent to the Site. Such areas are considered to be highly sensitive to changes in rainfall. An increase in summer drought conditions has the potential to lead to a decline in wet grassland communities including CFGM, which may lead to a change in species composition in these habitats. It is not possible to predict whether there would be changes in land management or land use (such as modification of the grazing regime) on CFGM and what the effects would be.
- 7.5.89. Although woodland cover in the UK has increased slightly in the last 100 years, much of this is non-native tree species. Existing native woodlands are isolated, in poor ecological condition and present a decline in woodland wildlife. As well as direct habitat loss, climate change also poses a threat through impacts on/from: growing season; imported diseases; invasive plants; mammal browsing; and air pollutants⁵¹.

Bats

- 7.5.90. Collins (2016)⁵² examined trends in 11 species compared to a baseline year of 1999, which found that these species were either stable or increasing. Climate change may affect bat populations through changes in their annual hibernation cycle, breeding success and food availability.

Birds

- 7.5.91. The BTO⁵³ breeding farmland bird index has reduced by more than half since 1970 in the UK. This indicates a long-term decline in farmland bird populations.
- 7.5.92. The breeding woodland bird index for the UK has declined by 30% between 1970 and 2018, and 5% over the recent short-term period (2012-2027). The breeding water and wetland bird index for the UK fell by 6% between 1975 and 2018, but over the short term (2012-2027) increased slightly by 3%.
- 7.5.93. Increased flood risk resulting from climate change (described in detail in **Chapter 9: Water Environment and Flood Risk (Volume 1)** and **Chapter 12: Climate Change Resilience (Volume 1)**) may result in a change of habitat type over time. Areas more likely to flood, including adjacent designated sites, may change to habitats typical of wetter environments, such as wetlands and marshes. This may affect the extent and distribution of suitable habitat for breeding and overwintering birds that currently use these areas, and may also result in an overall change to the assemblage of bird species for which the habitats are suitable.
- 7.5.94. A number of wintering wildfowl and wader species have declined significantly in their abundance in the UK, particularly in west coast estuaries, as they migrate shorter distances in the non-breeding season, and many have shifted north-eastwards to new feeding grounds. This may have long-term effects on the abundance and distribution of overwintering species using the Site and suitable habitat within the Study Area.

Otter

- 7.5.95. The otter population of the UK underwent a dramatic decline from the mid-1950s until at least the mid-1970s, when systematic population surveys first began, with the greatest declines being in England and Wales. Since these first surveys, the population has increased in most areas, but there have been some regional variations. Surveys as of 2003 showed a continuation of the recovery throughout England, although it appears to be slower than expected in some northern areas⁵⁷.
- 7.5.96. Periods of drought due to warmer, drier summers could lead to reduced water flow in rivers and other watercourses, which would adversely affect foraging opportunities and habitat connectivity for otters⁵¹.

Water Vole

- 7.5.97. Water voles were formerly widespread and common in England, Wales and Scotland, ranging from Cornwall to the extreme north-east of Scotland. Populations are still widespread but patchy and have undergone serious decline since the 1960s. The water vole is the UK's most rapidly declining mammal and has been lost from 94% of places where they were once prevalent^{54,58}.
- 7.5.98. Similar to above in relation to otters, periods of drought may lead to a change in the composition of existing water vole habitat, affecting their ability to forage, commute and breed.

Reptiles

- 7.5.99. Evidence from the BTO Research Report 572⁵⁵ points to general declines in common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*. Warming, through climate change, could increase reptile growth and reproductive rates due to longer periods of activity with reduced hibernation lengths and earlier emergence. However, research suggests the increase in food resource requirements (due to the increased periods of activity) may not be met fully by increased foraging, particularly when warm weather restricted their activity⁵⁶.

Terrestrial Invertebrates

- 7.5.100. State of Nature 2019⁵⁴ reports that the occupancy indicator for insects shows a decrease in average distribution of 10% over the long term, and 8% over the short term, with 405 invertebrates (12%) classified as being at risk of extinction from Great Britain. Butterflies and moths have been particularly hard hit, with numbers of butterflies down by 17% and moths down by 25% since 1970. These declines are due to a variety of factors, including climate change, habitat loss, and change in land management practices.

Notable Plants and Invasive Species

- 7.5.101. Botanical species in the UK are generally in decline. State of Nature 2019⁵⁷ reports the occupancy indicator for vascular plants is 4% lower compared to 1970, with little, short-

term change in average distribution. A total of 440 plants (18%) are classified as being at risk of extinction from Great Britain. These declines are due to a variety of factors, including climate change, habitat loss, and change in land management practices. However, State of Nature 2019 also reports the rise in invasive species within the UK, with an average of 10–12 new non-native species becoming established in the UK annually, and that 10–20% of these cause serious adverse impacts.

- 7.5.102. Invasive species can colonise quickly where previously absent. Different species colonise at different rates. However, due to the known presence of some INNS within the Site and surrounding area, there is the potential for these species to spread beyond their current extent and out-compete native flora, reducing the overall biodiversity value of habitats present.

Land Use Changes

- 7.5.103. As described in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, the partial demolition of the Lighthouse Green Fuels TV1 facilities and demolition and clearance of the TV2 facilities is being carried out under a separate consent. Any decommissioning and demolition activities for the existing TV1 and TV2 plants are anticipated to have a largely negligible impact on ecological receptors within the footprints of the sites themselves and on IEFs within the Site of the Proposed Scheme. Any demolition works would be expected to be temporary, short term in duration and localised in extent. Furthermore, demolition works would be required to be subject to appropriate mitigation measures, likely including measures outlined in a Noise Management Plan and Dust Management Plan. This would limit the potential for significant disturbance impacts to surrounding ecological receptors. These measures have already been requested from Natural England during discussions relating to the demolition of the TV1 and TV2 applications.
- 7.5.104. The area of the former reclamation pond, part of the SAF Plant Site, is subject to an extant planning permission held by the current landowner (as discussed in **Table 7-3**). If the proposals for which planning permission has been granted are implemented (comprising infilling of the land to create a development platform), this will result in the loss of OMHPDL, saltmarsh and reedbed habitat within the Site. The basis of assessment for this PEIR is that these habitats form part of the current baseline for the Site. However, for the ES, there are two potential scenarios with regard to the habitat baseline and subsequent assessment, given that the extant permission could be implemented and these habitats removed within the DCO application timescales. This has potential implications for the outcome of the terrestrial ecology assessment (including the BNG assessment) and the extent of mitigation and compensation measures that may be required. This will be assessed in detail in the ES when more definitive information in relation to the Site baseline is expected to be available.

7.6. EMBEDDED DESIGN, MITIGATION AND ENHANCEMENT MEASURES

OVERVIEW

- 7.6.1. The design of the Proposed Scheme is an iterative process and subject to revision and refinement throughout preparation of this PEIR and the subsequent ES. However, as stated in **Chapter 3: Approach to EIA (Volume 1)**, embedded mitigation will be included as part of the design.
- 7.6.2. As a general principle, the mitigation hierarchy will be adhered to as far as possible. Avoidance (in the first instance) and mitigation measures will be developed throughout the design process of the Proposed Scheme to reduce the impact of adverse effects. This will include creation of habitats to compensate for those lost during construction and enhancement of existing habitats to be retained.
- 7.6.3. The following represent key principles that will, wherever possible, be enforced during the design of the Proposed Scheme:

CONSTRUCTION PHASE

- A 4m-high earth bund is present on the western boundary of the SAF Plant Site. This will help to reduce the impacts of noise, vibration, dust, visual disturbance, and artificial lighting on the Dorman's Pool section of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. This will be applicable to both construction and operation.
- Sensitive timing and programming of construction will aim to avoid/minimise impacts upon protected and/or notable species and habitats. For example, piling works and general construction works in close proximity to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar to be avoided during the winter, as far as practicable, in order to minimise disturbance to overwintering birds.
- Where certain sensitive periods cannot feasibly be avoided, the use of visual and acoustic screening will be employed during construction to screen plant, equipment and site operatives and avoid disturbance to nearby bird assemblages. Key areas where screening may be required would include around the SAF Plant and along the heavy haul road and utilities corridors where they are in close proximity to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. Screening can be constructed to suit particular requirements, and should be of a sufficient height to screen out site operatives, vehicles and plant without being visually intrusive in its own right. The design of any screening to be used would be determined in conjunction with Landscape and Visual Impact Assessment (see **Chapter 10: Landscape and Visual (Volume 1)**).
- Vegetation removal and demolition works will be programmed outside the bird breeding season (approximately March to August, inclusive), where possible. However, this will need to be considered in relation to avoidance of works during the overwintering bird period, which comprises embedded mitigation for the Proposed Scheme. Where avoidance of works during bird nesting season is not feasible, any vegetation removal undertaken within this period will require a pre-

clearance inspection for nesting birds by a Suitably Experienced Ecologist (SEE)/Ecological Clerk of Works (ECoW). Where an active nest/or nesting activity is found, an appropriately sized exclusion zone will be enforced around the area until such time that the nest becomes inactive (for example, eggs hatch and chicks fledge the nest, or the nest fails). Mitigation measures required in relation to nesting birds would be outlined, agreed and committed to as part of the OCoCP;

- A Code of Construction Practice (CoCP), bespoke to the Proposed Scheme, will be produced to cover works during the construction phase and an Outline CoCP (OcoCP) will be submitted as part of the DCO application. The OcoCP will detail best practice mitigation measures to be incorporated into the Proposed Scheme during the construction phase. It will form the basis of the full CoCP which will be provided by appointed contractor prior to works commencing. Such measures will include:
 - Habitat clearance being limited to the minimum amount needed to facilitate construction works, with areas of existing vegetation being retained as far as feasible. Protective fencing will be used where necessary to demarcate habitats to be retained and prevent access from construction plant and operatives;
 - The construction programme being kept to the minimum amount of time needed to complete the works, in order to minimise the temporal extent of disturbance to ecological receptors;
 - Soft-start techniques for plant and equipment to minimise loud, percussive noises most disturbing to birds, to be secured via a Noise Management Plan ((NMP); further details are provided in **Chapter 6: Noise and Vibration (Volume 1)**;
 - General employment of noise reduction measures on operational plant machinery and equipment, to be secured via a Noise Management Plan (NMP);
 - Piling works required will be undertaken using continuous light auger piling rather than sheet piling, in order to minimise noise and vibrational impacts, including loud, percussive noises;
 - Dust suppression measures, to be secured via a Dust Management Plan (DMP; further details are provided in **Chapter 5: Air Quality (Volume 1)**;
 - Best practice measures for pollution prevention to minimise impacts on surrounding habitats (including water quality), such as the creation of suitable drainage and use of silt fences, where necessary; and
 - Implementation of a sensitive construction lighting strategy.
 - Construction materials should be securely stored and maintained away from watercourses. Silt fences or similar should be placed around exposed ground and stockpiles, and early revegetation of the completed elements of the construction area should be undertaken to reduce further erosion;
 - Appropriate checking and maintenance of marine vessels to minimise the likelihood of fuel spillage during shipping movements; and

- Chemicals and fuels must be stored in secure containers located away from watercourses or waterbodies. No refuelling of plant or machinery should take place near water environments.

OPERATION PHASE

7.6.4. Mitigation measures during the operation phase are likely to include:

- The layout of the SAF Plant Site has been designed to minimise potential noise and visual impacts to birds within the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar site. These design measures include the siting of the Flare Area within the eastern half of the SAF Plant Site, located over 300m from the nearest section of the SSSI/SPA/Ramsar.
- Measures intended to avoid or reduce air and water emission impacts are expected to be embedded into the design of the Proposed Scheme. This will help to minimise impacts on surrounding habitats, including statutory designated sites. The SAF Plant Site will be subject to an environmental permit which would strictly regulate air and water emissions. Further details are provided in **Chapter 5: Air Quality (Volume 1)** and **Chapter 9: Water Environment and Flood Risk (Volume 1)**. The Proposed Scheme will also include its own wastewater treatment facilities to clean (and re-use as far as practicable) process water, with effluent being discharged to the nearby Bran Sands Wastewater Treatment Plant (WWTP).
- A sensitive lighting scheme to be implemented for any permanent lighting to be installed as part of the Proposed Scheme; and
- Ongoing management of habitats retained, enhanced or newly created during the construction phase.

7.7. PRELIMINARY ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

OVERVIEW

7.7.1. A preliminary assessment of likely impacts and effects is presented within this section, based on the information available at the time of writing. This is subject to change and refinement as the baseline is completed through further survey work and assessment of the results, and as the design of the Proposed Scheme progresses. On this basis, the preliminary assessment has been undertaken on reasonable assumptions that have been made about likely impacts at this stage. The full assessment will be provided in the ES.

CONSTRUCTION PHASE

7.7.2. The likely significant effects associated with the construction phase are discussed below and summarised in **Table 7-16**. Where habitats of conservation importance have been identified as IEFs separately through both the desk study and site survey (e.g. reedbed and OMHPDL), these have been considered here as a single receptor.

Habitat Loss and Fragmentation

Overview

7.7.3. Any habitat loss or fragmentation is expected to be restricted to areas within the Site itself and will not affect adjacent or wider habitats within the Study Area.

Notwithstanding this, the following IEFs may be affected by habitat loss or fragmentation:

- Teesmouth and Cleveland Coast SSSI, SPA, Ramsar
- Non-statutory designated sites (presence unconfirmed due to data gaps)
- OMHPDL HPI; Brownfields TVBAP
- CFGM HPI
- Reedbeds HPI and TVBAP
- Lowland Calcareous Grassland HPI
- Mudflats and Saltmarsh TVBAP
- Conservation Areas
- Trees
- Inland salt meadow Annex I habitat
- Badger
- Bats
- Breeding birds (general)
- Wintering birds (general)
- Otter
- Water vole
- Reptiles
- GCN
- Terrestrial invertebrates

7.7.4. It is acknowledged that there are sections of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar located within the DCO Application Boundary. At the time of writing, the assessment below has been made on a precautionary basis in terms of potential habitat loss/fragmentation. However, the intention is to refine the DCO Application Boundary at the ES stage in order to avoid loss of habitat associated with these designated sites.

Assessment of Likely Impacts and Effects

Teesmouth and Cleveland Coast SSSI/SPA/Ramsar

7.7.5. As highlighted on **Figure 2.2d (Volume 2)**, there are relatively limited proportions of the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar that fall within the Site. As such, it is currently assumed that there is the potential for these areas of habitat to be directly impacted by the Proposed Scheme. This may result in the direct loss of habitats that support qualifying features of the SSSI, SPA and Ramsar, potentially on a

permanent basis. However, as mentioned above, the intention is to refine the DCO Application Boundary in order to avoid loss of habitat associated with these designated sites. This will be assessed further and the results will be presented in the ES.

- 7.7.6. The sensitivity of the SSSI, SPA and Ramsar is considered to be **high** in all cases. On the basis of the permanent loss of habitat, the magnitude of change is also considered to be **high**. As such, this is considered to constitute a **Major Adverse (Significant)** impact.

Non-statutory Designated Sites

- 7.7.7. No LWS have been recorded within the Site to date. However, due to changes in the DCO Application Boundary, there are gaps in the desk study and there is the potential for LWS to be present in areas for which biological records data has not yet been obtained. If present within the Site, groundworks and site clearance could result in the partial or total loss of LWSs during construction.

- 7.7.8. LWSs are important at a Borough level, and so the sensitivity of this receptor is considered to be **medium**. The magnitude of change, in a worst-case scenario, would be **high** in the event of the total loss of an LWS. As such, this would be considered a **Major to Moderate Adverse (Significant)** impact.

Open Mosaic Habitat on Previously Developed Land HPI; Brownfields TVBAP

- 7.7.9. By the time the DCO application is submitted, the baseline habitat is considered likely to have changed. Some of the OMHPDL within the Site may have already been removed in the former reclamation pond area as a result of proposed infilling works by the current landowner (as discussed in the **Future Baseline** section, above). Notwithstanding this, if habitats within the former reclamation pond area are retained throughout the construction and operation phases of the Proposed Scheme, there is expected to be fragmentation of habitat due to the reduction of connectivity between this area and parts of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar to the west, affecting the use of these habitats by a range of bird species and other wildlife.

- 7.7.10. The sensitivity of this IEF is considered to be **medium** and the magnitude of change is considered to also be **medium**, due to the partial alteration or loss of habitat connectivity. As such, the likely effect is expected to be **Moderate Adverse (Significant)**.

Coastal and Floodplain Grazing Marsh HPI

- 7.7.11. Some CFGM habitat is present within the Site. Although this is relatively limited compared to the extent of CFGM habitat present in the Study Area as a whole (as shown on **Figure 2.2 (Volume 2)**), it has been assumed that at least some of this will need to be removed during construction works to construct the heavy haul road, which is expected to result in the permanent loss of habitat. Other areas of CFGM may also be lost as a result of clearance works associated with the Proposed Scheme.

7.7.12. The sensitivity of this IEF is considered to be **medium** and the magnitude of change is considered to be **low** due to a small proportion of this habitat being expected to be lost. As such, the likely effect is expected to be **Minor to Moderate Adverse (Significant)**. In this instance, a precautionary approach has been taken and this effect has been assumed to be significant.

Reedbed HPI

7.7.13. As mentioned above with regard to OMHPDL, by the time the DCO application is submitted, some of the reedbed habitat within the Site may have already been removed in the former reclamation pond area as a result of proposed infilling works under the current landowner's extant planning permission. However, if the habitats are retained, there may still be a loss or reduction of habitat connectivity between this area and areas of the Teesmouth and Cleveland Coast SSS/SPA/Ramsar to the west, which would be considered habitat degradation as it could affect the use of these habitats by a range of bird species and other wildlife.

7.7.14. The sensitivity of this habitat is considered to be **medium** and the magnitude of change is also considered to be **medium**, is considered to also be **medium**, due to the partial alteration or loss of habitat connectivity. As such, this is considered to constitute a **Moderate Adverse (Significant)** effect.

Lowland Calcareous Grassland HPI

7.7.15. The vast majority of lowland calcareous grassland within the Study Area is located within the Site and may be partly or entirely lost during construction to facilitate the creation of the heavy haul road. For the purpose of this assessment, a precautionary approach has been taken and it has been assumed that the entirety of this habitat would need to be permanently lost to facilitate construction works.

7.7.16. The sensitivity of this habitat is considered to be **medium** and the magnitude of change is considered to be **high** due to the entirety of this habitat potentially being permanently lost. As such, this is considered to constitute a **Major Adverse (Significant)** effect.

Mudflats and Saltmarsh TVBAP

7.7.17. As above with regard to OMHPDL and reedbed, this habitat may be entirely lost during the proposed infilling works of the former reclamation pond area. However, even if this habitat is retained, there may still be a loss or reduction of habitat connectivity between this area and areas of the Teesmouth and Cleveland Coast SSS/SPA/Ramsar to the west, which would constitute habitat degradation, as it could affect the use of these habitats by a range of bird species and other wildlife.

7.7.18. The sensitivity of this IEF is considered to be **medium** and the magnitude of change is also considered to be **medium**, due to the partial loss or alteration of habitat connectivity. As such, this is considered to be **Moderate Adverse (Significant)** effect. On a precautionary basis, this effect is considered to be **Significant**.

Conservation Areas

- 7.7.19. No Conservation Areas have been recorded within the Site to date. However, due to changes in the DCO Application Boundary, there are gaps in the desk study and there is the potential for Conservation Areas to be present in areas for which the relevant desk study data has not yet been obtained. If present within the Site, groundworks and site clearance could result in the loss of parts of one or more Conservation Areas during construction.
- 7.7.20. Conservation Areas are important at a Borough level, and so the sensitivity of this receptor is considered to be **medium**. The magnitude of change, in a worst-case scenario, is expected to be **medium**, resulting from the partial loss of one or more Conservation Areas. As such, this would be considered a **Moderate Adverse (Significant)** impact.

Trees

- 7.7.21. No notable trees were recorded during the arboricultural walkover survey completed. However, due to changes in the DCO Application Boundary, there are areas that have not been surveyed, which may contain notable trees or woodland. If present within the Site, groundworks and site clearance could result in the partial or total loss of notable trees and woodland during construction.
- 7.7.22. Further survey effort is required in relation to the current DCO Application Boundary to determine the presence of any notable trees or woodland and make an assessment of likely impacts and effects. This will be presented in the ES.

Inland Salt Meadow Annex I Habitat

- 7.7.23. As above with regard to the Mudflats and Saltmarsh TVBAP, this habitat may be entirely lost during the proposed infilling works of the former reclamation pond area. However, even if this habitat is retained, there may still be a loss or reduction of habitat connectivity between this area and areas of the Teesmouth and Cleveland Coast SSS/SPA/Ramsar to the west.
- 7.7.24. The habitat is considered to be very rare in the UK, with only one other known location remaining, which is Pasturefields Salt Marsh SAC, located in Shropshire and Staffordshire. Therefore, the sensitivity of this habitat is considered **high** and the magnitude of change resulting from the permanent loss of this habitat is also considered to be **medium**, due to the partial loss or alteration of habitat connectivity for species that may use this habitat as a resource. As such, this is considered to a **Major to Moderate Adverse (Significant)** effect.

Badger

- 7.7.25. Surveys completed to date have not identified the presence of badger within the Study Area. However, further surveys may reveal the presence of suitable habitat and/or confirm the presence of badger. Sufficient information is not currently available to make a detailed impact assessment. However, vegetation clearance and groundworks during

construction may result in the loss and/or fragmentation of suitable badger habitat, including the potential direct loss of active setts.

- 7.7.26. A detailed impact assessment will be made in the ES when further project design information is expected to be available and further surveys have been completed.

Bats

- 7.7.27. Sufficient information is not currently available at this stage on the project design or presence of bats in the Study Area to make a detailed impact assessment. However, there is the potential that roosting habitat for bats may be lost as a result of vegetation clearance and demolition during the construction phase. Foraging and commuting habitat may also be affected.

- 7.7.28. A detailed impact assessment will be made in the ES when further project design information is expected to be available, and a daytime bat walkover has been completed.

Breeding Birds (General)

- 7.7.29. The extent of vegetation clearance required to facilitate the Proposed Scheme is not currently known; however, suitable habitat for a range of 'common' bird species (those not associated with the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar) is expected to be temporarily (medium to long-term) or permanently lost during the construction phase.

- 7.7.30. The sensitivity level of the bird assemblage on the Site is considered to be **low**, and the magnitude of change is precautionarily assessed as **medium**, with a partial loss of suitable habitat on Site anticipated. Therefore, this is considered to be a **Minor Adverse (Not Significant) to Moderate Adverse (Significant)** effect. In this instance, this is precautionarily considered to be **Significant**.

Wintering Birds (General)

- 7.7.31. The Site itself is considered to offer limited suitable habitat for wintering birds (those not associated with the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar) overall. However, the former reclamation pond area offers suitable overwintering habitat for a range of species. Again, the habitats in this area may no longer be present when the construction phase of the Proposed Scheme commences. However, in the event that the current landowner's extant planning permission is not implemented, works in this area during the construction phase would result in the permanent loss of saltmarsh, OMHPDL and reedbed habitat that could support a range of overwintering birds.

- 7.7.32. If the former reclamation pond area is determined to be functionally linked to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar through detailed assessment of wintering bird survey results, this assessment is expected to change. However, based on currently available information, the sensitivity level of the bird assemblage on Site is considered to be **low**, and the magnitude of change is considered to be **high**, due to the

expected total loss of suitable habitat to support them. As such, this is considered to constitute a **Moderate Adverse (significant)** effect.

Otter

- 7.7.33. The majority of suitable habitat for otter is located outside of the Site and, therefore, would not be directly impacted via loss during construction. Furthermore, no evidence of otter has been recorded during surveys completed, although they are known to be present in the wider area.
- 7.7.34. The sensitivity level of otter is considered to be **low** and the magnitude of change is also considered to be **low**, due to the (at worst) small amount of suitable otter habitat lost, with no evidence of their presence recorded. As such, this is considered to constitute a **Minor Adverse (Not Significant)** effect.

Water Vole

- 7.7.35. Similar to otter, above, the majority of suitable water vole habitat within the Study Area is located outside of the Site and, therefore, is not expected to be directly impacted by construction works. Some potential evidence of water vole has been recorded, but based on the overall limited evidence found, it is considered unlikely that a significant population of water vole would be affected by construction works, including habitat loss.
- 7.7.36. The sensitivity level of water vole is considered to be **low** and the magnitude of change is also considered to be **low**, again due to the small amount of suitable habitat expected to be lost, with no confirmed evidence of their presence recorded. As such, this is considered to constitute a **Minor Adverse (Not Significant)** effect.

Reptiles

- 7.7.37. Suitable reptile habitat is present across the Site in the form of areas of grassland and scrub. Surveys to confirm presence or likely absence of reptiles on the Site will be completed within 2024 to account for the new areas of the DCO Application Boundary included in the Proposed Scheme since EIA Scoping. It is anticipated that the Proposed Scheme will result in the loss of suitable reptile habitat.
- 7.7.38. It is not possible to assess the impact of the loss of suitable reptile habitat as reptile surveys have not been completed. A detailed impact assessment will be made in the ES.

GCN

- 7.7.39. Suitable habitat for GCN has been noted within the Study Area in the form of a small number of potentially suitable waterbodies for breeding, as well as the presence of suitable shelter and foraging habitat in the form of grassland, woodland and scrub. It is anticipated that the Proposed Scheme will result in the loss of suitable GCN habitat.
- 7.7.40. It is not possible to assess the impact of the loss of suitable GCN habitat until the baseline has been fully assessed and any further requirements determined. A detailed impact assessment will be made in the ES.

Terrestrial Invertebrates

- 7.7.41. Suitable habitat to support a range of terrestrial invertebrates is present across the Site. It is anticipated that the Proposed Scheme will result in the loss of habitat suitable to support invertebrate assemblages.
- 7.7.42. It is not possible to assess the impact on invertebrate assemblages, as a detailed assessment of baseline data has not yet been completed and further surveys may be undertaken. A detailed impact assessment will be made in the ES.

Noise and Vibration

Overview

- 7.7.43. Noise and vibrational impacts are expected to be incurred on the Site itself and wider Study Area during construction. This is expected to result from movement of plant and machinery and associated activities, such as excavation and piling. However, at the time of writing, further information on plant and equipment to be used is required to inform the assessment. An increase in marine vessel movements (estimated 300 in total) may also increase noise and vibration levels during construction. A construction road traffic noise assessment has been undertaken (discussed in **Chapter 6: Noise and Vibration (Volume 1)**) and significant effects in relation to road traffic have been screened out.
- 7.7.44. A series of key noise monitoring locations have been selected in relation to ecological receptors, focusing on areas within and adjacent to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. Monitoring commenced prior to the latest changes to the DCO Application Boundary and, therefore, some further monitoring data may be required for areas that have not been subject to this. Further details are provided in **Chapter 6: Noise and Vibration (Volume 1)**.
- 7.7.45. The following IEFs are expected to be disturbed by noise and vibration during construction:
- Badger
 - Bats
 - Breeding birds (SSSI/SPA/Ramsar)
 - Peregrine
 - Wintering birds (SSSI/SPA/Ramsar)
 - Otter
 - Water vole
 - Reptiles
 - GCN
 - Terrestrial invertebrates
- 7.7.46. Embedded mitigation (as detailed in **Section 7.6**, above) is to be incorporated into the construction phase in the form of soft-start techniques for plant and equipment and

general employment of noise reduction measures as far as practicable. Acoustic screening is also proposed for works adjacent to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. In addition, sensitive timing of certain works, such as avoiding piling during the winter months, will aim to avoid/minimise impacts upon protected and/or notable species.

Assessment of Likely Impacts and Effects

7.7.47. A detailed impact assessment will be made in the ES when full baseline information is available following the completion of terrestrial ecology surveys and noise monitoring. Given the embedded mitigation to be included within the Proposed Scheme, plus more detailed mitigation measures to be determined upon review of further baseline information, it is anticipated that significant effects can be largely or entirely avoided.

Visual Disturbance

Overview

7.7.48. Visual disturbance of IEFs may arise during construction as a result of the presence of site operatives, plant and vehicles (assumed 60 HGV movements per day and 250 SPMT movements across the Construction Phase) carrying out construction works across the Site, and marine vessel movements along the River Tees.

7.7.49. Effects are largely expected to be limited to the Site and immediate surrounding area. Habitats themselves are not sensitive to visual disturbance but the species of terrestrial wildlife present within them would be. Temporary, medium-term, frequent disturbance may be incurred throughout the construction phase.

7.7.50. The following IEFs are considered to be sensitive to visual disturbance:

- Bats
- Breeding birds (SSSI/SPA/Ramsar)
- Peregrine
- Wintering birds (SSSI/SPA/Ramsar)
- Otter
- Water vole

7.7.51. Embedded mitigation for visual disturbance during construction will include timing works to avoid disturbance species during key periods, such as the overwintering period for birds, and the use of screening to provide a visual barrier between construction works and habitats where protected or notable species will be or may be present. Based on the current terrestrial ecology baseline, it is expected that visual screening would be required in areas where construction works will be carried out in close proximity to the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar, particularly in instances where works cannot be timed to avoid the overwintering period.

Assessment of Likely Significant Effects

- 7.7.52. The sensitivity of breeding and wintering birds associated with the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar is considered to be **high**. The sensitivity of breeding birds (general), peregrine, otter, and water vole is considered to be **low**. The magnitude of change for all IEFs would typically be considered high, but with embedded mitigation in place, impacts are expected to be largely avoided and the magnitude of change is, therefore, considered to be **negligible** in all cases. As such, likely significant effects to all species are expected to be **Negligible (Not Significant)**.
- 7.7.53. An assessment will be made in relation to bats in the ES when further project design information is expected to be available and suitable baseline data is available.

Dust Deposition

Overview

- 7.7.54. Dust deposition within the Site and immediate surrounding areas is expected to result from construction works. Temporary, medium-to-long-term degradation of habitat, and the loss of that habitat's function to species it supports, would be the effect of deposition of dust released during the construction phase. Dust could cause an effect within the Study Area through smothering of vegetation, changed soil conditions, transmission of polluting substances and irritation of animal species.
- 7.7.55. The following IEFs have the potential to be affected by dust deposition during construction:
- Designated sites:
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
 - Non- statutory designated sites (presence unconfirmed due to data gaps)
 - Habitats of conservation importance:
 - OMHPDL HPI; Brownfields TVBAP;
 - CFGM HPI;
 - Mudflats HPI;
 - Lowland Fens HPI;
 - Reedbed HPI, TVBAP;
 - Eutrophic standing water HPI; Ponds, Lakes and Reservoirs TVBAP;
 - Rivers HPI; Rivers and Streams TVBAP;
 - Wet woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
 - Conservation Areas; and
 - Trees.
 - Protected and notable species

- Badger;
- Bats;
- Breeding birds (SSSI/SPA/Ramsar);
- Breeding birds (general);
- Peregrine;
- Wintering birds (SSSI/SPA/Ramsar);
- Otter;
- Water vole;
- Reptiles;
- GCN; and
- Terrestrial invertebrates.

7.7.56. Embedded mitigation in relation to dust deposition is detailed in **Chapter 5: Air Quality (Volume 1)** and will be provided in further detail in the OCoCP at the ES stage. In summary, this will include measures such as siting dust-causing activities away from ecological receptors, use of screens or barriers around dusty activities, restricting site speed limits to minimise dust emissions into adjacent habitats by construction traffic, and dust suppression methods such as water sprays and ventilation systems. These will control dust release and degradation of habitats, and consequent effects on species they support.

Assessment of Likely Significant Effects

Teesmouth and Cleveland Coast SSSI/SPA/Ramsar

7.7.57. Construction activities and vehicle movements are expected to take place in close proximity to the SSSI/SPA/Ramsar throughout the construction phase. The sensitivity of these IEFs in all cases is assessed to be **high**. With embedded mitigation in place, it is anticipated that significant emissions into the designated sites can be avoided. The magnitude of change is therefore considered to be **negligible**. As such, this is considered to have a **Negligible (Not Significant)** effect.

Non-statutory Designated Sites

7.7.58. No LWS have been recorded within the Site or within 700m of it to date. However, due to changes in the DCO Application Boundary, there are gaps in the desk study and there is the potential for LWS to be present in areas for which biological records data has not yet been obtained.

7.7.59. LWSs are important at a Borough level, and so the sensitivity of this receptor is considered to be **medium**. With embedded mitigation in place, it is anticipated that significant emissions into the designated sites can be avoided. The magnitude of change is therefore considered to be **negligible**. As such, this is considered to have a **Negligible (Not Significant)** effect.

Habitats of Conservation Importance

7.7.60. Again, construction activities and vehicle movements are expected to take place in close proximity to a range of habitats of conservation importance throughout the construction phase. The sensitivity of all of these habitats is considered to be **medium**, other than for trees, which is currently scoped in as a precautionary IEF. With embedded mitigation in place, the magnitude of change is expected to be **negligible**. As such, this is considered to constitute a **Negligible (Not Significant)** effect.

Protected and Notable Species

7.7.61. The sensitivity level of breeding and wintering birds within the SSSI/SPA/Ramsar is considered to be **high**. The sensitivity level of the breeding bird assemblage, peregrine, otter, and water vole, is considered to be **low** in all cases. With embedded mitigation, the magnitude of change is expected to be **negligible**. Therefore, this is considered to result in a **Negligible (Not Significant)** effect in all cases.

7.7.62. Further assessment is still required in relation to badger, bats, reptiles, GCN, and terrestrial invertebrates to determine their level of importance and, therefore, sensitivity. However, the magnitude of change to these species is again expected to be negligible with embedded mitigation in place. Therefore, a **Negligible (Not Significant)** effect is anticipated in all cases.

Water Pollution

7.7.63. Water pollution during construction may affect IEFs within and adjacent to the Site, and those hydrologically connected. Run-off during construction works could enter existing watercourses and waterbodies, including the River Tees. This presents a possible vector for sediment and chemical pollution that may affect water quality, and salts that may change the salinity of water in which plants and animals live. The build-up of sediments and pollutants may occur within the drainage network and/or ground water, adversely altering key conditions for habitats and species. Pollution may also be incurred via spillage from marine vessel movements, though this is only expected to affect IEFs that utilise the River Tees, including wintering birds, and otter. These impacts may lead to temporary, medium to long-term impacts on the affected habitats.

7.7.64. It should be noted that works where the Site Boundary crosses the River Tees itself relate to underground piping work within the existing pipeline tunnel and this is not anticipated to contribute to potential pollution impacts as described above.

7.7.65. The following IEFs may be affected by water pollution:

- Designated sites
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
 - Non-statutory designated sites (presence unconfirmed due to data gaps)
- Habitats of conservation importance

- CFGM HPI;
- Mudflats HPI;
- Lowland Fens HPI;
- Reedbed HPI, TVBAP;
- Eutrophic standing water HPI; Ponds, Lakes and Reservoirs TVBAP;
- Rivers HPI; Rivers and Streams TVBAP;
- OMHPDL HPI; Brownfields TVBAP;
- Wet woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
- Conservation Areas; and
- Trees.
- Protected and notable species
 - Badger;
 - Bats;
 - Breeding birds (SSSI/SPA/Ramsar);
 - Breeding birds (general);
 - Peregrine;
 - Wintering birds (SSSI/SPA/Ramsar);
 - Otter;
 - Water vole;
 - Reptiles;
 - GCN; and
 - Terrestrial invertebrates.

7.7.66. Embedded mitigation in relation to surface water run-off is detailed in **Chapter 9: Water Environment and Flood Risk (Volume 1)** and will be provided in further detail in the OCoCP at the ES stage. In summary, this will include a drainage strategy to be employed during construction to control run-off and minimise the risk of contamination to surrounding habitats. Embedded mitigation in relation to marine vessel movements is anticipated to be provided at the ES stage when further details on shipping movements are available.

Assessment of Likely Significant Effects

7.7.67. The sensitivity of the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar are considered to be **high** in all cases.

7.7.68. The sensitivity of non-statutory designated sites and all of the habitats of conservation importance are considered to be **medium**, other than trees, which are currently a precautionary IEF.

7.7.69. With regard to protected and notable species, the level of sensitivity is **high** for breeding and wintering birds associated with the Teesmouth and Cleveland Coast SSSI, SPA and

Ramsar; **low** for breeding birds (non-SSSI/SPA/Ramsar), peregrine, otter, and water vole. Badger, bats, reptiles, GCN, and terrestrial invertebrates are currently scoped in as precautionary IEFs.

- 7.7.70. With embedded mitigation in place, preventing run-off of pollutants during construction works, the magnitude of change is considered to be **negligible**. As such, all IEFs are anticipated to incur a **Negligible (Not Significant)** effect in relation to water pollution resulting from construction works.
- 7.7.71. Sufficient information on marine vessel movements during construction is not currently available. Potential significant effects in relation to pollution from marine vessels will be assessed in the ES when further baseline information is available.

Artificial Lighting

Overview

- 7.7.72. Lighting used during construction would be focused on works areas within the Site but light spill from these areas could affect species present within and adjacent to the Site, including species associated with the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. This may lead to temporary, frequent, medium-term disturbance throughout the construction period if and where night works are required and/or works are required during limited daylight hours in autumn and winter.
- 7.7.73. Protected and notable species may be disturbed from construction phase flood lighting, preventing them using certain areas or affecting their ability to forage, breed or undertake important ecological functions in their lifecycle.
- 7.7.74. The following IEFs are considered to have the potential to be affected by artificial lighting during construction:
- Badger;
 - Bats;
 - Breeding birds (SSSI/SPA/Ramsar);
 - Breeding birds (general);
 - Peregrine;
 - Wintering birds (SSSI/SPA/Ramsar);
 - Otter;
 - Water vole;
 - Reptiles;
 - GCN; and
 - Terrestrial invertebrates.
- 7.7.75. Embedded mitigation will be detailed in the OCoCP but, in summary, will include the sensitive use of artificial lighting to minimise spill onto retained habitats within and adjacent to the Site.

Assessment of Likely Significant Effects

- 7.7.76. The sensitivity level of breeding and wintering birds within the SSSI/SPA/Ramsar is considered to be **high**. The sensitivity level of breeding birds within the Site, peregrine, otter, and water vole is considered to be **low** in all cases. With embedded mitigation, the magnitude of change is precautionarily assessed to be **low**. This is due to the potential for some light spill to still be incurred where works may be required in close proximity to habitats of value for protected species. As such, this is considered to result in a **Moderate Adverse (Significant)** effect to breeding and wintering birds associated with the SSSI/SPA/Ramsar, and a **Minor Adverse (Not Significant)** effect to the general breeding birds assemblage, peregrine, otter, and water vole.
- 7.7.77. Further assessment is still required in relation to bats, reptiles, GCN, and terrestrial invertebrates to determine their level of importance and, therefore, sensitivity to artificial lighting during construction. The assessment will be presented in the ES once necessary baseline work has been completed.

Air Pollution

Overview

- 7.7.78. During construction, air quality may be affected by increased road traffic on the local road network (the ARN, as mentioned in **Table 7-1**) and increased vessel movements on the River Tees, which in turn would affect ambient pollutant levels. Road vehicle movements will take place throughout the Study Area, but are anticipated to be heaviest along Huntsman Drive, the A178 Seaton Carew Road, and the A1046 Haverton Hill Road. Terrestrial wildlife species are not directly sensitive to changes in air quality, but temporary, medium-term habitat degradation may be incurred within designated sites and to other habitats of conservation importance.
- 7.7.79. Modelling of road traffic emissions during construction has been undertaken and the details are presented in **Chapter 5: Air Quality (Volume 1)**. Modelling of marine vessel movements has not yet been undertaken and will be presented at the ES stage.
- 7.7.80. The following IEFs are located within or adjacent to areas of the Site expected to be affected by road traffic and marine vessel movements:
- Designated sites
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
 - Non-statutory designated sites (presence unconfirmed due to data gaps)
 - Habitats of conservation importance
 - OMHPDL HPI; Brownfields TVBAP;
 - CFGM HPI;
 - Mudflats HPI; Mudflats and Saltmarsh TVBAP;

- Lowland Fens HPI;
- Saline Lagoons HPI;
- Reedbeds HPI, TVBAP;
- Eutrophic standing waters HPI; Ponds, Lakes and Reservoirs TVBAP;
- Rivers HPI; Rivers and Streams TVBAP;
- Wet woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
- Conservation Areas; and
- Trees.

7.7.81. Predictions derived from dispersion modelling in several receptor locations has determined that the Teesmouth and Cleveland Coast SPA/SSSI is predicted to experience increases greater than 1% of the critical level for NO_x and 1% of the critical load for N deposition during the construction phase as a result of traffic emissions. Due to the overlap or proximity of the habitats of conservation importance listed above, it is considered that these could also be subject to significant effects.

7.7.82. As highlighted in **Section 5.8 of Chapter 5: Air Quality (Volume 1)**, there is a level of conservatism associated with in the modelling that has been undertaken. Further modelling is to be undertaken and the air quality assessment will be refined, the results of which will be presented in the ES. As such, the assessment below has been undertaken on a precautionary basis, but with additional modelling and further assessment, it is anticipated that significant effects can be avoided.

7.7.83. Embedded mitigation will be refined at the ES stage, but measures to reduce the impact of road traffic emissions will include imposing maximum speed limits for vehicles associated with the Proposed Scheme and behavioural measures such as switching off engines when stationary.

Assessment of Likely Significant Effects

7.7.84. As stated above, the effects of deposition of pollutants on designated sites and habitats of conservation could have temporary (medium term) impacts, with regular deposition into proportions of these designated sites and other habitats. The magnitude of change is assessed to be **medium** as there is considered to be the potential for partial loss or alteration of one or more key features of the sites and habitats to be affected.

Teesmouth and Cleveland Coast SSSI/SPA/Ramsar

7.7.85. The statutory designated sites are of **high** sensitivity, being of National and International importance. As stated above, the magnitude of change is considered to be **medium**. As such, a **Major to Moderate Adverse (Significant)** effect is predicted.

Non-statutory Designated Sites

7.7.86. The non-statutory designated sites are of **medium** sensitivity, being of Borough importance, and the magnitude of change is considered to be **medium**. As such, a **Moderate Adverse** effect is predicted. In this instance, due to gaps in the baseline information, this is precautionarily considered to be **Significant**.

HPI, TVBAP and Conservation Areas

7.7.87. The HPI, TVBAP habitats and Conservation Areas are all of **medium** sensitivity, being of Borough importance, and the magnitude of change is considered to be **medium**. As such, a **Moderate Adverse (Significant)** effect is predicted.

Trees

7.7.88. Notable trees and woodland are scoped in as a precautionary IEF due to gaps in baseline aboricultural information. An assessment of likely significant effects will be undertaken at the ES stage when additional baseline information will be available.

Table 7-16: Summary of Potential Likely Significant Effects During Construction

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
Habitat loss and fragmentation	Teesmouth and Cleveland Coast	High	High	Major Adverse (Significant)
	Teesmouth and Cleveland Coast SPA	High	High	Major Adverse (Significant)
	Teesmouth and Cleveland Coast Ramsar	High	High	Major Adverse (Significant)
	Non statutory designated sites (presence unconfirmed)	Medium	High	Major to Moderate Adverse (Significant)
	OMHPDL HPI; Brownfields TVBAP	Medium	Medium	Moderate Adverse (Significant)
	CFGM HPI	Medium	Low	Minor (Not Significant) to Moderate Adverse (Significant)
	Reedbeds HPI, TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Lowland Calcareous Grassland HPI	Medium	High	Major to Moderate Adverse (Significant)
	Mudflats and Saltmarsh TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Conservation Areas	Medium	Medium	Moderate Adverse (Significant)
	Trees	To be determined (TBD)	TBD	TBD
	Inland salt meadow Annex I habitat	High	Medium	Major to Moderate Adverse (Significant)
	Badger	TBD	TBD	TBD

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
	Bats	TBD	TBD	TBD
	Breeding birds (general)	Low	Medium	Minor (Not Significant) to Moderate Adverse (Significant)
	Wintering birds (general)	Low	High	Moderate Adverse (Significant)
	Reptiles	TBD	TBD	TBD
	GCN	TBD	TBD	TBD
	Terrestrial invertebrates	TBD	TBD	TBD
Noise and vibration	Badger	TBD	TBD	TBD
	Bats	TBD	TBD	TBD
	Breeding birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Breeding birds (other)	Low	TBD	TBD
	Peregrine	Low	TBD	TBD
	Wintering birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Otter	Low	TBD	TBD
	Water vole	Low	TBD	TBD
	Reptiles	TBD	TBD	TBD
	Terrestrial invertebrates	TBD	TBD	TBD
Visual disturbance	Bats	TBD	TBD	TBD
Water pollution (marine vessel movements)	Non statutory designated sites (presence unconfirmed)	Medium	TBD	TBD
	Conservation Areas	Medium	TBD	TBD
	Bats	TBD	TBD	TBD
	Wintering birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Otter	Low	TBD	TBD
	Trees	TBD	TBD	TBD
Artificial Lighting	Badger	TBD	TBD	TBD
	Bats	TBD	TBD	TBD

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
	Breeding birds (SSSI/SPA/Ramsar)	High	Low	Moderate Adverse (Significant)
	Wintering birds (SSSI/SPA/Ramsar)	High	Low	Moderate Adverse (Significant)
	Reptiles	TBD	TBD	TBD
	GCN	TBD	TBD	TBD
	Terrestrial invertebrates	TBD	TBD	TBD
Air pollution	Teesmouth and Cleveland Coast SPA	High	TBD	Major to Moderate Adverse (Significant)
	Teesmouth and Cleveland Coast Ramsar	High	TBD	Major to Moderate Adverse (Significant)
	Teesmouth and Cleveland Coast SSSI	High	TBD	Major to Moderate Adverse (Significant)
	Non-statutory designated sites (presence unconfirmed)	Medium	Medium	Moderate Adverse (Significant)
	OMHPDL HPI; Brownfields TVBAP	Medium	Medium	Moderate Adverse (Significant)
	CFGM HPI	Medium	Medium	Moderate Adverse (Significant)
	Mudflats HPI; Mudflats and Saltmarsh TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Lowland Fens HPI	Medium	Medium	Moderate Adverse (Significant)
	Saline Lagoons HPI	Medium	Medium	Moderate Adverse (Significant)
	Reedbeds HPI, TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Eutrophic Standing Water HPI; Ponds, Lakes and Reservoirs TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Rivers HPI; Rivers and Streams TVBAP	Medium	Medium	Moderate Adverse (Significant)

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
	Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Conservation Areas	Medium	Medium	Moderate Adverse (Significant)
	Trees	TBD	TBD	TBD

IEFS with No Likely Significant Effects

Overview

7.7.89. Based on potential impacts that are known or can be reasonably foreseen at this stage, the following IEFs are not anticipated to incur any significant effects during the construction phase.

Statutory Designated Sites

North York Moors SAC and SPA

7.7.90. Due to their distance from the Site (9.9km) and absence of hydrological connectivity, both direct impacts and indirect impacts to the North York Moors SAC and SPA are expected to be avoided during construction.

Teesmouth NNR

7.7.91. Teesmouth NNR is hydrologically connected to the Site via the River Tees. However, a drainage strategy will be in place during construction to control run-off of pollution and sediments. Furthermore, due to the distance of the NNR from the Site and dilution effects provided by the River Tees, if any contaminants enter the river, they are still expected to have a **negligible (Not Significant)** effect on the NNR. With regard to other potential impacts, due to the distance between the Site and the NNR, direct impacts will be avoided and indirect impacts such as noise, vibration, and visual and artificial lighting disturbance to species present are all expected to be **Negligible (Not Significant)**.

Cowpen Bewley Woodland Country Park LNR

7.7.92. Due to its distance from the Site (1.6km) and lack of hydrological connectivity, direct impacts and the majority of indirect impacts to Cowpen Bewley Woodland Country Park LNR are expected to be avoided during construction.

Non-statutory Designated Sites

7.7.93. Due to their distances from the Site (at least 720m) and lack of hydrological connectivity within the Stockton-on-Tees part of the Study Area, direct and indirect impacts to the following LWSs are expected to be avoided during construction:

- Teessaurus Park LWS;
- Berwick Hills and Ormesby Beck Complex LWS;
- Greatham Creek North Bank Saltmarsh LWS; and
- Greenabella Marsh LWS.

Habitats of Conservation Importance

Deciduous Woodland HPI

7.7.94. Based on the nature and scale of potential impacts from the Proposed Scheme, in combination with their distance from the Site, the areas of Deciduous Woodland HPI present in the Study Area are not expected to incur any significant effects.

OPERATION PHASE

7.7.95. The likely significant effects associated with the operation phase are discussed below and summarised in **Table 7-16**.

Noise and Vibration

Overview

- 7.7.96. Permanent noise and vibration are expected to be incurred during operation of the Proposed Scheme as a result of onsite operations, including ongoing usage of plant and equipment. However, details of the operational phase of the Proposed Scheme are still to be confirmed at the time of writing. In addition, noise and vibrational impacts may occur as a result of road and rail movements throughout the lifespan of the Proposed Scheme.
- 7.7.97. Preliminary noise modelling for fixed plant and equipment operating within the SAF Plant has been undertaken, with the results presented in **Chapter 6: Noise and Vibration (Volume 1)** and noise contours presented in **Figure 6-3 (Volume 3)**. Modelling for rail movements and for vibration in relation to SAF Plant operation are not available at the time of writing but will be presented in the ES.
- 7.7.98. Potential impacts on ecological receptors resulting from noise disturbance during operation have been informed by the use of noise monitoring in four locations within or adjacent to the Site (shown on **Figure 6-2 (Volume 3)**). In summary, these are located at:
- ENML1 – RSPB Dorman’s Pool;
 - ENML2 – RSPB Saltholme East Pool;
 - ENML3 – Maurice Nixon Land, off Port Clarence Road (adjacent to the River Tees); and
 - ENML4 – Industrial Chemicals Group Limited, off Hunstman Drive (adjacent to the River Tees).
- 7.7.99. Due to the sensitivity of the designated sites and potential for impacts, all four monitoring locations are within or adjacent to the Teesmouth and Cleveland Coast

SSSI/SPA/Ramsar. It should be noted that the noise modelling results are preliminary at this stage and will be refined as part of production of the ES.

7.7.100 The results of the noise modelling indicate significant changes (greater than 3dB) at three of the four monitoring locations: ENML1, ENML2 and ENML3 (see **Figure 6-2 (Volume 3)**).

7.7.101 The following IEFs are considered to be sensitive to noise and vibration during operation:

- Badger;
- Bats;
- Breeding birds (SSSI/SPA/Ramsar);
- Breeding birds (general);
- Peregrine;
- Wintering birds (SSSI/SPA/Ramsar);
- Otter;
- Water vole;
- Reptiles;
- GCN; and
- Terrestrial invertebrates.

7.7.102 Embedded mitigation will be reviewed and updated, where appropriate, as the design of the Proposed Scheme evolves during the ES stage, but is expected to include general elements such as good management of the SAF Plant Site to minimise the likelihood of incidents giving rise to significant noise and vibration. More detailed embedded mitigation will be provided in the Noise and Vibration ES chapter, and elements relevant to ecological receptors will be included in the Terrestrial Ecology ES chapter.

Assessment of Likely Significant Effects

7.7.103 The assessment provided below is in relation to the effects of noise disturbance from fixed plant and machinery associated with the SAF Plant only. Vibrational impacts from the SAF Plant and noise and vibrational impacts from rail movements during operation will be assessed in the ES when sufficient information is available. The full assessment (including noise impacts at operation) will also be refined at ES stage and included in the Terrestrial Ecology ES chapter when further baseline information is available in relation to the IEFs discussed below.

Breeding Birds

7.7.104 The susceptibility of birds to noise and vibrational disturbance depends on the intensity, frequency and duration of the source of disturbance and species of bird present. In general, infrequent, high-intensity activities tend to cause more disturbance than continuous low-intensity activities. With noise/vibration disturbance, birds have been found to quickly habituate to continual noises/vibrations, but large amplitude 'startling'

components may cause undue disturbance⁵⁸. The likelihood of this type of noise impact during operation is unpredictable, but may arise as a result of factors such as equipment being dropped from height and intermittent operation of flares. With embedded mitigation, it is anticipated that such incidents will be kept to a minimum during the lifespan of the operational phase.

- 7.7.105. Breeding bird species that are qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar are Little Tern and Avocet. There is no typically suitable breeding habitat for Little Tern present within the Study Area, but there are records of their presence within Dorman's Pool, adjacent to the SAF Plant Site. Suitable habitat is present to support Avocet, in the form of freshwater pools, and they are also known to be present in RSPB Saltholme. Suitable nesting habitat is also present within the Study Area for a wide range of non-qualifying bird species, in the form of areas of grassland, trees, scrub, and reedbed.
- 7.7.106. Birds have been found to accept a wide range of steady state noise levels from 55dBA to 85 dBA^{59, 60}. As shown on **Figure 6-3 (Volume 3)**, average noise levels ($L_{Aeq T}$) at all four monitoring locations would not be expected to exceed 60dB, and maximum baseline noise levels ($L_{AFmax T}$) recorded during the monitoring (see **Table 6-22 in Chapter 6: Noise and Vibration (Volume 1)**) exceeded 70 and 80dB. As such, average noise levels during operation are not expected to give rise to significant effects. However, in the absence of a full baseline and detailed mitigation, there is still considered to be the potential for infrequent, high-intensity noise disturbance during operation. Such events may lead to nest abandonment and failure of breeding. As such, on a precautionary basis, it is considered that significant effects may occur, but with some embedded mitigation in place to reduce the likelihood.
- 7.7.107. The sensitivity of the SSSI/SPA/Ramsar qualifying species is **high**, being of up to International importance, and the sensitivity of non-qualifying species is **low**, considered to be of importance at a Local level. The magnitude of change resulting from noise impacts is considered to be **low**. This is on the basis that good management of the SAF Plant Site during operation will minimise the likelihood of high-intensity events that result in high noise levels.
- 7.7.108. On this basis, qualifying species of the SSSI/SPA/Ramsar are predicted to incur a **Moderate Adverse (Significant)** effect, and non-qualifying species are predicted to incur a **Minor Adverse (Not Significant)** effect.

Wintering Birds

- 7.7.109. The susceptibility of birds to noise and vibrational disturbance is discussed above in relation to breeding birds. Although different species vary in their tolerance of disturbance, waterbirds, such as the qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar, are generally susceptible to disturbance and tend to preferentially select roosting or foraging sites where levels of disturbance are low. Larger bird species which form flocks in open habitats tend to be more vulnerable to disturbance than smaller species in more enclosed habitats.

- 7.7.110. The Waterbird Disturbance Mitigation Toolkit⁶¹ contains reviews of noise disturbance for a range of bird species, including several that are qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. These are Knot, Redshank, Shelduck (SSSI only), Sanderling (SSSI only), and Ringed Plover (SSSI only). Redshank, Knot and Shelduck are considered to be highly sensitive to noise disturbance, with noise levels of up to 70dB at the bird being considered acceptable for Redshank and Knot, and 72dB for Shelduck. Sanderling and Ringed Plover are considered to be of low sensitivity and will habituate to noise levels above 70dB.
- 7.7.111. Taken in isolation, disturbance from a single development may simply result in birds being displaced into alternative habitat further from the source of disturbance. In many cases this may have no discernible effect on the population of the species concerned. However, if birds are unable to compensate for lost feeding time, disturbance can affect their ability to maintain their energy reserves and may therefore affect individual's chances of surviving cold weather. Sustained disturbance can also affect numbers of birds using a site in the longer term⁶².
- 7.7.112. As mentioned above, average noise levels at all four monitoring locations would not be expected to exceed 60dB during operation and, therefore, not give rise to significant effects, but in the absence of a full baseline and detailed mitigation, there is still considered to be the potential for infrequent, high-intensity noise disturbance. If these events occur during the passage and/or overwintering periods, such events may lead to habitat abandonment, undue energy expenditure and lost feeding time. As such, on a precautionary basis, it is considered that significant effects may occur, but with some embedded mitigation in place to reduce the likelihood.
- 7.7.113. The sensitivity of wintering birds is **high**, being of National and International importance, and the magnitude of change resulting from noise impacts is considered to be **low**. This is again on the basis that good management of the SAF Plant Site during operation will minimise the likelihood of high-intensity events that result in high noise levels. As such, wintering birds are predicted to incur a **Moderate Adverse (Significant)** effect resulting from operational noise.

Peregrine

- 7.7.114. Peregrines vary in their tolerance to human disturbance. Generally, undisturbed habitats are preferred for breeding, but artificial structures in urbanised environments are also known to be used. The effects of noise and vibration on peregrines are still not well understood, but in general, this species is considered to be sensitive to disturbance, particularly during the breeding season⁶³.
- 7.7.115. As shown on **Figure 6-2 (Volume 3)**, average noise levels within the SAF Plant Site during operation are expected to range between 50dB and 80dB. The upper limits of these noise levels could cause significant disturbance to peregrine within the nesting season, resulting in failed breeding and affecting their long-term survival.

7.7.116. The sensitivity of Peregrine is **low**, assessed to be of Local importance, and the magnitude of change is considered to be **high**. This is on the basis that the highest levels of noise and vibration during operation will be emitted in close proximity to the existing nest site. As such, a **Moderate Adverse (Significant)** effect is anticipated.

Otter

7.7.117. Noise and vibrational disturbance to otter could affect breeding and foraging activities, potentially affecting the long-term survival of any local populations present.

7.7.118. The majority of suitable habitat for otter is located outside of the Site, and no evidence of otter has been recorded during surveys completed, although they are known to be present in the wider area.

7.7.119. The sensitivity level of otter is considered to be **low**, being assessed to be of Local importance, and the magnitude of change is also considered to be **low**. This is based on an absence any evidence of otter recorded in the Study Area to date, combined with good management practices employed during operation in relation to noise and vibration. This is anticipated to limit potential noise and vibrational impacts only to parts of the Study Area for which there is currently no baseline information, which could potentially be impacted by road and rail movements. Notwithstanding this, there is currently predicted to be a **Minor Adverse (Not Significant)** effect to otter as a result of operational noise and vibration.

Water Vole

7.7.120. As with otter, above, noise and vibrational disturbance to otter could affect breeding and foraging activities, potentially affecting the long-term survival of any local populations present.

7.7.121. The majority of suitable habitat for water vole is located outside of the Site, and no evidence of water vole has been recorded during surveys completed, although they are known to be present in the wider area.

7.7.122. The sensitivity level of otter is considered to be **low**, being assessed to be of Local importance, and the magnitude of change is also considered to be **low**. This is based on an absence any evidence of otter recorded in the Study Area to date, combined with good management practices employed during operation in relation to noise and vibration. In addition, water vole are known to be tolerant of noise disturbance⁶². This is anticipated to limit potential noise and vibrational impacts only to parts of the Study Area for which there is currently no baseline information, which could potentially be impacted by road and rail movements. Notwithstanding this, there is currently predicted to be a **Minor Adverse (Not Significant)** effect to water vole as a result of operational noise and vibration.

Other Species

7.7.123. No baseline information is currently available in relation to bats, reptiles, GCN, and terrestrial invertebrates, and further baseline information is required in relation to

badger, so an assessment of potential impacts cannot be made at this stage. This will be presented in the ES.

Visual Disturbance

Overview

- 7.7.124. Visual disturbance of IEFs may arise during operation as a result of the presence of tall buildings and structures within the SAF Plant Site (including operational flares), marine vessel movements along the River Tees, and the presence of site operatives and vehicles carrying out activities within the SAF Plant Site and associated facilities.
- 7.7.125. Effects are largely expected to be limited to the Site and immediate surrounding area. Habitats themselves are not sensitive to visual disturbance but the species of terrestrial wildlife present within them would be.
- 7.7.126. The following IEFs are considered to be sensitive to visual disturbance:
- Bats;
 - Breeding birds (SSSI/SPA/Ramsar);
 - Peregrine;
 - Wintering birds (SSSI/SPA/Ramsar);
 - Otter; and
 - Water vole.
- 7.7.127. Embedded mitigation will be refined at the ES stage when further information on the design of the Proposed Scheme is available and will be included in the Landscape and Visual and Terrestrial Ecology ES chapters. In principle, however, embedded mitigation relating to ecological receptors is expected to include an integrated landscape and ecological strategy. This will include planting and creation of habitats to provide a long-term visual screen between the Proposed Scheme and sensitive habitats, which offer a landscaping benefit as well as contributing to overall ecological enhancement and BNG requirements.

Assessment of Likely Significant Effects

- 7.7.128. Sufficient baseline information and operation details of the Proposed Scheme are not available at the time of writing. Therefore, it is not considered possible at this stage to make a detailed assessment of potential likely significant effects. This will be provided in the ES when further information is available.

Water Pollution

Overview

- 7.7.129. Water pollution impacts may be incurred during operation as a result of pollution events during day-to-day operations associated with the Proposed Scheme or water emissions from onsite processes, including discharge of nutrients (particularly nitrogen). Potential impacts would be anticipated within the Site and immediately adjacent habitats, as well

as any areas that are hydrologically connected, such as the River Tees. These would be expected to result in long-term or permanent degradation of the habitats themselves, reducing habitat suitability for the species that utilise them, including for breeding and foraging.

7.7.130. The following IEFs may be affected by water pollution during operation:

- Statutory designated sites
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
- Non-statutory designated sites (presence unconfirmed due to data gaps)
- Habitats of conservation importance
 - CFGM HPI;
 - Mudflats HPI;
 - Lowland Fens HPI;
 - Reedbed HPI, TVBAP;
 - Eutrophic standing water HPI; Ponds, Lakes and Reservoirs TVBAP;
 - Rivers HPI; Rivers and Streams TVBAP;
 - OMHPDL HPI; Brownfields TVBAP;
 - Wet woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
 - Conservation Areas; and
 - Trees.
- Protected and notable species
 - Bats;
 - Breeding birds (SSSI/SPA/Ramsar);
 - Breeding birds (general);
 - Peregrine;
 - Wintering birds (SSSI/SPA/Ramsar);
 - Otter;
 - Water vole;
 - Reptiles;
 - GCN; and
 - Terrestrial invertebrates.

7.7.131. Embedded design to control water pollution during the operation phase will include an appropriate drainage design (as with construction) to minimise the risk of surface water pollution, and environmental permitting to strictly regulate and treat water emissions during operation. Wastewater will be discharged to the Bran Sands WWTP and sewerage from welfare facilities will be tankered offsite. Embedded mitigation is

mentioned in more detail in **Chapter 9: Water Environment and Flood Risk (Volume 1)**.

- 7.7.132. In addition, a nutrient neutrality assessment is being undertaken as part of the EIA in order to determine potential impacts resulting from discharge of nutrients (particularly nitrogen) from the Proposed Scheme. The potential impacts of nutrient discharge into the Teesmouth and Cleveland Coast SPA and Ramsar are discussed further in **Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)**.

Assessment of Likely Significant Effects

- 7.7.133. The sensitivity of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar, and the breeding and wintering bird assemblages associated with these designations is considered to be **high** in all cases. The sensitivity of habitats of conservation importance is considered to be **medium** in all cases, and the sensitivity of the general breeding bird assemblage, peregrine, otter, and water vole is considered to be **low**. Further assessment is needed to determine the sensitivity of trees, bats, reptiles, GCN, and terrestrial invertebrates. Notwithstanding this, with embedded mitigation in place, the magnitude of change is expected to be **negligible**. Therefore, in the case of all receptors, this is expected to result in a **Negligible (Not Significant)** effect.

Dust Deposition

Overview

- 7.7.134. There is the potential for fugitive dust emissions during the operation phase of the Proposed Scheme from feedstock transfer and processing, slag storage, and rail terminal activities. Temporary, medium-to-long-term degradation of habitat, and the loss of that habitat's function to species it supports, would be the effect of deposition of dust released during the operation phase. Dust could cause an effect within the Study Area (the Site and up to 50m away) through smothering of vegetation, changed soil conditions, transmission of polluting substances and irritation of animal species.
- 7.7.135. The following IEFs have the potential to be affected by dust deposition during construction:
- Designated sites:
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
 - Local non-statutory sites (presence unconfirmed due to data gaps)
 - Habitats of conservation importance:
 - OMHPDL HPI; Brownfields TVBAP;
 - CFGM HPI;
 - Mudflats HPI;

- Lowland Fens HPI;
- Reedbeds HPI, TVBAP;
- Eutrophic Standing Waters HPI; Ponds, Lakes and Reservoirs TVBAP;
- Rivers HPI; Rivers and Streams TVBAP;
- Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
- Conservation Areas; and
- Trees
- Protected and notable species
 - Badger;
 - Breeding birds (SSSI/SPA/Ramsar);
 - Breeding birds (general);
 - Peregrine;
 - Wintering birds (SSSI/SPA/Ramsar);
 - Otter;
 - Water vole;
 - Reptiles;
 - GCN; and
 - Terrestrial invertebrates.

7.7.136. Embedded mitigation in relation to dust deposition is outlined in **Chapter 5: Air Quality (Volume 1)** and will include measures such as sealing of feedstock conveyors and processing areas, storing process feedstock in sealed silos or buildings, storage of process emissions in sealed silos, application of water sprays to dampen emissions, where necessary, and avoiding transfers during windy and/or dry weather. However, it is considered that there is still the potential for emissions from process waste sources.

Assessment of Likely Significant Effects

7.7.137. A detailed assessment of likely significant effects will be provided in the ES when detailed design information upon which to base the assessment.

Artificial Lighting

Overview

7.7.138. Lighting used during operation could spill onto adjacent habitats and affect species present within and adjacent to the Site, including species associated with the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. This may lead to temporary but frequent long-term disturbance throughout the operational lifespan of the Proposed Scheme, preventing species using certain areas or affecting their ability to forage, breed or undertake important ecological functions in their lifecycle.

7.7.139. The following IEFs are considered to have the potential to be affected by artificial lighting during operation:

- Badger;
- Bats;
- Breeding birds (SSSI/SPA/Ramsar);
- Breeding birds (general);
- Peregrine;
- Wintering birds (SSSI/SPA/Ramsar);
- Otter;
- Water vole;
- Reptiles;
- GCN; and
- Terrestrial invertebrates.

Assessment of Likely Significant Effects

7.7.140. An Outline Lighting Strategy for the operational phase of the Proposed Scheme is not currently available. This will be produced at the ES stage. As such, it is not currently considered possible to make an assessment of likely significant impacts to IEF. This will be undertaken in the ES when detailed information is available.

Air Pollution

Overview

- 7.7.141. During operation, air quality may be affected by increased road traffic on the ARN and increased marine vessel movements on the River Tees, which in turn would affect ambient pollutant levels. Road vehicle movements will take place throughout the Study Area but are anticipated to be heaviest along Huntsman Drive, the A178 Seaton Carew Road, and the A1046 Haverton Hill Road.
- 7.7.142. There is also a risk of evaporation of SAF and naphtha vapour during product transfer and transport of the final product by rail and marine vessel. Good practice mitigation will be embedded in the final design, which will be available at the ES.
- 7.7.143. As mentioned in **Section 7.1**, emissions from the SAF Plant during operation are not covered here. They are assessed in **Chapter 5: Air Quality (Volume 1)** and **Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)**.
- 7.7.144. The following IEFs are located within or adjacent to areas of the Site expected to be affected by road and rail traffic and marine vessel movements:
- Designated sites
 - Teesmouth and Cleveland Coast SPA;
 - Teesmouth and Cleveland Coast Ramsar;
 - Teesmouth and Cleveland Coast SSSI;
 - Local non-statutory designated sites (presence unconfirmed due to data gaps)

- Habitats of conservation importance
 - OMHPDL HPI; Brownfields TVBAP;
 - CFGM HPI;
 - Mudflats HPI; Mudflats and Saltmarsh TVBAP;
 - Lowland Fens HPI;
 - Saline Lagoons HPI;
 - Reedbeds HPI, TVBAP;
 - Eutrophic Standing Waters HPI; Ponds, Lakes and Reservoirs TVBAP;
 - Rivers HPI; Rivers and Streams TVBAP;
 - Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP;
 - Conservation Areas; and
 - Trees.

7.7.145. As with the construction phase, dispersion modelling has determined that the Teesmouth and Cleveland Coast SPA/SSSI is predicted to experience increases greater than 1% of the critical level for NO_x and 1% of the critical load for N deposition during the operation phase as a result of traffic emissions. Due to the overlap or proximity of the habitats of conservation importance listed above, it is considered that these could also be subject to significant effects. Further details are provided in **Section 5.8 of Chapter 5: Air Quality (Volume 1)**.

7.7.146. As also mentioned in relation to the construction phase, there is a level of conservatism associated with in the modelling that has been undertaken. Further modelling is to be undertaken and the air quality assessment will be refined, the results of which will be presented in the ES. As such, the assessment below has again been undertaken on a precautionary basis, but with additional modelling and further assessment, it is anticipated that significant effects can be avoided.

7.7.147. Embedded mitigation will include good practice measures to minimise the likelihood of evaporation of SAF/naphtha into the atmosphere. Details will be provided at the ES stage. More detailed mitigation measures will also be developed at the ES stage and will be included in the Air Quality and Terrestrial Ecology ES chapters.

Assessment of Likely Significant Effects

7.7.148. The effects of deposition of pollutants on designated sites and habitats of conservation importance could have long-term or permanent impacts, with regular deposition into proportions of these designated sites and other habitats over the lifespan of the Proposed Scheme (50 years). The magnitude of change is assessed to be **medium** as there is considered to be the potential for partial loss or alteration of one or more key features of the sites and habitats to be affected.

Teesmouth and Cleveland Coast SSSI/SPA/Ramsar

7.7.149. The statutory designated sites are of **high** sensitivity, being of National and International importance. As stated above, the magnitude of change is considered to be **medium**. As such, a **Major to Moderate Adverse (Significant)** effect is predicted.

Non-statutory Designated Sites

7.7.150. The non-statutory designated sites are of **medium** sensitivity, being of Borough importance, and the magnitude of change is considered to be **medium**. As such, a **Moderate Adverse** effect is predicted. In this instance, due to gaps in the baseline information, this is precautionarily considered to be **Significant**.

HPI, TVBAP and Conservation Areas

7.7.151. The HPI, TVBAP habitats and Conservation Areas are all of **medium** sensitivity, being of Borough importance, and the magnitude of change is considered to be **medium**. As such, a **Moderate Adverse (Significant)** effect is predicted.

Trees

7.7.152. Notable trees and woodland are scoped in as a precautionary IEF due to gaps in baseline aboricultural information. An assessment of likely significant effects will be undertaken at the ES stage when additional baseline information will be available.

Table 7-17: Summary of Potential Likely Significant Effects During Operation

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
Noise and vibration	Badger	TBD	TBD	TBD
	Bats	TBD	TBD	TBD
	Breeding birds (SSSI/SPA/Ramsar)	High	Low	Moderate Adverse (Significant)
	Peregrine	Low	High	Moderate Adverse (Significant)
	Wintering birds (SSSI/SPA/Ramsar)	High	Low	Moderate Adverse (Significant)
	Reptiles	TBD	TBD	TBD
	GCN	TBD	TBD	TBD
	Terrestrial invertebrates	TBD	TBD	TBD
Visual disturbance	Bats	TBD	TBD	TBD
	Breeding birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Peregrine	Low	TBD	TBD
	Wintering birds	High	TBD	TBD
	Otter	Low	TBD	TBD
	Water vole	Low	TBD	TBD
Dust deposition	Teesmouth and Cleveland Coast SPA	High	TBD	TBD
	Teesmouth and Cleveland Coast Ramsar	High	TBD	TBD
	Teesmouth and Cleveland Coast SSSI	High	TBD	TBD
	Non-statutory designated sites (presence unconfirmed)	Medium	TBD	TBD
	OMHPDL HPI; Brownfields TVBAP	Medium	TBD	TBD
	CFGM HPI	Medium	TBD	TBD
	Mudflats HPI	Medium	TBD	TBD
	Lowland Fens HPI	Medium	TBD	TBD
	Reedbeds HPI, TVBAP	Medium	TBD	TBD
	Eutrophic Standing Waters HPI; Ponds, Lakes and Reservoirs TVBAP	Medium	TBD	TBD
	Rivers HPI; Rivers and Streams TVBAP	Medium	TBD	TBD
	Wet Woodland HPI; Semi-natural Broadleaved Woodland TVBAP	Medium	TBD	TBD
	Conservation Areas	Medium	TBD	TBD
	Trees	TBD	TBD	TBD
	Badger	TBD	TBD	TBD
	Bats	TBD	TBD	TBD

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
	Breeding birds (SSS/SPA/Ramsar)	High	TBD	TBD
	Breeding birds (general)	Low	TBD	TBD
	Peregrine	Low	TBD	TBD
	Wintering birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Otter	Low	TBD	TBD
	Water vole	Low	TBD	TBD
	Reptiles	TBD	TBD	TBD
	GCN	TBD	TBD	TBD
	Terrestrial invertebrates	TBD	TBD	TBD
Artificial lighting	Badger	TBD	TBD	TBD
	Bats	TBD	TBD	TBD
	Breeding birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Breeding birds (other)	Low	TBD	TBD
	Peregrine	Low	TBD	TBD
	Wintering birds (SSSI/SPA/Ramsar)	High	TBD	TBD
	Otter	Low	TBD	TBD
	Water vole	Low	TBD	TBD
	Reptiles	TBD	TBD	TBD
	GCN	TBD	TBD	TBD
Terrestrial invertebrates	TBD	TBD	TBD	
Air pollution	Teesmouth and Cleveland Coast SPA	High	Medium	Major to Moderate Adverse (Significant)
	Teesmouth and Cleveland Coast Ramsar	High	Medium	Major to Moderate Adverse (Significant)
	Teesmouth and Cleveland Coast SSSI	High	Medium	Major to Moderate Adverse (Significant)
	Non-statutory designated sites (presence unconfirmed)	Medium	Medium	Moderate Adverse (Significant)
	OMHPDL HPI; Brownfields TVBAP	Medium	Medium	Moderate Adverse (Significant)
	CFGM HPI	Medium	Medium	Moderate Adverse (Significant)
	Mudflats HPI; Mudflats and Saltmarsh TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Lowland Fens HPI	Medium	Medium	Moderate Adverse (Significant)
	Saline Lagoons HPI	Medium	Medium	Moderate Adverse (Significant)
	Reedbeds HPI, TVBAP	Medium	Medium	Moderate Adverse (Significant)
Eutrophic Standing Water HPI; Ponds, Lakes and Reservoirs TVBAP	Medium	Medium	Moderate Adverse (Significant)	

Potential Impacts	Important Ecological Feature	Sensitivity	Magnitude of Change	Likely Significant Effect
	Rivers HPI; Rivers and Streams TVBAP	Medium	Medium	Moderate Adverse (Significant)
	Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP	Medium	Medium	Moderate adverse
	Conservation Areas	Medium	Medium	Moderate Adverse (Significant)
	Trees	TBD	TBD	TBD

IEFs with No Significant Effects

Overview

7.7.153. Based on potential impacts that are known or can be reasonably foreseen at this stage, the following IEFs are not anticipated to incur any significant effects during the operation phase.

Statutory Designated Sites

North York Moors SAC and SPA

7.7.154. Due to their distance from the Site (9.9km) and absence of hydrological connectivity, direct impacts and the majority of indirect impacts to the North York Moors SAC and SPA are expected to be avoided during operation. Potential air quality impacts may be incurred during operation. This is discussed in **Chapter 5: Air Quality (Volume 1)**.

Teessmouth NNR

7.7.155. Teessmouth NNR is hydrologically connected to the Site. However, a drainage strategy will be in place during construction to control run-off of pollution and sediments and wastewater treatment facilities for process effluent will form part of the design of the Proposed Scheme. As such, any potential impacts from water pollution are anticipated to have a **negligible (not significant)** effect on the NNR. With regard to other potential impacts, due to the distance between the Site and the NNR, direct impacts will be avoided and indirect impacts such as noise, vibration, and visual and artificial lighting disturbance to species present are all expected to be **negligible (not significant)**.

Non-statutory Designated Sites

7.7.156. Based on the nature and scale of potential impacts from the Proposed Scheme, in combination with the distance from the Site of LWSs noted to date, the following non-statutory designated sites are not expected to incur any significant effects during operation:

- Teessaurus Park LWS;
- Berwick Hills and Ormesby Beck Complex LWS;
- Greatham Creek North Bank Saltmarsh LWS; and

- Greenabella Marsh LWS.

Habitats of Conservation Importance

Deciduous Woodland HPI

7.7.157. Based on the nature and scale of potential impacts from the Proposed Scheme, in combination with their distance from the Site, the areas of Deciduous Woodland HPI present in the Study Area are not expected to incur any significant effects.

7.8. ADDITIONAL DESIGN, MITIGATION AND ENHANCEMENT MEASURES

OVERVIEW

- 7.8.1. This section considers any additional mitigation measures which are likely to be required to address significant effects during both the construction and operation phases, as assessed in **Section 7.7**. Whilst the assessment presented in this Chapter does not overlap with those presented in **Chapter 5: Air Quality (Volume 1)** and **Chapter 8: Freshwater and Marine Ecology (Volume 1)**, recommendations are provided in those chapters in relation to certain receptors discussed here, such as surrounding designated sites and the River Tees.
- 7.8.2. Mitigation measures described below are based upon the known ecological baseline, current Proposed Scheme information, and assumed potential impacts resulting from the Proposed Scheme at the time of writing (discussed above). Mitigation measures will be refined further throughout the project design process. This will be undertaken using the results of the continuing terrestrial ecology surveys, as well as further information being provided from environmental disciplines on which the terrestrial ecology assessment partly relies.

CONSTRUCTION PHASE

- 7.8.3. Mitigation during construction is likely to include the following measures:
- Design of the Proposed Scheme and associated construction activities to avoid the loss of areas of the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar that are located within the Site. Where areas of the SSSI, SPA and Ramsar overlap the Site Boundary within terrestrial habitats, these are relatively limited in extent (typically each less than 1ha) and are not located in areas that are essential for construction of the Proposed Scheme. Therefore, it is anticipated that measures can be put in place during construction to avoid any habitat loss. With regard to areas of the SSSI, SPA and Ramsar along the River Tees, these overlap the construction phase marine wharfs that are proposed to be used for delivery of construction components and plant (see **Chapter 2: Site and Proposed Scheme Description (Volume 1)**). However, no construction works are proposed that may result in any loss of areas of the designated sites. This is assessed in **Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)**.

- The results of further air quality modelling to be undertaken will determine mitigation measures to avoid/minimise effects to designated sites and other habitats.
- If required, applications will be made for protected species licensing in advance of construction works commencing. Bespoke methodologies will be prescribed within any licence application. Licencing will also prescribe requirements for compensation or features where applicable, such as bat boxes, to address the loss of any breeding/resting or sheltering feature;
- Where licencing is not required, precautionary working methods will be employed for works with the potential to impact upon protected and/or notable species. Precautionary working methods will be outlined, agreed and committed to as part of the OCoCP;
- If required, directional lighting will be used to reduce adverse impacts upon fauna, such as foraging and commuting bats. Lighting must be switched-off when not in use and, where possible, positioned so as not to spill on to adjacent habitats. The construction lighting design will be amended in response to provision of the full terrestrial ecology baseline in order to fully determine key areas to avoid;
- If required, exclusion zones will be demarcated and enforced around areas of invasive species to avoid spread or propagation. Biosecurity measures will be implemented during construction to prevent the spread of INNS. These measures will be detailed in a Biosecurity Method Statement or similar and will also be outlined in the OCoCP;
- Workers should be equipped with the necessary equipment, Personal Protective Equipment (PPE) and substances to implement biosecurity control measures, including effective hygiene and sanitation practices, if required. This will most frequently comprise disinfectant tablets, sprayers, and brushes to clean and disinfect equipment and PPE prior to entering/leaving construction areas;
- Modification of working practices, where necessary, in response to noise monitoring results in order to further minimise potential noise impacts to protected and notable species. Approaches to mitigation in relation to qualifying features of the Teesmouth and Cleveland Coast SSSI/SPA/Ramsar will be discussed further with Natural England, where considered appropriate; and
- Modification of working practices, where necessary, to minimise visual disturbance on protected and notable species.

7.8.4. In addition, compensation and enhancement measures (such as creation of new habitats) will be implemented during the construction phase. This will include bespoke creation of habitats to compensate for those lost during site clearance, as well as appropriate planting to offer habitat enhancement for a range of species. Compensation and enhancement measures will be implemented on the Site itself in the first instance, where feasible (including features such as living walls). In addition, offsite options will also be explored for compensation and enhancement offsite, if this is determined to be necessary. Any opportunities that are identified offsite will be implemented depending

upon agreement with relevant landowners. Details of these measures will be included in an Outline Landscape and Biodiversity Strategy (OLBS) to be produced.

OPERATION PHASE

- 7.8.5. Further details on the management of the retained and enhancement measures will be provided in the ES, BNG assessment, and OLBS to be produced. However, as an overview, mitigation measures during the operation phase are likely to include the following:
- As mentioned in **Section 7.6**, the SAF Plant will be designed in such a way as to minimise noise and visual effects on surrounding IEFs during operation, including the adjacent Teesmouth and Cleveland Coast SSSI/SPA/Ramsar. This will include consideration of the locations of noisy plant and equipment, and the siting of the Flare Area;
 - SAF Plant design and emissions controls to minimise air quality impacts on ecological receptors during operation are being explored as part of the air quality assessment. Further sensitivity testing on stack and flare heights will also be undertaken at the ES Stage to minimise impacts from the SAF Plant to achieve compliance. Further model analysis will also be undertaken to determine the actual location of peak concentrations in relation to the protected features within the designation, (**Chapter 5: Air Quality (Volume 1)**);
 - A Lighting Strategy will be produced once the finalised layout and design of the Proposed Scheme has been confirmed. Any operational lighting to be installed will be designed to avoid significant light spill onto IEFs, such as Teesmouth and Cleveland Coast SSSI/SPA/Ramsar; and
 - Appropriate management of habitats to be created in order to maximise their ecological value in the long term and meet necessary commitments in relation to BNG.
- 7.8.6. Detailed mitigation measures for the operation phase will be set out in the ES, when the design of the Proposed Scheme has progressed, and potential likely significant effects have been able to be assessed further. Measures for managing the habitat that has been retained and enhanced or created as part of the construction phase will also be included in the OLBS, which will be submitted as part of the DCO application.

7.9. MONITORING

- 7.9.1. As outlined in **Section 7.8**, the presence of an ECoW is likely to be required for various elements of the construction stage to carry out update surveys and direct works supervision in relation to certain species. The timing and frequency of ECoW presence will be dependent on the final works programme and to what extent works can be timed to avoid sensitive periods (or not), such as undertaking clearance works during bird nesting season.
- 7.9.2. Further to the above, similar involvement is likely to be required at the decommissioning stage. It is anticipated that detailed requirements will be confirmed closer to the time

when up-to-date survey data can be obtained and appropriate mitigation measures can be more accurately determined.

- 7.9.3. Mitigation licences may need to be obtained from Natural England in relation to certain species at any point during the works, depending on the outcome of ongoing and future surveys. Upon granting of any licences, ongoing monitoring may be required if considered necessary by Natural England, depending on the significance of any species populations to be affected. Exact requirements and timings of the monitoring will be determined by Natural England when processing the relevant licence application(s).
- 7.9.4. Monitoring of habitats created as compensation and retained enhancement measures are expected to be subject to 30-year management agreement, as per BNG measures.
- 7.9.5. Further details in relation to potential monitoring requirements will be provided in the ES when the terrestrial ecology assessment has progressed and specific monitoring requirements will be able to be more clearly determined. In addition, monitoring requirements specifically in relation to habitats created as compensation and enhancement measures will be detailed in the BNG assessment report, once the BNG assessment has been able to be undertaken.

7.10. RESIDUAL EFFECTS

- 7.10.1. Based on the baseline information currently available, it is not possible to assess potential residual effects in full. Further surveys and assessment in relation to terrestrial ecology are required beyond this PEIR stage in order to help determine any potential significant effects, and a comprehensive assessment of potential residual effects will be provided within the ES. However, an assessment of potential residual effects at the time of writing has been provided below. **Table 7-18**, below, summarises the residual effects associated with the Proposed Scheme.

Table 7-18: Summary of Residual Effects for Ecological Receptors

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
Construction Phase				
Habitat loss and fragmentation	Teesmouth and Cleveland Coast SSSI	Major Adverse (Significant)	Design Proposed Scheme to avoid habitat loss within designated sites	Negligible (Not Significant)
	Teesmouth and Cleveland Coast SPA	Major Adverse (Significant)	Design Proposed Scheme to avoid habitat loss within designated sites	Negligible (Not Significant)
	Teesmouth and Cleveland Coast Ramsar	Major Adverse (Significant)	Design Proposed Scheme to avoid habitat loss within designated sites	Negligible (Not Significant)
	Non-statutory designated sites (presence unconfirmed)	Major Adverse (Significant) to Moderate Adverse (Significant)	Design Proposed Scheme to avoid habitat loss within designated sites	Negligible (Not Significant)
	OMHPDL HPI; Brownfields TVBAP	Moderate Adverse (Significant)	Bespoke compensatory habitat creation, including to maintain existing habitat connectivity	Minor adverse (Not Significant)
	CFGM HPI	Minor Adverse (Not Significant) to Moderate Adverse (Significant)	Compensatory habitat creation and/or enhancement of habitats to be retained	Negligible (Not Significant)
	Reedbeds HPI, TVBAP	Moderate Adverse (Significant)	Compensatory habitat creation and/or enhancement of habitats to be retained, including to	Negligible (Not Significant)

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
			maintain existing habitat connectivity	
	Lowland Calcareous Grassland HPI	Major Adverse (Significant) to Moderate Adverse (Significant)	Bespoke compensatory habitat creation	Minor adverse (Not Significant)
	Mudflats and Saltmarsh TVBAP	Moderate Adverse (Significant)	Bespoke compensatory habitat creation, including to maintain existing habitat connectivity	Minor adverse (Not Significant)
	Inland salt meadow Annex I habitat	Major Adverse to Moderate (Significant) Adverse (Significant)	Bespoke compensatory habitat creation, including to maintain existing habitat connectivity	Minor adverse (Not Significant)
	Badger	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Avoidance of any active setts as far as feasible, or closure under licence; compensatory habitat creation and/or enhancement of habitats to be retained	An assessment of Residual Effects will be completed as part of the ES assessment
	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment	Compensatory habitat creation and/or enhancement of habitats to be retained	An assessment of Residual Effects will be completed as part of the ES assessment

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Breeding birds (general)	Minor Adverse (Not Significant) to Moderate Adverse (Significant)	Compensatory habitat creation and/or enhancement of habitats to be retained	Negligible (Not Significant)
	Wintering birds (general)	Moderate Adverse (Significant)	Compensatory habitat creation and/or enhancement of habitats to be retained	Minor adverse (Not Significant)
	Reptiles	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Compensatory habitat creation and/or enhancement of habitats to be retained	An assessment of Residual Effects will be completed as part of the ES assessment.
	GCN		Compensatory habitat creation and/or enhancement of habitats to be retained	
	Terrestrial invertebrates		Compensatory habitat creation and/or enhancement of habitats to be retained	
	Conservation Areas	Moderate Adverse (Significant)	Further arboricultural work to be undertaken at ES stage to fully determine potential impacts and any mitigation required	An assessment of Residual Effects will be completed as part of the ES assessment
	Trees	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Further arboricultural work to be undertaken at ES stage to fully determine potential impacts and any mitigation required	An assessment of Residual Effects will be completed as part of the ES assessment
	Badger			

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
Noise and vibration	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Mitigation to be determined in response to full terrestrial ecology baseline data and development of noise and vibration mitigation at ES stage.	An assessment of Residual Effects will be completed as part of the ES assessment. However, given the embedded mitigation to be included within the Proposed Scheme, plus more detailed mitigation measures to be determined upon review of further baseline information, it is anticipated that significant effects can be largely or entirely avoided.
	Breeding birds (SSSI/SPA/Ramsar)			
	Breeding birds (other)			
	Peregrine			
	Wintering birds (SSSI/SPA/Ramsar)			
	Otter			
	Water vole			
	Reptiles			
	GCN			
	Terrestrial invertebrates			
Visual disturbance	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Modifying working practices to minimise visual disturbance to species when active	An assessment of Residual Effects will be completed as part of the ES assessment.
Water pollution (marine vessel movements)	Bats	An assessment of Likely Significant Effects will be completed as part	Appropriate checking and maintenance of marine vessels before, during and after shipping movements	An assessment of Residual Effects will be completed as part of the ES assessment.
	Wintering birds (SSSI/SPA/Ramsar)			
	Wintering birds (general)			

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Otter	of the ES assessment.		
Artificial lighting	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Modifying lighting design and locations in response to further terrestrial ecology baseline data	An assessment of Residual Effects will be completed as part of the ES assessment.
	Breeding birds (SSSI/SPA/Ramsar)	Moderate Adverse (Significant)		Moderate adverse (Significant)
	Wintering birds (SSSI/SPA/Ramsar)	Moderate Adverse (Significant)		Moderate adverse (Significant)
	Reptiles	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		An assessment of Residual Effects will be completed as part of the ES assessment.
	GCN			
Terrestrial invertebrates				
Air pollution	Teesmouth and Cleveland Coast SPA	Major Adverse (Significant) to Moderate Adverse (Significant)	Mitigation to be determined in response to full terrestrial ecology baseline data and development of air quality mitigation at ES stage.	An assessment of Residual Effects will be completed as part of the ES assessment. Further modelling is to be undertaken and the air quality assessment refined, with detailed

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Teesmouth and Cleveland Coast Ramsar	Major Adverse (Significant) to Moderate Adverse (Significant)		mitigation measures provided. With the implementation of these mitigation measures, it is anticipated that significant effects can be largely or entirely avoided.
	Teesmouth and Cleveland Coast SSSI	Major Adverse (Significant) to Moderate Adverse (Significant)		
	Non-statutory designated sites (presence unconfirmed)	Moderate Adverse (Significant)		
	OMHPDL HPI; Brownfields TVBAP	Moderate Adverse (Significant)		
	CFGM HPI	Moderate Adverse (Significant)		
	Mudflats HPI; Mudflats and Saltmarsh TVBAP	Moderate Adverse (Significant)		
	Lowland Fens HPI	Moderate Adverse (Significant)		

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Saline Lagoons HPI	Moderate Adverse (Significant)		
	Reedbeds HPI, TVBAP	Moderate Adverse (Significant)		
	Eutrophic Standing Water HPI; Ponds, Lakes and Reservoirs TVBAP	Moderate Adverse (Significant)		
	Rivers HPI; Rivers and Streams TVBAP	Moderate Adverse (Significant)		
	Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP	Moderate Adverse (Significant)		
	Conservation Areas	Moderate Adverse (Significant)		
	Trees	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		
Operation Phase				

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
Noise and vibration	Badger	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Mitigation to be determined when full ecology baseline, noise monitoring results, and further design information are available.	An assessment of Residual Effects will be completed as part of the ES assessment.
	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		
	Breeding birds (SSSI/SPA/Ramsar)	Moderate Adverse (Significant)		
	Breeding birds (other)	Moderate Adverse (Significant)		
	Peregrine	Moderate Adverse (Significant)		
	Wintering birds (SSSI/SPA/Ramsar)	Moderate Adverse (Significant)		
	Reptiles	An assessment of Likely Significant		

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
		Effects will be completed as part of the ES assessment.		
	GCN	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		
	Terrestrial invertebrates	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		
Visual disturbance	Bats Breeding birds (SSSI/SPA/Ramsar) Breeding birds (other) Peregrine Wintering birds Otter Water vole	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Mitigation to be determined when full ecology baseline and further design information are available	An assessment of Residual Effects will be completed as part of the ES assessment.

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
Dust deposition	Teessmouth and Cleveland Coast SPA	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Mitigation to be determined following detailed assessment in relation to operational dust emissions at the ES stage.	An assessment of Residual Effects will be completed as part of the ES assessment.
	Teessmouth and Cleveland Coast Ramsar			
	Teessmouth and Cleveland Coast SSSI			
	OMHPDL HPI; Brownfields TVBAP			
	CFGM HPI			
	Mudflats HPI			
	Lowland Fens HPI			
	Saline Lagoons HPI			
	Reedbeds HPI, TVBAP			
	Eutrophic Standing Waters HPI; Ponds, Lakes and Reservoirs TVBAP			
	Rivers HPI; Rivers and Streams TVBAP			
Wet Woodland HPI; Semi-natural Broadleaved Woodland TVBAP				

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Bats			
	Breeding birds (SSS/SPA/Ramsar)			
	Breeding birds (general)			
	Peregrine			
	Wintering birds (SSSI/SPA/Ramsar)			
	Otter			
	Water vole			
	Reptiles			
	GCN			
	Terrestrial invertebrates			
Artificial lighting	Bats	An assessment of Likely Significant Effects will be completed as part of the ES assessment.	Full terrestrial ecology baseline and detailed lighting design to be completed at the ES stage.	An assessment of Residual Effects will be completed as part of the ES assessment.
	Breeding birds (SSSI/SPA/Ramsar)			
	Breeding birds (other)			
	Peregrine			
	Wintering birds (SSSI/SPA/Ramsar)			
	Otter			
	Water vole			

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Reptiles			
	GCN			
	Terrestrial invertebrates			
Air pollution	Teesmouth and Cleveland Coast SPA	Major Adverse (Significant) to Moderate Adverse (Significant)	Mitigation to be determined in response to full terrestrial ecology baseline data and further air quality data and assessment.	An assessment of Residual Effects will be completed as part of the ES assessment. Further modelling is to be undertaken and the air quality assessment refined, with detailed mitigation measures provided. With the implementation of these mitigation measures, it is anticipated that significant effects can be largely or entirely avoided.
	Teesmouth and Cleveland Coast Ramsar	Major Adverse (Significant) to Moderate Adverse (Significant)		
	Teesmouth and Cleveland Coast SSSI	Major Adverse (Significant) to Moderate Adverse (Significant)		
	OMHPDL HPI; Brownfields TVBAP	Moderate Adverse (Significant)		
	CFGM HPI	Moderate Adverse (Significant)		

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Mudflats HPI; Mudflats and Saltmarsh TVBAP	Moderate Adverse (Significant)		
	Lowland Fens HPI	Moderate Adverse (Significant)		
	Saline Lagoons HPI	Moderate Adverse (Significant)		
	Reedbeds HPI, TVBAP	Moderate Adverse (Significant)		
	Eutrophic Standing Water HPI; Ponds, Lakes and Reservoirs TVBAP	Moderate Adverse (Significant)		
	Rivers HPI; Rivers and Streams TVBAP	Moderate Adverse (Significant)		
	Wet Woodland HPI; Semi-natural Broadleaved Lowland Woodland TVBAP	Moderate Adverse (Significant)		
	Conservation Areas	Moderate Adverse (Significant)		

Lighthouse Green Fuels

Description of Effect	Important Ecological Feature	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation and Enhancement Measures	Residual Effect
	Trees	An assessment of Likely Significant Effects will be completed as part of the ES assessment.		

7.11. NEXT STEPS

- 7.11.1. Further survey work is required in 2024 (and possibly into 2025), and subsequent assessment of the findings in order to obtain a full and complete baseline with which to inform the EIA. Remaining surveys required are summarised in **Section 7.4** and **Section 7.5**.
- 7.11.2. The terrestrial ecology assessment will be further developed and refined in response to the collection and analysis of further baseline data, design refinement, and responses from statutory consultees. The collection of further baseline data will include the completion of surveys proposed in early to mid 2024. Due to the extension of the Site Boundary and associated Study Area, additional desk study data will also need to be obtained. The further development of the terrestrial ecology assessment will also the availability and review of a full baseline from noise monitoring in relation to ecological receptors.
- 7.11.3. A detailed impact assessment of potential impacts on terrestrial ecology during the construction and operation phases of the Proposed Scheme will be undertaken and included within the ES, with detailed mitigation, compensation and enhancement measures presented to address any significant impacts on specific species and/or habitats.
- 7.11.4. A BNG assessment will accompany the ES and detail changes in biodiversity units pre and post construction of the Proposed Scheme. This will utilise the BM4.0 and help to inform the Proposed Scheme's landscape masterplan. A review of the draft landscape masterplan will be undertaken, with recommendations for habitat enhancement provided where necessary in order to achieve an overall net gain in biodiversity post-development.
- 7.11.5. The development and refinement of the landscape masterplan via terrestrial ecology input will include a delineation of the operational area layout of the Proposed Scheme and an outline and plans for how onsite habitat compensation and enhancement will be incorporated around this. It will also include the development of offsite habitat creation proposals, if determined to be necessary following completion of the BNG assessment.
- 7.11.6. A HRA Appropriate Assessment (AA) will be prepared and accompany the ES as part of the DCO Application, detailing Likely Significant Effects upon internationally designated sites as a result of the Proposed Scheme. Where necessary, the assessment will include requirements for mitigation to ensure qualifying features of internationally designated sites are protected. The HRA screening assessment that will inform the AA is provided as **Appendix 7B: Information to Inform Habitat Regulations Assessment Screening (Volume 3)**.

7.12. LIMITATIONS AND ASSUMPTIONS

- 7.12.1. The assessment with this Chapter is based on information available at the time of writing. Information on the Study Area, as well as the design of the Proposed Scheme, is therefore subject to change.
- 7.12.2. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- Where access restrictions within the Study Area prevent a full ecological baseline assessment, a precautionary principle has been applied to the assessment (and has been to the scoping assessment, as described in the EIA Scoping Report²) of any important ecological features. The precautionary principle will assume a 'reasonable worst-case' scenario informed by professional experience and knowledge, desk-based information and field-based evidence (where available) for any feature/receptor unable to be accessed or fully surveyed. This approach will ensure that appropriate recommendations and/or mitigation are provided even though these may not later be required. Any recommendation/mitigation can thereafter be amended accordingly once access/survey has been possible.
 - A detailed scope for the assessment has been provided as far as feasible at this stage. However, the scope may be subject to change as a result of the ongoing assessment and/or any forthcoming details relating to the Proposed Scheme. This may require additional survey effort and/or assessments to be completed in order to accurately determine likely significant effects resulting from the Proposed Scheme.
 - The basis of assessment is still to be defined with regard to the former reclamation pond area of the SAF Plant Site. IEFs located within this area have been scoped into this PEIR (and to the adjacent PEA and HRA screening). However, this may be subject to change for the ES stage, depending on whether or not the extant planning permission is implemented and the habitats present are to be removed.
 - Every effort has been made to provide a comprehensive data set for the desk study. However, records held by local biological record centres and local recording groups are generally collected on a voluntary basis. Therefore, the absence of records does not necessarily demonstrate the absence of species; it may simply indicate a gap in recording coverage.
 - Ecological survey data is typically valid for 18 months to two years unless otherwise specified, for example if conditions are likely to change more quickly due to ecological processes or anticipated changes in management (CIEEM, 2019⁶⁴). Any delays to completion of the scope of surveys outlined above may therefore require update surveys to be completed to ensure that any findings presented as part of the EIA are valid.
 - As mentioned in **Section 7.1**, the scope included within this Chapter does not include an assessment of freshwater and marine ecology. This is assessed separately in **Chapter 8: Freshwater and Marine Ecology (Volume 1)**.
 - The scope of the assessment of air quality impacts in this Chapter is limited to dust deposition and emissions from traffic and shipping movements only, and

limited to within 50m of the Site. Potential deposition impacts on ecological receptors beyond this Study Area are addressed in **Chapter 5: Air Quality (Volume 1)**.

- Whilst there is overlap between the terrestrial ecology assessment and noise and vibration assessment, this Chapter only contains the assessment methodology, impact assessment and proposed mitigation in relation to ecological receptors. The noise monitoring methodology and results are presented in **Chapter 6: Noise and Vibration (Volume 1)**.
- The updates to the design of the Proposed Scheme since the EIA Scoping Stage (as mentioned in **Section 7.1**) have also resulted in a change in scope to the HRA screening assessment. Whilst elements of the assessment relevant to the HRA are included within this PEIR Chapter, full details of the screening assessment undertaken in relation to the latest Proposed Scheme design are provided in **Appendix 7B: Information to Inform Habitats Regulations Assessment Screening (Volume 3)**.

7.13. REFERENCES

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