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24. Cumulative and Combined Effects

24.1 Introduction

24.1.1 This chapter of the Environmental Statement (ES) provides an assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development. Cumulative and combined effects are defined as follows:

- **combined effects:** these are effects resulting from several different impacts from a single development, in this case the Proposed Development, that may collectively cause an effect /effects of greater significance, on any single environmental receptor. Individually the effects resulting from these impacts may not be significant but the accumulation of effects may collectively cause an overall significant effect; and
- **cumulative effects:** these occur when the environmental impacts and effects of the Proposed Development interact with those associated with other planned projects and developments located within a given geographical scope where environmental impacts could act together to result in a greater significance of effect on environmental receptors.

24.1.2 The assessment presented in this chapter draws on the assessment of impacts provided in ES Chapters 8 to 23 (ES Volume I, Document Ref. 6.2), and information in the public domain relating to other known developments within the Study Area, or Zone of Influence (ZoI).

24.1.3 The cumulative effects assessment does not consider other developments that are already constructed and operating, as such existing developments are already accounted for in the baseline conditions established for the main assessments within Chapters 8 to 23 (ES Volume I, Document Ref. 6.2).

24.1.4 This chapter is supported by Figure 24-1: Zones of Influence, Figure 24-2: Long List of Other Developments and Figure 24-3: Short List of Other Developments (ES Volume II, Document Ref. 6.3).

24.1.5 Furthermore, this chapter is accompanied by Appendix 24A: Planned Developments and Development Allocations within the search area, Appendix 24B: Assessment of Cumulative Effects – Stages 1-3 and Appendix 24C: Statement of Combined Effects (ES Volume III, Document Ref. 6.4).

24.2 Legislation and Planning Policy Context

24.2.1 Due to the potential for cumulative effects to occur as a result of the construction and operation (including maintenance) of the Proposed Development, a cumulative assessment has been undertaken as part of the Environmental Impact Assessment (EIA) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'), as amended (including as amended by the Environmental Assessments and Miscellaneous Planning (Amendment) (EU

Exit) Regulations 2018 (SI 2018/1232)), and the assessment requirements of the National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011).

24.2.2 The requirement for cumulative and combined effects assessments is stated in the EIA Regulations as detailed below:

- Schedule 4 Part 5 of the EIA Regulations requires: "*A description of the likely significant effects of the development on the environment resulting from, inter alia […] (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources". The EIA Regulations state that this description of likely significant effects "should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development*";
- Paragraph 4.1.3 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011) states that:

  "In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the Infrastructure Planning Commission [now the Planning Inspectorate] should take into account:

  - *its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and*
  - *its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts".*
- Paragraph 4.2.5 of NPS EN-1 goes on to state that when considering cumulative effects, "*the Environmental Statement (ES) should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence). The IPC may also have other evidence before it, for example from appraisals of sustainability of relevant NPSs or development plans, on such effects and potential interactions. […]*"; and
- Paragraph 4.2.6 of NPS EN-1 states that consideration should be given to "*how the accumulation of, and interrelationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.*"

24.3 Assessment Methodology

Assessment of Combined Effects

24.3.1 The assessment of combined effects considers whether an individual environmental receptor or resource would be affected by more than one type of impact as a result of the Proposed Development. For example, a single

receptor, such as a property or habitat, being subject to noise, air quality and visual impacts associated with the Proposed Development.

24.3.2 The Study Area for the assessment of combined effects is defined by the Study Areas used in each of the environmental topics set out in Chapters 8 to 23 of the ES (ES Volume I, Document Ref. 6.2).

24.3.3 The sources of data for the assessment of combined effects are the specialist environmental assessments presented within Chapters 8 to 23 of the ES (ES Volume I, Document Ref. 6.2).

24.3.4 The assessment methodology for combined effects involves the identification of environmental resources and receptors where there is potential for more than one impact to be experienced and therefore potential for interactions between these. This enables the identification of the overall combined environmental effects of the Proposed Development.

24.3.5 The following environmental resources and receptor groups have been identified and considered in relation to the potential for more than one type of impact to be experienced by a single receptor:

- human receptors (residents, local community using community facilities);
- ecological receptors;
- geology and soils;
- water bodies; and
- users and operators of local businesses and tourism amenities.

24.3.6 Geological strata, mineral resources and soils are not considered likely to be affected by impacts other than those identified within the assessment in Chapter 10: Geology, Hydrogeology and Contaminated Land, ES Volume I, Document Ref. 6.2) and are therefore not subject to combined effects.

24.3.7 The potential interactions between individual effects have been identified by reviewing the final conclusions of the assessments within the topics presented in Chapters 8 to 23 of the ES (ES Volume I, Document Ref. 6.2). Some of these chapters have already addressed interactions between different types of impact relating to specified environmental resources and receptors, as described below:

- Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) includes an assessment of the potential impacts of construction dust and nitrogen deposition upon ecological receptors. These have also been taken into account in the assessment of effects upon terrestrial ecology and nature conservation as reported in Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2).
- Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2) considers the potential impacts of air quality upon water quality, as well as the potential impacts of climate change upon flood risk.
- Chapter 10: Geology, Hydrogeology and Contaminated Land (ES Volume I, Document Ref. 6.2) considers the potential impacts of soils disturbance and mobilisation of contamination on ecological receptors.

- Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) takes into consideration the potential for air quality, dust and noise impacts and therefore how they could (in combination with other ecological impacts, such as habitat loss) affect ecological receptors.
- Chapter 13: Aquatic Ecology and Chapter 14: Marine Ecology (ES Volume I, Document Ref. 6.2) each include consideration of effects on the water environment and how they could in turn affect ecological receptors.
- Chapter 21: Climate Change (ES Volume I, Document Ref. 6.2) includes an In-Combination Climate Change Impact (ICCI) Assessment, which addresses the in-combination effects of a changing climate and the Proposed Development on receptors in the surrounding environment. Potential ICCIs have been assessed by technical disciplines and collated within Chapter 21.

24.3.8 The effects due to the interaction of different types of impact which form an inherent part of the technical assessments listed above are not included within this combined effects' assessment. The combined effects assessment considers only those effects which could arise as a result of multiple impacts on single receptors which have not been identified elsewhere within this ES.

24.3.9 Therefore, as potential combined effects on ecological resources, geology and soils and waterbodies are considered in the above chapters, this chapter considers the combined effects on human receptors only. The types of impacts that could be experienced by these receptors and which may interact are noise, air quality and visual effects, during both construction and operation.

24.3.10 The following effects have been considered for each topic:

- Air quality – effects on receptors identified as being sensitive with respect to construction dust (i.e. at more than negligible risk) and receptors experiencing a minor adverse or worse effect during operation;
- Noise and vibration – effects on receptors experiencing a minor adverse or worse effect during construction or operation; and
- Visual effects – effects on receptors experiencing a minor adverse or worse effect during construction, opening (start of operation), operation (15 years post-opening).

24.3.11 For definitions of these criteria please refer to: Chapter 8: Air Quality, (Section 8.3: Assessment Methodology); Chapter 11: Noise and Vibration, (Section 11.3: Assessment Methodology and Significance Criteria) and Chapter 17: Landscape and Visual Amenity (Section 17.3: Assessment Methodology and Significance Criteria) (ES Volume I, Document Ref. 6.2).

Assessment of Cumulative Effects

24.3.12 The assessment of cumulative effects considers the effects on environmental resources and receptors that will likely occur from the changes arising from the Proposed Development in conjunction with those associated with other planned developments.

24.3.13 A combination of professional judgement and established guidance has been used to confirm the scope of the cumulative effects assessment and to aid the identification and (where necessary) mitigation of likely significant effects.

24.3.14 The cumulative effects assessment has been primarily based upon guidance contained within the Planning Inspectorate's (PINS) 'Cumulative Effects Assessment – Advice Note seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects' (PINS, 2019a), which provides advice on the identification and assessment of other planned developments.

24.3.15 The four-stage approach in advice note seventeen (PINS, 2019a) was adopted for the assessment of cumulative effects:

- Stage 1: Establishing the long list of 'other existing development and/or approved development';
- Stage 2: Establishing a shortlist of 'other existing development and/or approved development';
- Stage 3: Information Gathering; and
- Stage 4: Assessment.

24.3.16 Further details of how the four-stage approach was implemented are provided below.

Stage 1: Establishing the Long List of Other Developments

24.3.17 The first stage of the assessment of cumulative effects was guided by the following principles:

- understanding the limits of the effects associated with the Proposed Development and those of other planned developments;
- the sensitivity, value or importance of environmental resources or receptors, and their susceptibility to effects;
- whether different types of effect will occur and interact in a way that alters their significance;
- whether effects will be temporary or permanent in duration, what their timescales will be, and whether such effects will be intermittent or constant; and
- the degree of certainty and confidence relating to the effects.

24.3.18 Given the scope and scale of the works associated with the Proposed Development, the Stage 1 activities focussed on establishing the Proposed Development's likely ZoIs associated with each of the environmental topic areas being assessed within the EIA.

24.3.19 Table 24-1 presents the ZoIs identified within each environmental topic. Each ZoI applied at Stage 1, as reported in the Preliminary Environmental Information (PEI) Report (AECOM, 2020) was indicative and was subject to further review as the individual assessments progressed. Table 24-1 presents the ZoIs used for the final cumulative assessment.

Table 24-1: Summary of Indicative Zones of Influence (ZoIs)

Environmental Topic	ZoIs Applied to the Assessment of Cumulative Effects	Change in ZoI since PEI Report
Air Quality	**Construction:** 350 m ZoI from the Site boundary and 500 m for site entrances. Construction impacts will be due to construction dust and emissions from construction activities, which may affect human receptors up to approximately 350 m from the construction activities and 50 m for ecological receptors. At site entrances the ZoI increases to 500 m for both human and ecological receptors due to greater 'track out' of dust e.g. on vehicle wheels. **Operation:**15 km from the proposed Power, Capture and Compression (PCC) Site for ecological receptors; 2 km from the PCC Site for human receptors. Operational impacts will be due to emissions from the PCC. **Traffic-related air quality:** 200 m from affected roads[1]. As the construction phase traffic data includes traffic associated with other developments, the air quality impacts assessment of traffic -related construction impacts reported in Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2), is inherently cumulative. There is therefore no separate assessment of cumulative air quality construction traffic-related impacts included in this ES.	Construction ZoI changed: previously a single ZoI for construction of 50 m from construction activities for effects relating to construction dust and emissions, with no distinction between human and ecological receptors.
Hydrology and Water Resources	**Construction and Operation:** 1 km ZoI from the Site boundary. Refer to Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2) for more information.	No change
Geology, Hydrogeology and Contaminated Land	**Construction and Operation**: 500 m ZoI from the Site boundary, for both construction and operational effects upon geology and soils. Refer to Chapter 10: Geology, Hydrogeology and Contaminated Land (ES Volume I, Document Ref. 6.2) for more information.	No change
Noise and Vibration	**Construction Vibration:** 50 m ZoI from the Site boundary. **Construction Noise:** 2 km ZoI from the PCC Site and 800 m from the proposed Site boundary where this extends beyond the 2 km ZoI from the PCC Site. **Operational Noise:** 2 km ZoI from the PCC Site. **Traffic-related noise:** 600 m ZoI from the traffic links identified within the Traffic and Transport assessment study area (Chapter 16: Traffic and Transportation (ES Volume I, Document Ref. 6.2)). As the construction phase traffic data includes traffic associated with other developments, the noise and vibration assessment of construction-related traffic noise reported within Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2), is inherently cumulative. Any effects due to operational vibration were scoped out of further assessment (refer to Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2), Section 11.3 – Assessment Methodology and Significance Criteria), therefore no assessment of cumulative operational vibration effects has been undertaken.	Construction ZoI now defined. No change for operational and traffic -related noise

[1] Affected roads are roads which are predicted by the traffic model to exceed threshold increases in traffic flows—as set by the Guidelines for the Environmental Assessment of Road Traffic (IEMA, 2003)—and where receptors have been identified that would be affected by the increases. Full details can be found in paragraphs 16.3.7 and 16.3.10 of Chapter 16: Traffic and Transport (ES Volume I).

Environmental Topic	ZoIs Applied to the Assessment of Cumulative Effects	Change in ZoI since PEI Report
	Refer to Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2) for more information.	
Terrestrial Ecology and Nature Conservation	**Construction and Operation:** 15 km ZoI from the PCC Site for international and national nature conservation designations. **Construction and Operation:** 2 km ZoI from the Site boundary for all other terrestrial ecology effects. Refer to Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) for more information.	No change
Aquatic Ecology and Nature Conservation	**Construction and Operation:** 15 km ZoI from the PCC Site for international and national nature conservation designations. **Construction and Operation:** 2 km ZoI from the Site boundary for all other aquatic ecology effects. Refer to Chapter 13: Aquatic Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) for more information.	ZoI for international and national nature conservation designation increased from 10 km to 15 km
Marine Ecology and Nature Conservation	**Construction and Operation:** 15 km ZoI from the PCC Site for air quality effects upon internationally and nationally designated nature conservation areas. **Construction and Operation:** 10 km ZoI from the Site boundary for all construction and operational effects on all designated marine ecology and nature conservation areas, except for effects related to air quality. Refer to Chapter 14: Marine Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) for more information.	No change
Ornithology	**Construction and Operation:** 15 km ZoI from the PCC Site for international and national nature conservation designations. **Construction and Operation:** 2 km ZoI from the Site boundary for all other ornithology effects. Refer to Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2) for more information.	New ZoIs: no ZoIs for Ornithology included in PEI Report
Landscape and Visual Amenity	**Construction and Operation:** 10 km from the PCC Site and 2 km from the Site boundary where that extends beyond 10 km from the PCC Site. Refer to Chapter 17: Landscape and Visual Amenity (ES Volume I, Document Ref. 6.2) for more information.	No change to ZoI from PCC. Description of ZoI from proposed Site boundary replaces previous wording: 2 km from the Natural Gas and Electrical Connection Corridors.
Archaeology and Cultural Heritage	**Construction and Operation** (designated assets): 5 km ZoI from the Site boundary.	No change

Environmental Topic	ZoIs Applied to the Assessment of Cumulative Effects	Change in ZoI since PEI Report
	Construction and Operation (non-designated assets): 1 km ZoI from the Site boundary. Refer to Chapter 18: Archaeology and Cultural Heritage (ES Volume I, Document Ref. 6.2) for more information.	
Marine Heritage	**Construction and Operation:** 1 km ZoI from the Site boundary (offshore only). Refer to Chapter 19: Marine Heritage (ES Volume I, Document Ref. 6.2) for more information.	No change
Climate Change	The greenhouse gas (GHG) ZoI includes all GHG emissions from within the Site boundary arising during all stages of the construction and operation of the Proposed Development. It also includes emissions arising from offsite activities which are directly related to the onsite activities, such as transport, and treatment of materials and waste disposal. Refer to Chapter 21: Climate Change (ES Volume I, Document Ref. 6.2) for more information.	No change

24.3.20 The Traffic and Transportation assessment (Chapter 16: Traffic and Transportation, ES Volume I, Document Ref. 6.2) assesses the impacts of construction traffic in the year of peak construction for the Proposed Development i.e. in 2024, for the road links listed below.

- A1085 Trunk Road (east of Site entrance);
- A1085 Trunk Road (west of Site entrance);
- A1042 Kirkleatham Lane;
- A1085 Trunk Road (south of British Steel Lackenby entrance);
- A1085 Broadway;
- A66 (west of A1053);
- A1053 Greystone Road;
- B1380 High Street;
- A174 (west of Greystones roundabout);
- A1046 Port Clarence Road to the Natural Gas Connection Corridor and CO_2 Gathering Network Corridor;
- A178 Seaton Carew Road to the Natural Gas Connection Corridor and CO_2 Gathering Network Corridor; and
- Unnamed Road serving Seal Sands to the Natural Gas Connection Corridor and CO_2 Gathering Network Corridor.

24.3.21 The 2024 baseline traffic against which the effects of construction traffic have been assessed includes any traffic that would be generated by committed 'other developments'. The assessment of construction traffic effects is therefore inherently cumulative. Further details are presented in Chapter 16: Traffic and Transportation of the (ES Volume I, Document Ref. 6.2).

Search Area for Long List of Other Developments

24.3.22 In accordance with PINS advice note seventeen (PINS, 2019a), the search area for the long list of developments was set at 15 km, consistent with the largest ZoI of the individual disciplines.

Local Authority and Major Infrastructure Developments included in Long List

24.3.23 For planned developments within the search area, the following search criteria were applied during Stage 1:

- Local authority planning applications that represent 'major developments', the definitions and thresholds for which are set out in The Town and Country Planning (Development Management Procedure) (England) Order 2015;
- Development Consent Order (DCO) applications for Nationally Significant Infrastructure Projects (NSIPs) in England, contained in the Register of Applications on the National Infrastructure Planning website (PINS, 2019b);
- any major development projects being progressed through other statutory procedures;

- allocations identified in the adopted and emerging development plans of the local planning authorities; and
- other relevant development plans and projects.

Initial Long List of Developments

24.3.24 An initial long list of other developments in the vicinity of the Proposed Development was identified following a search of the relevant planning databases (PINS, Middlesbrough Council (MC), Redcar and Cleveland Borough Council (RCBC), Hartlepool Borough Council (HBC) and Stockton-on-Tees Borough Council (STBC).

24.3.25 This initial search focused on developments within the 15 km search area which meet the criteria outlined above. The findings are presented in Appendix 24A: Planned Development and Development Allocations with the Search Area (ES Volume III, Document Ref. 6.4). This preliminary search, based on information available from local authority online planning portals, was subsequently extended as further work was undertaken during the EIA process, to capture other developments within the adopted areas of search, and to ensure the most up to date information was used to inform the EIA.

24.3.26 Based on a review of the initial long list of developments, it was considered that potential exists for some of these to generate cumulative impacts with the Proposed Development based on their location, scale and/or their likely construction and operational timescales.

24.3.27 During the completion of the ES, the long list of other developments continued to be updated with additional developments or information that emerged (up until a cut-off date of 1 month prior to final preparation of this assessment, i.e. March 2021).

24.3.28 Each development within the long list was reviewed to determine its status at the time of undertaking the assessment (March 2021) and was assigned a final status and tier, as described in Table 24-2), informed by the guidance and levels presented within Advice Note seventeen (PINS, 2019a). This was also informed by feedback from the relevant local authorities to establish the level of certainty and detail available for each development. The long list of planned developments and development allocations and the current tiers are presented in Table 24B-1 in Appendix 24B: Assessment of Cumulative Effects – Stages 1-3 (ES Volume III, Document Ref. 6.4).

Table 24-2: Assigning Certainty to 'Other Existing Development and/or Approved Development'

Tier 1	• under construction;	**Decreasing level of information likely to be available.** ↓
	• permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented; • submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.	
Tier 2	• projects in the Planning Inspectorate's Programme of Projects where a scoping report has been submitted.	
Tier 3	• projects in the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted;	
	• identified in the relevant development plan (and emerging Development Plans—with appropriate weight being given as they move closer to adoption) recognising that there will be limited information on the relevant proposals;	
	• identified in other plans and programmes (as appropriate) which set the framework for future developments consents/approvals, where such a development is likely to come forward.	

24.3.29 With regards to other developments under construction, the PINS guidance states that "Where other projects are expected to be fully constructed and in operation before construction of the (Proposed Development) and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. The ES should clearly distinguish between projects forming part of the dynamic baseline and those in the cumulative effects assessment". Where other developments would already be constructed and /or in operation and have been included in the baseline for the specialist topic assessments, they are not included in the cumulative assessments reported in this chapter.

24.3.30 The generation of the long list of developments was also informed by consultation with relevant stakeholders and in response to the EIA Scoping Report and the PEI Report (AECOM, 2020); further details are provided in Section 24.4, below.

Stage 2: Establishing a Shortlist of Other Developments

24.3.31 This stage involved a review of the long list of planned developments, to identify those to be taken forward (shortlisted) into the cumulative assessment.

24.3.32 In determining which of the developments should be shortlisted, a minimum level of information is necessary. Only those developments with at least a Scoping Report, Environmental Assessment Report (EAR) or ES available were considered for shortlisting. However, a few exceptions to this general principle were made where no Scoping Report, EAR or ES was available, but it was considered that there was potential for significant cumulative effects to occur based upon professional judgement, for example due to close proximity to the Proposed Development.

24.3.33 Land allocations on their own have not been considered as there is no certainty that developers will come forward with projects within the timescale

for the delivery of these sites and the nature for such projects and their associated environmental effects are currently unknown.

24.3.34 Developments that are already in existence i.e. those which are completed and operational, are considered to form part of the environmental baseline conditions within which the Proposed Development will be implemented. They have therefore been accounted for through establishment of the current baseline within each technical assessment presented in Chapters 8-23 of the ES (ES Volume I, Document Ref. 6.2) and were therefore not considered for shortlisting.

24.3.35 Similarly, where other developments are expected to be completed prior to Proposed Development construction, and where the effects of those projects are fully determined, these have also been considered within the environmental baseline adopted in the ES (ES Volume I, Document Ref. 6.2).

24.3.36 The shortlisting process was informed by interrogation of available development information, including information on environmental effects, engagement with relevant stakeholders (e.g. South Tees Development Corporation (STDC)) or their representatives and the professional judgement of the environmental specialists undertaking the EIA.

24.3.37 Where individual technical disciplines have scoped out assessment of developments included on the short list for the purposes of their cumulative assessment, the reasoning for this is set out in the relevant section below and topic ES Chapter.

Stage 3: Gathering Information

24.3.38 This stage involved reviewing the available information relating to the shortlisted developments to establish the details of their likely environmental effects.

24.3.39 This considered factors including: the ZoIs of the environmental topics assessed; the planned timescales for construction, operation and (where relevant) decommissioning; and details of their potential or likely significant effects.

Stage 4: Assessment

24.3.40 Those developments which met the criteria set out in the above stages were incorporated into the cumulative effects' assessment. This involved identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

24.3.41 As noted in Table 24-1, the assessment of traffic-related construction air quality and noise impacts reported in chapters 8 and 11 are based on traffic data which includes traffic from other committed developments and are therefore inherently cumulative.

Impact Assessment and Significance Criteria

24.3.42 The significance of potential combined effects has been determined in accordance with the classification criteria set out in Table 24-3, below. The significance of potential cumulative effects has been determined in

accordance with the criteria used within each of the individual topic assessments.

Table 24-3: Classification of Combined Effects

Effect Classification	Typical Descriptors of Effect
Very large (typically adverse only)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a very highly significant (beneficial or adverse, though typically adverse only) effect. Effects would be due to permanent impacts for receptors of very high value.
Large (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a highly significant (beneficial or adverse) effect. Effects would be due to impacts which would be, e.g.: • widespread/large scale for a receptor of high value[2]; • permanent for a receptor or receptors of high value; • localised for a receptor or receptors of very high value; or • temporary for a receptor or receptors of very high value.
Moderate (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a significant (beneficial or adverse) effect. Effects would be due to impacts which would be, e.g.: • permanent for a receptor or receptors of medium value; • localised for a receptor or receptors of high value; or • temporary for a receptor or receptors of high value.
Minor (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a beneficial or adverse effect. Effects would be due to impacts which would be e.g.: • permanent for receptors of low value; • localised for a receptor or receptors of medium value; or • temporary for a receptor or receptors of medium value.
Neutral/ Negligible (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a negligible and not significant (beneficial or adverse) effect.

24.3.43 The significance of combined effects upon environmental receptors and resources has been determined using professional judgement, assisted by the views and opinions of the competent experts responsible for undertaking the topic assessments.

24.3.44 In determining the possible significance of cumulative effects, the location and timing of the identified other developments and their associated impacts/ effects have been taken into account wherever possible.

24.3.45 Where information regarding construction and operational timescales was available, it is included in Table 24B-1 in Appendix 24B: Assessment of Cumulative Effects – Stages 1-3 (ES Volume III, Document Ref. 6.4). Where timescale information was not available, as a worst-case scenario, the assessments were conducted under the assumption that the construction

[2] Note that the term 'value' refers here to both intrinsic value and sensitivity.

and operational phases would overlap, though this is unlikely to be the case for all in reality.

24.3.46 The cumulative effects assessment only considers those receptors that would experience a residual effect associated with the Proposed Development. For receptors where the Proposed Development's residual effects are assessed to be neutral/ negligible, it is considered that such receptors could not experience cumulative effects. For the purposes of the assessment of cumulative effects during construction, a worst-case year of construction has been defined by the expected peak construction year for the Proposed Development, which would be 2024. For some topics the significance criteria may vary slightly to those given in Table 24-3 above. Full details of significance criteria are provided within the individual topic chapters.

24.3.47 The assessment of cumulative effects during operation considers the total effects of the Proposed Development and the other identified developments operating concurrently.

24.3.48 As the Proposed Development has an estimated design life of 25 years, cumulative effects during decommissioning are not considered as it is not possible to predict the developments which would be in progress at that point in time.

24.3.49 Combined and cumulative effects that are moderate, large or very large are considered significant effects in relation to the EIA Regulations.

24.4 Consultation

24.4.1 The list of other developments was also informed by comments received during consultation on the EIA Scoping Report and on the PEI Report (AECOM, 2020). Where further developments were identified through the consultation process, these were included within this assessment.

24.4.2 Table 24-4, below, provides a summary of consultation regarding cumulative and combined effects, and how this has been addressed by the Applicants.

Table 24-4: Consultation Summary (Responses to Scoping Report and PEI Report)

Consultee	Date	Summary	Addressed
Inspectorate (Scoping Opinion)	02.04.19	The Scoping Report does not explain the approach relating to the assessment of cumulative effects. The ES should consider the approach set out in the Inspectorate's Advice Note 17 with regards to the assessment of cumulative effects. The ES should identify other developments with the potential to impact on sensitive receptors (including, where appropriate, the offshore works of the Teesside Cluster Carbon Capture & Usage Project [now the Net Zero Teesside (NZT) project]) together with the Proposed Development. Any likely significant cumulative effects should be assessed. The Inspectorate also notes that RCBC is developing highways proposals in the vicinity although these have not yet been adopted as Council policy. The Inspectorate recommends to monitor the progress of these proposals and include them in the assessment of the cumulative effects, where significant effects are likely. The Scoping Report states that cumulative effects from other projects or activities located within a 'realistic geographical scope' would be considered. The ES should set out and justify what is the 'realistic geographical scope'. The Inspectorate advises that this is based on the zone of influence of potential impacts from the Proposed Development and the other activities or projects under consideration, as advocated in the Inspectorate's Advice Note Seventeen: Cumulative Effects Assessment.	The approach to the assessment of cumulative effects set out in PINS Advice Note Seventeen (PINS, 2019a) has been adopted, and the long list of other developments, including the offshore element of the Net Zero Teesside project and allocations from local planning authority plans, is provided in Appendix 24A: Planned Developments and Development Allocations within the search area (ES Volume III, Document Ref. 6.4). Consultation with RCBC has been ongoing and, where significant effects are considered likely, any emerging developments (such as the highways proposals) included in the final cumulative effects' assessment. The reasonable maximum geographical scope has been set at 15 km using the methodology advocated in Advice Note Seventeen (see Table 24-1).
Natural England (Scoping Opinion)	17.09.20	The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application. The assessment should refer to the relevant National Character Areas which can be found on the Natural England website. Links for Landscape Character Assessment at a local level are also available on the same page. A full consideration of the implications of the whole Proposed Development should be included in the ES. All supporting infrastructure should be included within the assessment. 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	As set out in Section 24.3: Assessment Methodology of this document, the cumulative effects assessment will consider cumulative and in combination effects with other relevant existing or proposed developments in the vicinity of the Site, including: proposals at Scoping stage, existing completed projects (in the future baseline scenarios), approved but uncompleted projects. Land allocations on their own have not been considered as there is no certainty that developers will come forward with projects within the timescale for the delivery of these sites, and the nature for such projects and their associated environmental effects are currently unknown. National

Consultee	Date	Summary	Addressed
		are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information): – existing completed projects; – approved but uncompleted projects; – ongoing activities; – plans or projects for which an application has been made and which are under consideration by the consenting authorities; and – plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.	Character Areas and Landscape character assessments will be considered in the landscape and visual impacts assessment and the cumulative effects assessment.
Public Health England (Scoping Opinion)	18.09.20	Identify cumulative and incremental impacts (i.e. assess cumulative impacts from multiple sources), including those arising from associated development, other existing and proposed development in the local area, and new vehicle movements associated with the proposed development; associated transport emissions should include: – consideration of non-road impacts (i.e. rail, sea, and air). Whilst screening of impacts using qualitative methodologies is common practice (e.g. for impacts arising from fugitive emissions such as dust), where it is possible to undertake a quantitative assessment of impacts then this should be undertaken.	As set out in Section 24.3: Assessment Methodology of this document, the cumulative effects assessment will consider cumulative and in combination effects with other relevant existing or proposed developments in the vicinity of the Site, including: proposals at scoping stage, existing completed projects (in the future baseline scenarios), approved but uncompleted projects and allocations in local plans. The Proposed Development would not give rise to any emissions related to non-road transport. Quantitative assessments have been used to assess fugitive emissions where it is appropriate to do so.
Environment Agency (EA) (Stage 2 Consultation)	30.09.20	The EIA in-combination impact assessment must include Tees REP at Tees Dock. The Tees Renewable Energy Plant is not currently operational and therefore not contributing to background levels. Consideration must also be given to the two new RDF plants (the Redcar Energy Centre at South Gare and the “under construction” Port Clarence RDF Plant).	MGT Teesside Ltd’s Tees REP (ID 68), the Redcar Energy Centre (ID 77) and Port Clarence RDF Plant (ID 78) are included in the shortlist of developments, assessed at Stage 4 and listed at Table 24-5.

Consultee	Date	Summary	Addressed
Marine Management Organisation (MMO) (Stage 2 Consultation)	10.08.20	The MMO consider that potential cumulative impacts from current projects within the vicinity of the proposed scheme have been adequately addressed (Table 24-4). However, it is noted that the Northern Gateway Container Terminal has not been included in this table (i.e. Table 24-4 of the PEI Report).	The Northern Gateway Container Terminal (ID 79) is included in the shortlist of developments, assessed at Stage 4 and listed at Table 24-5.
South Tees Development Corporation (STDC) (Stage 2 Consultation)	17.09.20	We note that Teesworks (STDC) masterplan is included in the long list of sites to be considered cumulatively and that this list is to be reviewed to determine its status at the time of undertaking the ES. Teesworks would be pleased to assist OGCI to ensure that the assessment is comprehensive and accounts for all relevant projects including those planned in the Teesworks area that are the subject of planning applications or planning permissions.	Teesworks (STDC) have supplied information for all relevant projects including those planned in the Teesworks area that are the subject of planning applications or planning permissions. This includes development IDs 66, 73 and 83-87, which are included in the shortlist of developments, assessed at Stage 4.

24.5 Cumulative Effects Assessment

24.5.1 The developments included in the shortlist and progressed to Stages 3 and 4 of the cumulative effects' assessment are listed in Table 24-5 below. Table 24B-1 in Appendix 24B: Assessment of Cumulative Effects – Stages 1-3 (ES Volume III, Document Ref. 6.4), which is based on Appendix 1 of PINS Advice Note seventeen (PINS 2019a), provides a record of the outcomes of the Stage 1, 2 and 3 processes and thereby provides the basis whereby the final shortlist of developments to be assessed was established.

24.5.2 ID1 in Table 24-5 below refers to the off-shore transport and storage infrastructure for captured CO_2 which will be directed and injected into the Endurance saline aquifer beneath the North Sea. These off-shore works, together with the on-shore works which constitute the Proposed Development, comprise the Net Zero Teesside (NZT) Project ('the Project'). Whilst the off-shore works will be the subject of a separate consent and the environmental effects will be assessed within a separate Environmental Statement, it is recognised that the combined environmental effects of the Project as a whole need to be considered. Consideration has therefore been given to the potential for shared receptors to be affected by the on-shore and off-shore works associated with the Project. Full details are provided within Appendix 24C: Statement of Combined Effects (ES Volume III, Document Ref. 6.4) which considers all potential effects for both schemes as identified at the time of submission of this ES. For the purposes of the cumulative effects assessment reported below, only those receptors that would experience a residual effect associated with the Proposed Development are considered. For receptors where the Proposed Development's residual effects are assessed to be neutral/ negligible, it is considered that such receptors would not experience cumulative effects.

Table 24-5: Refined Short List of Projects Assessed at Stage 4 of Cumulative Effects Assessment

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
1	N/A – application not yet submitted	NZT: Offshore elements to be consented by Marine Licence including CO_2 Export Pipeline below MHWS and geological store and associated facilities. **Note: not shown on Figure 24-2, as planning application boundary is not yet known.**	Adjacent	NA (within Site boundary)	Not yet submitted	Y – construction programme to be confirmed, however may overlap with the Proposed Development	Y	Surface Water, Flood Risk and Water Resources; Marine Ecology; Socio-economics and tourism – shipping and navigation. **See Appendix 24C: Statement of Combined Effects (ES Volume III, Document Ref. 6.4).**
2	TR030002 (PINS)	York Potash Limited - The installation of wharf/jetty facilities with two ship loaders capable of loading bulk dry material at a rate of 12m tons per annum (dry weight). Associated dredging operations to create berth. Associated storage building with conveyor to wharf/jetty. Including a materials handling facility (if not located at Wilton) served by a pipeline (the subject of a separate application) and conveyor to storage building and jetty. **Note: associated with IDs 27 and 71 below (shortlisted developments), and IDs 26 and 70 included in the long list of developments – see Appendices 24A and 24B for reasoning behind exclusion from shortlist.**	Adjacent	NA (within Site boundary)	Approved	Y – overlap in construction periods (construction underway; all works scheduled for completion by 2024)	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Landscape & Visual Impact; Marine Ecology

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
3	EN010082 (PINS)	Sembcorp Utilities (UK) Limited - Tees CCP, a gas fired combined cycle gas turbine (CCGT) power station with a maximum generating capacity of up to 1,700 MWe (assuming carbon capture and storage requirements are met). The project will utilise existing Gas and National Grid connections.	3.9	1.8	Approved	Y – overlap in construction periods (construction period of 2019-2022, with a potential of further construction works until 2030)	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Air Quality; Terrestrial Ecology; Landscape & Visual Impact
4	EN010051 (PINS)	Forewind Ltd. (formerly Dogger Bank Teesside B) - Project previously known as Dogger Bank Teesside A&B. Dogger Bank Teesside A & B is the second stage of Forewind's offshore wind energy development of the Dogger Bank Zone (Zone 3, Round 3). Dogger Bank Teesside A & B will comprise up to two wind farms, each with an installed capacity of up to 1.2GW, which are expected to connect to the National Grid at the existing National Grid substation at Lackenby, near Eston. It follows that Dogger Bank Teesside A & B could have a total installed capacity of up to 2.4GW. Dogger Bank Teesside A & B is located within The Dogger Bank Zone which comprises an area of 8660 square kilometres (km^2) located in the North Sea between 125 kilometres (km) and 290km off the UK North East coast. **Linked to ID 31, below.**	4.1	2.5	Approved	Y - overlap in construction periods	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Marine Ecology

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
13	R/2016/0484 /FFM	CBRE - proposed anaerobic biogas production facility and combined heat and power plant, former Croda Site Wilton International Redcar.	2.5	1.2	Approved	Unknown	N – No Scoping Report, EAR or ES Submitted	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Landscape & Visual Impact
16	R/2019/0767 /OOM	Director of regeneration & neighbourhoods, Hartlepool - outline application for the construction of an energy recovery facility (ERF) and associated development, Grangetown Prairie Land east of John Boyle Road and west of Tees Dock Road, Grangetown.	3.9	1.2	Approved	Y – overlap in construction periods (construction to begin 2022, with a start-date for the facility of 2025).	Y	Surface Water, Flood Risk and Water Resources; Air Quality; Terrestrial Ecology; Landscape & Visual Impact
17	R/2016/0663 /OOM	Homes and Communities Agency (HCA) - outline planning application for up to 550 residential units with associated access, landscaping and open space, land north of Kirkleatham Business Park and west of Kirkleatham Lane, Redcar. **Note that ID 6, included in the long list of developments, is a subsequent reserved matters application associated with this application. This application is also linked to ID 51 – a Local Plan allocation.**	2.8	1.3	Approved	Unknown	N – No Scoping Report, EAR or ES Submitted	Surface Water, Flood Risk and Water Resources; Aquatic Ecology; Landscape
27	R/2017/0906 /OOM	Sirius Minerals Plc - outline planning application for an overhead conveyor and associated storage facilities in connection with the York potash project, land between	Adjacent to it	NA (within Site boundary)	Approved	Unknown	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Landscape &

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
		Wilton International and Bran Sands, Redcar. **Note: this is associated with the York Potash project i.e. IDs 2 and 71 (shortlisted developments), and IDs 26 and 70 included in the long list of developments – refer to Appendices 24A and 24B for reasoning behind exclusion from shortlist).**						Visual Impact; Aquatic Ecology
31	R/2015/0678 /OOM	Forewind - outline application (all matters reserved) for installation of two underground sections of high voltage electrical cables and fibre-optic cable associated with Dogger bank Teesside A & B offshore wind farms, land at Wilton International, Redcar. **Note: this is split into two parts and is labelled as ID 31 Area 1 and ID 31 Area 2 on Figure 24-2 (ES Volume II, Document Ref. 6.3).** **Linked to ID 4.**	0.1	2.6	Approved	Unknown (works to be commenced on or before 25th August 2022; construction is expected to take 12 weeks)	Y	Surface Water, Flood Risk and Water Resources; Aquatic Ecology; Landscape
36	H/2019/0275	Graythorp Energy Ltd - energy recovery (energy from waste) facility and associated infrastructure, land to the south of Tofts Road, West Graythorp, Hartlepool.	5.4	3.4	Approved 10/07/2020	Y – overlap in construction (facility scheduled to open in early 2024)	Y	Landscape & Visual Impact
51	Redcar and Cleveland Local Plan	Redcar and Cleveland Local Plan (2018) Allocation - up to 550 houses. **Note: associated with ID 17 (outline planning**	2.8	1.3	Adopted (Local Plan)	Unknown (to be delivered within the	N/A – development is	Surface Water, Flood Risk and Water

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
	(2018) Allocation H3.15 West of Kirkleatham Lane	**application), above, and ID 6 included in the long list (reserved matters application).**				plan period (i.e. up to 2032)).	a Local Plan Allocation	Resources; Aquatic Ecology; Landscape
66	R/2019/0427 /FFM	STDC - Full planning application: Demolition of structures and engineering operations associated with ground preparation and temporary storage of soils and its final use in the remediation and preparation of land for regeneration and development **Note: IDs 90 and 91, included in the long list of developments, are related to this application – ID 90 is a subsequent Section 73 application for a minor material amendment to Permission Ref: R/2019/0427/FFM (ID 66). ID 91 is an application for minor material amendment to Permission Ref: R/2021/0057/VC (ID 90).**	Adjacent to it	NA (within Site boundary)	Approved	Unknown	N – No Scoping Report, EAR or ES Submitted	Surface Water, Flood Risk and Water Resources; Terrestrial Ecology; Landscape & Visual Impact
68	R/2008/0671 /EA	MGT Teesside Ltd - Full planning application: Proposed construction of a 300 Mw biomass fired renewable energy power station on land adjacent to the main southern dock at Teesside on the south bank of the River Tees.	2.8	1.1	Approved	Y – operational only (plant scheduled to become operational in February 2021)	Y	Surface Water, Flood Risk and Water Resources; Air Quality; Terrestrial Ecology; Landscape & Visual Impact

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
71	R/2014/0627 /FFM	York Potash Ltd - Full planning application: The winning and working of polyhalite by underground methods including the construction of a minehead at doves nest farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between doves nest farm and land at Wilton that links to the mine below, comprising 1 shaft at doves nest farm, 3 intermediate access shaft sites, each with associated landforming of associated spoil, construction of buildings, access roads and car parking, landscaping, restoration and aftercare, the construction of a tunnel portal at Wilton comprising buildings, land-forming of spoil and associated works. **Note: this application is associated with the York Potash project i.e. IDs 2 and 27 above (shortlisted developments), and IDs 26 and 70 included in the long list of developments – refer to Appendices 24A and 24B (ES Volume III, Document Ref 6.4) for reasoning behind exclusion from shortlist).**	1.7	0.4	Approved	Y – overlap in construction periods	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Aquatic Ecology; Landscape

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
73	R/2020/0357 /OOM	STDC - Outline planning application for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access	3.1	Adjacent	Approved 03/12/2020	Y – overlap in construction periods (works to begin in early 2021. “It is assumed that the site will deliver a proportion of the employment units and their associated infrastructure over a period of 5 to 8 years…with first occupation in 2023”).	Y	Surface Water, Flood Risk and Water Resources; Terrestrial Ecology; Landscape
77	R/2020/0411 /FFM	Redcar Holdings Ltd - Full planning application: Construction of the Redcar Energy Centre (REC) consisting of a material recovery facility incorporating a bulk storage facility; an energy recovery facility; and an incinerator bottom ash recycling facility along with ancillary infrastructure and landscaping	0.8	Adjacent	Approved	Y – overlap in construction periods (construction scheduled for 2021-2024)	Y	Surface Water, Flood Risk and Water Resources; Noise & Vibration; Air Quality; Terrestrial Ecology; Landscape & Visual Impact
78	14/1106/EIS	Port Clarence Energy Ltd - Full planning application: Proposed 45MWe renewable energy plant: Land At Grid Reference 450674 521428 Port Clarence Road Port Clarence	6.5	1.5	Approved	Y – potential overlap in construction periods (construction began in 2015,	N – No Scoping Report, EAR or ES Submitted	Surface Water, Flood Risk and Water Resources; Landscape

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
						with operations mothballed at present. It is presumed that construction could resume at any time).		
79	N/A – application not yet submitted	P D Teesport - Northern Gateway Container Terminal, Teesport. **Note: linked to (supersedes) ID 69 (outline planning application) included in the long list.**	1.2	0.6	Not yet submitted	Unknown	Unknown (not yet submitted)	Landscape & Visual Impact; Marine Ecology
83	Unknown	STDC - Outline planning application for development of up to 139,353 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourse including realignment and associated infrastructure works. All matters reserved.	3.1	0.3	Unknown	Y – overlap in construction periods (ID 83 construction period: 2021-2032).	Y	Surface Water, Flood Risk and Water Resources; Noise and Vibration; Landscape
84	Unknown	STDC - Outline planning application for development of up to 92,903sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	2.7	Adjacent	Unknown	Y – operational only. No overlap in construction periods (construction to commence in 2028).	Y	Surface Water, Flood Risk and Water Resources; Aquatic Ecology; Noise and Vibration; Landscape
85	Unknown	STDC - Outline planning application for development of up to 464,515qm (gross) of	Adjacent to it	NA (within Site boundary)	Unknown	Y – overlap in construction	Y	Surface Water, Flood Risk and Water

ID	Application Reference	Applicant and brief description of development	Approx. distance to PCC Site (km)	Approx. distance to Site boundary if not within it (km)	Status at time of assessment	Development timescale/ overlap in temporal scope	Environmental info. available to inform assessment? (Y/N)	Relevant environmental topics
		general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.				periods (ID 85 construction period: 2021-2033).		Resources; Landscape & Visual Impact; Noise and Vibration.
86	Unknown	STDC - Outline planning application for the development of up to 185,806 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourses including realignment and associated infrastructure works. All matters reserved.	Adjacent to it	NA (within Site boundary)	Unknown	Y – overlap in construction periods (ID 86 construction period: 2021-2033).	Y	Surface Water, Flood Risk and Water Resources; Landscape & Visual Impact; Aquatic Ecology; Noise and Vibration.
87	Unknown	STDC - Outline planning application for the development of up to 15,794sqm (gross) of office accommodation (Use Class E) and car parking and associated infrastructure works. All matters reserved.	0.5	Adjacent/ overlap with Site boundary	Unknown	Y – overlap in construction periods (ID 87 construction period: 2026-2031).	Y	Surface Water, Flood Risk and Water Resources; Landscape & Visual Impact; Aquatic Ecology; Noise and Vibration

24.5.3 All of the developments identified in Table 24-5 above are considered to have the potential to generate significant cumulative effects when considered alongside the Proposed Development, by virtue of their nature, proximity to the Site and/or temporal scope (i.e. the planned timescales for construction and operation). They have therefore been progressed to Stage 4 of the cumulative effects assessment and have been assessed in relation to each environmental topic included in the ES (ES Volume I, Document Ref. 6.2), with the exceptions of Geology, Hydrogeology and Contaminated Land, Major Accidents and Natural Disasters and Population and Human Health. The locations of the shortlisted developments in relation to the Proposed Development are shown on Figure 24-3 (ES Volume II, Document Ref. 6.3).

24.5.4 With regards Major Accidents and Natural Disasters and Population and Human Health, cumulative effects assessment has not been undertaken for the reasons set out below:

- **Major Accidents and Disasters**: None of the other developments in the short-list of developments, other than the off-shore part of the NZT export pipeline (ID 1), is a Major Accident Hazard or COMAH development. With the implementation of measures described in Chapter 22: Major Accidents and Natural Disasters (MA &NDs), Section 22.9 and Table 22.2, it has been concluded that there would be no residual effects as a result of the Proposed Development. As there would be no residual effects, either during construction or operation of the Proposed Development, consideration of cumulative effects due to MA&NDs has been scoped out of this assessment.
- **Population and Human Health**: Chapter 23: Population and Human Health (ES Volume I, Document Ref. 6.2) is a summary, highlighting key aspects relevant to population and human health of the technical assessments completed and presented within Chapters: 8: Air Quality, 9: Surface Water, Flood Risk and Water Resources, 10: Geology, Hydrogeology and Contaminated Land, 11: Noise and Vibration, 16: Traffic and Transport, and 20: Socio-economics and Tourism (all ES Volume I, Document Ref. 6.2). As potential cumulative population and human-health-related effects upon human health would be the same as those assessed within the aforementioned ES chapters and in the corresponding sections above, these are therefore not reiterated here.

24.5.5 As earlier stated at paragraph 24.3.32 a few exceptions were made to the general rule of excluding developments without at least a Scoping Report, EAR or ES from the shortlist, those being IDs 13, 17, 66, 78 and 79. These were included due to their potential to generate significant effects due to their proximity to the Proposed Development and to the scale and nature of the development. Further details about these developments are provided in Appendix 24B, ES Volume III, Document Ref. 6.4. Where relevant, comments are provided within the sections below.

24.5.6 The results of the cumulative effects assessment (Stage 4) are presented in the following sections.

24.5.7 As noted in Table 24-1, the assessment of traffic-related construction air quality and noise impacts reported in Chapter 8: Air Quality and Chapter 11:

Noise and Vibration (ES Volume I, Document Ref. 6.2) are based on traffic data which includes traffic from other committed developments and are therefore inherently cumulative. These are therefore not included in the cumulative assessments reported below.

Air Quality Cumulative Effects

Cumulative Effects during Construction

24.5.8 Cumulative impacts from existing sources of pollution in the area are accounted for in the adoption of site-specific background pollutant concentrations from archive sources and a programme of project-specific baseline air quality monitoring in close proximity to the Site, refer to Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) and Appendix 8A: Air Quality - Construction Assessment (ES Volume III, Document Ref. 6.4). It is recognised, however, that there is a potential impact on local air quality from emission sources which were not present at the time of the survey.

24.5.9 During the construction phase of the Proposed Development, there is a risk that there could be cumulative impacts at dust sensitive receptors due to construction of other committed developments occurring at the same time. The receptors affected would be those screened into the construction dust assessment for the Proposed Development and which are also defined as dust sensitive receptors for those other committed developments. The assessment of construction dust impacts reported in the air quality assessment at Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) and Appendix 8A: Air Quality - Construction Assessment (ES Volume III, Document Ref. 6.4) has been undertaken in line with industry-standard guidance to demonstrate the level of dust control required to mitigate any potential for significant effects. It is reasonable to assume that any other construction site in the vicinity of the Proposed Development will have done the same and will control dust through mitigation that is standard practice on all well managed construction sites across the UK. It is therefore concluded that the risk of cumulative construction dust impacts is low and not considered to be significant.

24.5.10 The traffic data used in the air quality assessment in Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) and Appendix 8A : Air Quality - Construction Assessment (ES Volume III, Document Ref. 6.4) includes predicted traffic growth on modelled roads between the current and the future year baselines. The methodology to determine the growth in traffic on the local road network is described in Chapter 16: Traffic and Transportation (ES Volume I, Document Ref. 6.2). The predicted growth included in the traffic data accounts for increases in traffic associated with other committed developments in the area and consequently the air quality assessment of construction road traffic emissions is inherently cumulative. There is therefore no separate assessment of cumulative impacts of construction traffic as part of this ES.

Cumulative Effects during Operation

24.5.11 Cumulative impacts from existing sources of air-borne pollution in the area are accounted for in the adoption of site-specific background air-borne

pollutant concentrations from archive sources and a programme of project-specific baseline air quality monitoring in close proximity to the Site.

24.5.12 It is recognised, however, that there is a potential impact on local air quality from emission sources which have either received or are about to receive planning permission but have yet to come into operation.

24.5.13 Table 24-6 below summarises how each of the developments included in the short list (Table 24-5) has been considered with regard to potential cumulative air quality effects during operation. Where any development has been excluded from consideration of cumulative air quality effects, i.e. 'scoped out' a comment is provided in Table 24-6 as to why this is the case. Four developments were scoped in to the assessment of operational cumulative air quality effects: IDs 3, 16, 68 and 77.

Table 24-6: Air Quality Cumulative Assessment (Operation)

ID	Scope of air quality cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed in the text above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
2 – York Potash	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed in the text above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
3 – Tees Combined Cycle Power Plant (CCPP)	**Scoped in -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Point source combustion emissions and ammonia emissions could result in cumulative impacts for human health and ecological receptors (operation).	Negligible cumulative air quality effects upon human health and ecological receptors.	NA	No residual cumulative effect
4 – Dogger Bank Teesside	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects	NA	NA	No residual cumulative effect
13 – CBRE	**Scoped out** – significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Cumulative effects during operation are considered unlikely, given the distance from the PCC and that the proposed combustion plant is small (3 x 1.5MW CHP engines), with a relatively short stack (28m), i.e. the development is unlikely to include a large combustion source with cumulative effects.	NA	NA	No residual cumulative effect
16 – Grangetown Prairie	**Scoped in -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above.	Negligible cumulative air quality effects upon human	NA	No residual cumulative effect

ID	Scope of air quality cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	Point source combustion emissions and ammonia emissions could result in cumulative effects for human health and ecological receptors (operation).	health and ecological receptors.		
17 - HCA	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
27 – Sirius Minerals	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects	NA	NA	No residual cumulative effect
31 – Forewind	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
36 – Graythorp Energy	**Scoped out** – significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Significant cumulative effects during operation are not considered likely due to the prevailing wind direction for the area.	NA	NA	No residual cumulative effect
51 – Redcar & Cleveland LP Allocation	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
66 – STDC South Bank 1	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect

ID	Scope of air quality cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
68 – MGT Teesside	**Scoped in -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Point source combustion emissions and ammonia emissions could result in cumulative effects for human health and ecological receptors (operation).	Negligible cumulative air quality effects upon human health and ecological receptors.	NA	No residual cumulative effect
71 – York Potash	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
73 – STDC South Bank 2	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect
77 – Redcar Energy Centre	**Scoped in -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Point source combustion emissions and ammonia emissions could result in cumulative effects for human health and ecological receptors (operation).	Negligible cumulative air quality effects upon human health and ecological receptors.	NA	No residual cumulative effect
78 – Port Clarence	**Scoped out** – significant cumulative effects are not considered for construction and traffic impacts, as detailed above. Cumulative effects are not considered likely due to remoteness from the Proposed Development (operation).	NA	NA	No residual cumulative effect
79 – Northern Gateway	**Scoped out –** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. No large point source emissions would occur as a result of the development, hence, no cumulative operational effects.	NA	NA	No residual cumulative effect

ID	Scope of air quality cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
83 – STDC Dorman Point	**Scoped out -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. It is not considered likely that this development would have any point source emissions leading to cumulative operational effects.	NA	NA	No residual cumulative effect
84 – STDC Lackenby	**Scoped out -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. It is not considered likely that this development would have any point source emissions leading to cumulative operational effects.	NA	NA	No residual cumulative effect
85 – STDC The Foundry	**Scoped out -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. It is not considered likely that this development would have any point source emissions leading to cumulative operational effects.	NA	NA	No residual cumulative effect
86 – STDC Long Acres	**Scoped out -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. It is not considered likely that this development would have any point source emissions leading to cumulative operational effects.	NA	NA	No residual cumulative effect
87 – STDC Steel House	**Scoped out -** significant cumulative effects are not considered for construction and traffic impacts, as detailed above. It is not considered likely that this development would have any point source emissions leading to cumulative operational effects.	NA	NA	No residual cumulative effect

24.5.14 The cumulative air quality assessment utilised the same advanced dispersion model (Atmospheric Dispersion Modelling Software (ADMS) version V5.2.2) as the main air quality assessment at Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) and included emission sources for the four shortlisted developments scoped into the cumulative air quality assessment, those being:

- Tees CCPP (ID 3);
- Grangetown Prairie (ID 16);
- MGT Teesside (ID 68); and
- Redcar Energy Centre (ID 77).

24.5.15 The greatest potential for cumulative impacts is from the proposed Redcar Energy Centre (ID 77), due to its close proximity to the PCC Site.

24.5.16 Information on the emissions from these sources was derived from the available Planning Applications and was included in the ADMS model. The cumulative assessment has only included emissions of oxides of nitrogen (NO_x), carbon monoxide (CO) and ammonia (NH_3), as these are the only pollutant species common to the respective cumulative schemes and the Proposed Development. Further information regarding the methodology for this assessment is included at Annex C to Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4).

24.5.17 The cumulative model schemes included (i.e. the four shortlisted developments scoped into the operational air quality assessment - IDs 3, 16, 68 and 77) have been assumed to run continuously at full output, therefore providing a worst-case assessment of the potential cumulative impact. The model inputs for the Proposed Development and the scoped in, shortlisted developments (IDs 3, 16, 68 and 77) are as described in Tables 8B-2, 8B-3 (Proposed Development) and Table C1 (cumulative developments) of Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4) respectively.

Human Health Receptors

Nitrogen dioxide emissions

24.5.18 The maximum predicted annual mean NO_2 concentration that occurs anywhere as a result of the cumulative impacts is 1.6 µg/m^3, which represents 3.9% of the Air Quality Assessment Level (AQAL). In combination with the background concentration of NO_2, the impact represents 40.8% of the AQAL, and therefore is well below the annual AQAL. It is therefore considered that the cumulative impact of NO_2 emissions from the developments assessed is negligible adverse and would not result in a significant effect.

24.5.19 The maximum predicted hourly mean NO_2 concentration (as the 99.79th percentile of hourly averages) that occurs anywhere as a result of the cumulative impacts is 15.7 µg/m^3, which represents 7.9% of the AQAL, and therefore can be considered insignificant in accordance with the significance criteria for air quality.

Carbon monoxide emissions

24.5.20 The maximum hourly and 8 hour running mean predicted concentrations that occur anywhere as a result of the cumulative impacts represent less than 1% of the hourly AQAL and 3% of the 8-hour AQAL. This is below the 10% threshold for short term impacts and is therefore considered to be negligible adverse. It is therefore considered that the cumulative effect of CO emissions from the developments assessed is negligible adverse.

Ammonia emissions

24.5.21 The annual and hourly average predicted concentrations of ammonia that occur anywhere as a result of the cumulative developments still represent less than 1% of the relevant AQALs and therefore can be considered to be insignificant/ negligible at all receptor locations. It is therefore considered that the cumulative impact of NH_3 emissions on human health receptors from the developments assessed is negligible adverse and would not have a significant effect.

Ecological Receptors

Oxides of nitrogen emissions – critical levels

24.5.22 The cumulative assessment results show that the predicted annual average NO_x impacts are below or the same as the criteria for significance at three sites (North York Moors SPA, SAC and SSSI; Northumbria Coast SPA and Ramsar; Durham Coast SAC and SSSI), and a further two sites are only just over the threshold for insignificance (Saltburn Gill SSSI; Lovell Hill Pool SSSI) (refer to Table C5 in Appendix 8B, Annex C). The remaining three sites are the Teesmouth and Cleveland Coast Special Protection Area (SPA, SSSI and Ramsar)), Coatham Marsh Local Wildlife Site (LWS) and also the Eston Pumping Station LWS. Both the LWS sites have impacts that remain <100% of the critical level when the background concentrations are taken into consideration. The cumulative impacts at the Teesmouth and Cleveland SPA, SSSI and Ramsar are 73% of the critical level when the background concentration is also taken into consideration, and therefore remains well below the critical level.

24.5.23 The daily average NO_x impacts are below the criteria for significance at seven of the eight receptor referred to above, with the exception of the Teesmouth and Cleveland Coast SPA, SSSI and Ramsar, which has cumulative impacts that represent 21% of the critical level. However, when the background concentration is taken into consideration, the impacts represent 60% of the critical level, and therefore remains well below the critical level.

Ammonia emissions – critical levels

24.5.24 The assessment results show that the predicted cumulative annual average NH_3 impacts are over the criteria for insignificance (<1% of the critical level) at only three of the eight receptors, the three receptors being Teesmouth and Cleveland SPA, SSSI and Ramsar; Coatham Marsh LWS; and Eston Pumping Station LWS (refer to Table C6 in Appendix 8B, Annex C). The predicted annual average NH_3 impacts at the Teesmouth and Cleveland Coast SPA, SSSI and Ramsar are 4.1% of the critical level, however in

combination with the background concentration it represents only 25% of the critical level and therefore can be considered to be not significant.

Nitrogen deposition – critical loads

24.5.25 The EA and Natural England have agreed that depositional impacts that are below 1% of the relevant critical load for a site can be regarded as insignificant.

24.5.26 Though depositional impacts are greater than 1% of the relevant critical load at some ecological receptors (see Table B7, Annex B, Appendix 8B, ES Volume III, Document Ref. 6.4), Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) states that the cumulative air quality effect from deposition of nutrient nitrogen upon relevant ecological receptors is not significant. Further interpretation of the significance of the depositional results is provided in Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) and at in this assessment under 'Terrestrial Ecology and Nature Conservation Cumulative Effects'.

Conclusions

24.5.27 Based upon the above, the cumulative air quality impacts of the Proposed Development together with the other developments upon human health and ecological receptors would be negligible and the cumulative air quality effects would therefore be negligible and not significant, during both construction and operation. No additional mitigation measures are proposed, and no significant residual cumulative air quality effects would arise.

Surface Water, Flood Risk and Water Resources Cumulative Effects

24.5.28 Table 24-7 below summarises how each of the developments included in the short list (Table 24-5) has been considered with regard to potential cumulative surface water, flood risk and water resources effects.

24.5.29 Of those developments, those 'scoped in' are considered to have potential for cumulative effects with regard to the water environment, due to being located in the 1 km ZoI for surface water, flood risk and water resources or which might drain to Tees Bay, Tees Estuary or its upstream tributaries, which are potentially also impacted by the Proposed Development. With the exception of ID 36, all developments in Table 24-5 have been included in the assessment of cumulative surface water, flood risk and water resources effects.

Table 24-7: Surface Water, Flood Risk and Water Resources Cumulative Assessment (Construction and Operation)

ID	Scope of surface water, flood risk and water resources cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped in** – Potential for cumulative construction impacts to Tees Bay	Impacts of the breakout of the HDD bores for the off-shore Net Zero project are assessed to be similar to breakout of the MTB boring machine as part of this development but with greater potential for dispersion of sediment and WBM as reported in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional significant cumulative effects during construction are identified.	Mitigation as presented in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional mitigation proposed for cumulative effects.	**Construction:** Temporary slight adverse effect (not significant) to Tees Bay.
2 – York Potash	**Scoped in** – Potential for cumulative construction impacts to Tees Estuary	**Construction:** There would be potential for a temporary impact on water quality in the Tees Estuary (a very high value receptor) due to mobilisation of fine sediments, resulting in a slight adverse effect, as reported in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional significant cumulative effects during construction are identified. **Operation:** no additional cumulative effects during operation (i.e. effects are the same as that for the Proposed Development alone).	Mitigation as presented in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional mitigation proposed for cumulative effects.	**Construction:** Temporary slight adverse effect (not significant) to Tees Estuary (for water quality with regard to mobilisation of fine sediment). All cumulative effects are not significant. **Operation:** Neutral -slight adverse effects (not significant) upon all receptors.
3 – Tees CCPP	**Scoped in** – The site is adjacent to Kettle Beck which could convey fine sediments or spillages to Tees Estuary, which could be subject to cumulative water quality impacts during construction. Drainage and effluent from the Tees CCPP is proposed to discharge the	As per ID 2	As per ID 2	As per ID 2

ID	Scope of surface water, flood risk and water resources cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	Wilton Site Drainage System, and ultimately the Tees Estuary, and so there should be no potential for cumulative impacts during operation.			
4 – Dogger Bank Teesside	**Scoped in** - The cable routes to Lackenby substation could cause cumulative impacts to the Tees Bay waterbody and Kettle Beck watercourse, adjacent to the Lackenby substation.	**Construction:** There would be potential for a temporary impact on water quality in the Tees Bay (a very high value receptor) due to mobilisation of fine sediments, resulting in a moderate adverse effect. No additional significant cumulative effects during construction are identified. **Operation:** no additional cumulative effects during operation (i.e. effects are the same as that for the Proposed Development alone).	Mitigation as presented in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional mitigation proposed for cumulative effects.	**Construction:** Temporary and localised slight (not significant) effect to Tees Bay (for water quality with regard to mobilisation of fine sediment). All other cumulative effects are not significant. **Operation:** Neutral -slight adverse effects (not significant) upon all receptors.
13 – CBRE	**Scoped in** – The site is adjacent to Kinkerdale Beck to which there is potential for cumulative impacts during construction, and which could be conveyed downstream to Tees Estuary. Drainage is likely to tie into the Wilton Site Drainage System, and ultimately Tees Estuary and so there should not be potential for operational cumulative impacts.	As per ID 2	As per ID 2	As per ID 2
16 – Grangetown Prairie	**Scoped in** – The site is adjacent to Knitting Wife Beck where there is potential for cumulative impacts during construction and to the downstream receptor Tees Estuary.	As per ID 2	As per ID 2	As per ID 2

ID	Scope of surface water, flood risk and water resources cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
17 - HCA	**Scoped in** – This is adjacent to a tributary of The Fleet (Tees Estuary (S Bank) Water Framework Directive (WFD) waterbody), and so there is potential for cumulative construction and operational discharges to this waterbody.	**Construction:** There would be negligible impact on water quality in the Tees Estuary (South Bank) (i.e. the Fleet) watercourse (a high value receptor) due to mobilisation of fine sediments, resulting in a slight adverse effect (not significant), No significant cumulative effects during construction are identified. **Operation:** no cumulative effects during operation (i.e. effects are the same as that for the Proposed Development alone).	Mitigation as presented in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2). No additional mitigation proposed for cumulative effects.	**Construction:** All cumulative effects are not significant. **Operation:** Neutral -slight adverse effects (not significant) upon all receptors.
27 – Sirius Minerals	**Scoped in** – This is adjacent to the Fleet (Tees Estuary (S Bank) WFD waterbody) and so there is potential for cumulative construction and operational discharges to this waterbody.	As per ID 17	As per ID 17	As per ID 17
31 – Forewind	**Scoped in** – There is potential for cumulative construction impacts to watercourses potentially crossed including Main's Dike, and the downstream Tees Estuary.	As per ID 2	As per ID 2	As per ID 2
36 – Graythorp Energy	**Scoped out –** remote from the site and not hydrologically connected to the Proposed Development.	NA	NA	No residual cumulative effect
51 – Redcar & Cleveland LP Allocation	**Scoped in –** see ID 17, above.	As per ID 17	As per ID 17	As per ID 17
66 – STDC South Bank 1	**Scoped in** – The site is adjacent to Lackenby Channel and there is potential for cumulative impacts to this	As per ID 2	As per ID 2	As per ID 2

ID	Scope of surface water, flood risk and water resources cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	watercourse and Tees Estuary downstream.			
68 – MGT Teesside	**Scoped in** – The site is adjacent to the Tees Estuary and there could be cumulative impacts during construction or operation.	As per ID 2	As per ID 2	As per ID 2
71 – York Potash	**Scoped in** – Works at the Wilton International Site could cause cumulative construction impacts to watercourses including The Mill Race which is in close proximity, and the downstream Tees Estuary.	As per ID 2	As per ID 2	As per ID 2
73 – STDC South Bank 2	**Scoped in** – The site is adjacent to the Tees Estuary and there could be cumulative impacts during construction.	As per ID 2	As per ID 2	As per ID 2
77 – Redcar Energy Centre	**Scoped in** – The site is adjacent to Tees Estuary and Tees Bay with potential for cumulative construction and operational discharges.	As per ID 4	As per ID 4	As per ID 4
78 – Port Clarence	**Scoped in** – The site is adjacent to Tees Estuary with potential for cumulative impacts during construction.	As per ID 2	As per ID 2	As per ID 2
79 – Northern Gateway	**Scoped in** – potential impacts upon the Tees Estuary.	As per ID 2	As per ID 2	As per ID 2
83 – STDC Dorman Point	**Scoped in** – The site is adjacent to Lackenby Channel which discharges to the Tees Estuary, and so there is potential for cumulative impacts during construction.	As per ID 2	As per ID 2	As per ID 2

ID	Scope of surface water, flood risk and water resources cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
84 – STDC Lackenby	**Scoped in** - The site is adjacent to Lackenby Channel and Dabholm Gut (upstream of Tees Estuary) and so there is potential for cumulative impacts during construction.	As per ID 2	As per ID 2	As per ID 2
85 – STDC The Foundry	**Scoped in** – The site is adjacent to Tees Estuary and Tees Bay with potential for cumulative construction and operational discharges.	As per ID 4	As per ID 4	As per ID 4
86 – STDC Long Acres	**Scoped in** – The site is adjacent to The Fleet and Tees Bay and so there is potential for cumulative impacts during construction and operation.	As per ID 4	As per ID 4	As per ID 4
87 – STDC Steel House	**Scoped in** – The site is adjacent to The Fleet and Tees Bay and so there is potential for cumulative impacts during construction and operation.	As per ID 4	As per ID 4	As per ID 4

Cumulative Effects during Construction

24.5.30 There is likely to be overlap between construction of several of the 'scoped in' developments identified in Table 24-7, above, and construction of the Proposed Development. Thus, there is the potential for short term, temporary construction related pollutants generated from both the Proposed Development and all of the above developments to impact on watercourses in the ZoI (with watercourses affected included in the list above). Impacts of the breakout of the Horizontal Directional Drilling (HDD) bores for the off-shore Net Zero project (ID 1) are assessed to be similar to breakout of the MTB boring machine as part of this development but with greater potential for dispersion of sediment and water-based mud (WBM). However, provided that standard and good practice mitigation is implemented on the above construction sites through their respective Construction Environmental Management Plans (CEMPs) and as per the conditions of the relevant planning permission, environmental permits and licences (refer to Section 9.5 of Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2) and Appendix 5A: Framework CEMP (ES Volume III, Document Ref. 6.4), the cumulative risk can be effectively managed and there would not be a significant increase in the risks to any waterbodies. As such, there would not be any additional cumulative impacts during construction on the basis of the above assessment. In terms of water quality, with the proposed mitigation in place, there will remain a temporary and localised slight adverse effect (not significant) to Tees Bay with regard to mobilisation of fine sediment. There are no other significant cumulative effects to any other waterbody.

Cumulative Effects during Operation

24.5.31 It is assumed that drainage strategies for all of the 'scoped in' developments identified in Table 24-7, above, have been or will be produced with reference to the relevant policies and guidance documents outlined in Section 9.2 of Chapter 9: Surface Water, Flood Risk and Water Resources, ES Volume I, Document Ref. 6.2). The Proposed Development will similarly be designed to ensure no long-term deterioration in water quality or increase in flooding. Attenuation and treatment will be provided for runoff from the Proposed Development prior to discharge to waterbodies. As such, provided that all the mitigation measures are implemented for all developments, the cumulative effects from the Proposed Development and the above developments would have a negligible impact on water quality and flooding and therefore a neutral effect (not significant).

Conclusions

24.5.32 Other than the potential slight adverse effect upon water quality in Tees Bay (temporary and localised, and related to the mobilisation of fine sediment) during the construction phase, the Proposed Development would not result in any significant residual cumulative effects relating to surface water, flood risk and water resources. This assessment was based on the worst-case assumption that the existing discharge outfall to Tees Bay is in a poor state of repair and cannot be used. As such, the temporary effect may not be realised.

24.5.33 Therefore, all cumulative effects relating to surface water, flood risk and water resources are the same as that reported for the Proposed Development alone, during both construction and operation.

24.5.34 As such no additional mitigation measures are proposed above that outlined within Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2).

Contaminated Land Cumulative Effects

24.5.35 Potential developments included in the short list (Table 24-5) which are within the 500 m ZoI defined for Geology, Hydrogeology and Contaminated Land (Construction and Operation) (Table 24-1) and scoped in for contaminated land include:

- STDC Developments:
  - ID 66: South Bank 1;
  - ID 85: The Foundry;
  - ID 86: Long Acres; and
  - ID 87: Steel House
- ID 77: Redcar Energy Centre;
- York Potash Developments:
  - ID 2: Wharf/Jetty Facilities; and
  - ID 27: Conveyor.

24.5.36 As evidenced by Condition 3 in Planning Permission R/2020/0411/FFM for the Redcar Energy Centre, this development, along with the STDC Developments, will not commence until the following have been carried out to the satisfaction of the Local Planning Authority:

- site characterisation comprising an investigation and risk assessment, including *inter* alia assessment risks to human health, property (existing or proposed), groundwater and surface water and ecological systems;
- submission and approval of a detailed remediation scheme to bring the sites to a condition suitable for intended use by removing unacceptable risks to human health, buildings and other property and the natural and historic environment; and
- implementation of the approved remediation scheme prior to the commencement of development.

24.5.37 The scale of the STDC developments means that foundation works are unlikely to require piling. It is assumed that piling risk associated with the construction of the Redcar Energy Centre would be managed in accordance with a Code of Construction Practice as set out in the ES for that development. It is assumed that this will contain a piling risk assessment.

24.5.38 The NZT development and the York Potash developments will be carried out in accordance with the requirement of their respective DCOs and as such will mitigate any risks associated with land contamination.

24.5.39 As such, risks associated with land contamination will be managed so that significant cumulative effects on human health or environmental receptors do not occur.

Noise and Vibration Cumulative Effects

24.5.40 Table 24-8 below summarises how each of the developments included in the short list (Table 24-5) has been considered with regard to potential cumulative noise effects, during both construction and operation. Twelve of the developments on the short-list in Table 24-5 have been included in the assessment of cumulative noise and vibration effects. The other developments have been excluded from the assessment of cumulative noise and vibration effects for the reasons presented in Table 24-8.

24.5.41 The locations of the Noise Sensitive Receptors (NSRs) referred to in Table 24-8 are shown on Figure 11-1 (ES Volume II, Document Ref. 6.3). The distance of these receptors from the Site boundary and from the PCC Site are shown in Table 24-9.

Table 24-8: Noise Cumulative Assessment (Construction and Operation)

ID	Scope of noise cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped out -** largely offshore; not likely to result in cumulative noise effects.	NA	NA	No residual cumulative effect
2 – York Potash	**Scoped in** -Large construction at a distance at which some noise contribution would be expected: potential for cumulative noise effects during construction.	**Construction:** The significance of the cumulative construction noise effects at all NSRs, except NSR3, would be the same as that from the Proposed Development alone. **Operation:** Slight increases in ambient noise levels at NSR1, NSR2 and NSR4 during operation of the Proposed Development together with the other developments, however overall effect would be minor /slight adverse (the same as for the Proposed Development alone).	No additional mitigation proposed for cumulative effects	**Construction:** Negligible adverse at NSRs 1, 2, 4, 5 and 6; Minor adverse at NSRs 3, 7 and 8 (not significant). **Operation:** Minor adverse (not significant).
3 – Tees CCPP	**Scoped in -** Possibility of significant operational noise for this type of development. Some noise contribution during construction would be expected.	As per ID 2	As per ID 2	As per ID 2
4 – Dogger Bank Teesside	**Scoped in -** Large construction at a distance at which some noise contribution would be expected	As per ID 2	As per ID 2	As per ID 2
13 – CBRE	**Scoped in -** Possibility of significant operational noise for this type of development.	As per ID 2	As per ID 2	As per ID 2
16 – Grangetown Prairie	**Scoped out** -This development is a significant distance (approximately 3 km) from the NSRs for the Proposed Development.	NA	NA	No residual cumulative effect

ID	Scope of noise cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
17 - HCA	**Scoped out** -As a housing development, this is not expected to be a significant noise source at the distance it is from the Proposed Development during construction and would not be a significant noise source during operation.	NA	NA	No residual cumulative effect
27 – Sirius Minerals	**Scoped in** - Possibility of significant operational noise for this type of development.	As per ID 2	As per ID 2	As per ID 2
31 – Forewind	**Scoped out** - Significant distance from receptors so not likely to result in cumulative noise effects	NA	NA	No residual cumulative effect
36 – Graythorp Energy	**Scoped out** - Significant distance from receptors so not likely to result in cumulative noise effects	NA	NA	No residual cumulative effect
51 – Redcar & Cleveland LP Allocation	**Scoped out** – see ID 17	NA	NA	No residual cumulative effect
66 – STDC South Bank 1	**Scoped out -** due to distance to construction areas and the types of construction which wouldn't be expected to result in cumulative impacts	NA	NA	No residual cumulative effect
68 – MGT Teesside	**Scoped out** – due to significant distance from receptors	NA	NA	No residual cumulative effect
71 – York Potash	**Scoped in** - Large construction at some points close to NSRs, some possibility of operational noise impacts as well	As per ID 2	As per ID 2	As per ID 2
73 – STDC South Bank 2	**Scoped out** – due to significant distance from receptors	NA	NA	No residual cumulative effect

ID	Scope of noise cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
77 – Redcar Energy Centre	**Scoped in** - Possibility of significant operational noise for this type of development.	As per ID 2	As per ID 2	As per ID 2
78 – Port Clarence	**Scoped out** - a comparatively small energy development (45 MW); at the distance to NSRs, not likely to result in cumulative noise effects.	NA	NA	No residual cumulative effect
79 – Northern Gateway	**Scoped out** – relatively remote from NSRs and ES submitted for previous application at Site (outline application for the Northern Gateway Container Terminal – ID 69 in long list) states that it will have negligible noise effects upon all receptors. As such; not considered likely to result in cumulative noise effects.	NA	NA	No residual cumulative effect
83 – STDC Dorman Point	**Scoped in** - Large construction at some points close to NSRs; possibility of operational noise due to proximity to receptors	As per ID 2	As per ID 2	As per ID 2
84 – STDC Lackenby	**Scoped in -** Large construction at some points close to NSRs; possibility of operational noise due to proximity to receptors	As per ID 2	As per ID 2	As per ID 2
85 – STDC The Foundry	**Scoped in -** Large construction at some points close to NSRs; possibility of operational noise due to proximity to receptors	As per ID 2	As per ID 2	As per ID 2
86 – STDC Long Acres	**Scoped in** - Large construction at some points close to NSRs; possibility of operational noise due to proximity to receptors	As per ID 2	As per ID 2	As per ID 2

ID	Scope of noise cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
87 – STDC Steel House	**Scoped in** - Large construction at some points close to NSRs; possibility of operational noise due to proximity to receptors	As per ID 2	As per ID 2	As per ID 2

Table 24-9: Details of Noise Sensitive Receptors (NSRs)

Receptor	Address / NSR type	Approximate distance to Site boundary (m) / Direction	Approximate distance to PCC Site (m) / Direction
NSR1	58 Broadway West, Redcar / (residential)	300 / SE	1300 / SE
NSR2	51 York Road, Redcar / (residential)	900 / E	1500 / E
NSR3	131 Broadway West / (residential)	300 / SE	1500 / SE
NSR4	Marsh House Farm / (residential)	150 / NE	650 / E
NSR5	Billingham / (residential)	700 / NW	9600 / SW
NSR6	Haverton Hill / (residential)	600 / SE	8100 / SW
NSR7	Bran Sands Waste Water Treatment Plant site offices / (office)	50 / W	800 / S
NSR8	Seal Sands site offices (office)	20 / E	2900 / SW

Cumulative Effects during Construction

24.5.42 Construction noise was determined for the other developments with and without the Proposed Development at each of the noise sensitive receptors (NSRs). The cumulative assessment was based on a worst-case assumption that the construction phase producing the highest construction noise levels for each development would occur simultaneously, though in practice this is unlikely to occur for prolonged periods, if at all.

24.5.43 The quantitative results are presented in Table 11-30 in Section 11.6 of Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2). In summary, the cumulative assessment of construction noise concluded that the significance of the cumulative construction noise effects at all NSRs, except NSR3, would be the same as the effects from the Proposed Development alone. At NSR3 (131 Broadway West), the cumulative effect would be minor adverse, whereas for the Proposed Development alone it would be negligible adverse. For NSR1 (58 Broadway West), NSR2 (51 York Road), NSR4 (Marsh House Farm), NSR5 (Billingham), NSR6 (Haverton Hill) the cumulative effect would be negligible adverse and for NSR7 (Bran Sands Waste Water Treatment Plant site offices) and NSR8 (Seal Sands site offices) it would be minor adverse, i.e. the same as for the Proposed Development alone.

Cumulative Effects during Operation

24.5.44 The assessment of the cumulative effects of operational noise assessed the operational noise from the Proposed Development together with the predicted noise levels presented in the noise assessments submitted with development applications for the other scoped in, shortlisted developments identified in Table 24-8, above.

24.5.45 The assessment presented is a worst-case scenario, based on all of the scoped in, shortlisted developments (IDs 2, 3, 4, 13, 27, 71, 77 and 83-87,

as identified in Table 24-8, above) operating during the night-time period when ambient sound levels are lower and there are likely to be greater impacts at NSR1, NSR2 and NSR4. Additionally, the highest of the operational noise levels predicted (according to the noise assessments submitted with the applications for the scoped in, shortlisted developments) have been chosen for each development.

24.5.46 This assessment assumes that all of the short-listed developments are completed and operational. Furthermore, as not all of the other developments included are consented as yet so are not certain to go ahead, the outcome of the assessment presents a potentially exaggerated worst case, as it assumes that all are operational.

24.5.47 The results of the cumulative assessment of operational noise are presented in Table 11-31 in Section 11.6 of Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2).

24.5.48 The assessment shows that ambient noise levels at NSR1 and NSR2 would increase as a result of other developments and that increase would be the same both with and without the Proposed Development. At NSR4, Marsh House Farm, there would be an increase in ambient levels of 1 dB from the Proposed Development in conjunction with the other developments, compared to the increase incurred from the other developments alone (i.e. excluding the Proposed Development). An increase of 1 dB in the ambient sound level would be below the level of increase that is perceptible under normal environmental conditions and would not constitute more than a minor adverse effect, i.e. the same significance of effect as that for the Proposed Development alone.

Conclusions

24.5.49 The majority of the cumulative noise and vibration effects would be of the same level of significance as the effects for the Proposed Development alone, both during construction and operation. The only exception to this would be the cumulative construction noise effect at NSR3, which would increase from negligible to minor adverse (not significant) compared to the effect for the Proposed Development alone.

Terrestrial Ecology and Nature Conservation Cumulative Effects

24.5.50 With regards to Terrestrial Ecology and Nature Conservation, potential pathways for a cumulative effects relate to:

- operational air quality impacts from the PCC site and other developments on important habitats (nature conservation designations); and
- cumulative losses of terrestrial habitats within the South Tees Area due to construction of the PCC and surrounding developments.

24.5.51 No other relevant pathways have been identified that are likely to produce a cumulative effect on Terrestrial Ecology and Nature Conservation (refer to Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2)).

24.5.52 Table 24-10 below summarises how each of the developments included in the short list (Table 24-5) has been considered with regard to potential cumulative effects on Terrestrial Ecology and Nature Conservation. Only those developments which are also scoped into the air quality cumulative effects assessment or which would result in habitat losses within STDC land are scoped in.

Table 24-10: Terrestrial Ecology and Nature Conservation Cumulative Assessment

ID	Scope of Terrestrial Ecology and Nature Conservation cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped out –** no interface with effects on Terrestrial Ecology	NA	NA	No residual cumulative effect
2 – York Potash	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses	NA	NA	No residual cumulative effect
3 – Tees CCPP	**Scoped in -** point source combustion emissions and ammonia emissions could result in cumulative impacts for ecological receptors.	Negligible cumulative air quality effects upon ecological receptors – refer to air quality cumulative effects assessment and to text below table.	NA	No residual cumulative effect
4 – Dogger Bank Teesside	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
13 – CBRE	**Scoped out** – scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
16 – Grangetown Prairie	**Scoped in -** point source combustion emissions and ammonia emissions could result in cumulative impacts for ecological receptors.	Negligible cumulative air quality effects upon ecological receptors – refer to air quality cumulative effects assessment and to text below table.	NA	No residual cumulative effect
17 - HCA	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
27 – Sirius Minerals	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
31 – Forewind	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect

ID	Scope of Terrestrial Ecology and Nature Conservation cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
36 – Graythorp Energy	**Scoped out** – scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
51 – Redcar & Cleveland LP Allocation	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
66 – STDC South Bank 1	**Scoped out -** it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and above for its impact (i.e. achieves a net gain).	NA	NA	No residual cumulative effect
68 – MGT Teesside	**Scoped in -** point source combustion emissions and ammonia emissions could result in cumulative impacts for ecological receptors.	Negligible cumulative air quality effects upon ecological receptors – refer to text below table.	NA	No residual cumulative effect
71 – York Potash	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
73 – STDC South Bank 2	**Scoped out -** it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and	NA	NA	No residual cumulative effect

ID	Scope of Terrestrial Ecology and Nature Conservation cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	above for its impact (i.e. achieves a net gain).			
77 – Redcar Energy Centre	**Scoped in -** point source combustion emissions and ammonia emissions could result in cumulative impacts for ecological receptors. Potential for cumulative habit loss impacts.	Negligible cumulative air quality effects upon ecological receptors – refer to text below this table. Habitat provision within the Proposed Development would fully compensate for permanent habitat losses associated with construction of the PCC and would provide additional biodiversity gain – refer to text below this table.	No additional mitigation required for effects relating to air quality or habitat loss.	No residual cumulative effect
78 – Port Clarence	**Scoped out** – cumulative effects are not considered likely due to remoteness from the Proposed Development	NA	NA	No residual cumulative effect
79 – Northern Gateway	**Scoped out –** scoped out of air quality assessment and no interface with habitat losses.	NA	NA	No residual cumulative effect
83 – STDC Dorman Point	**Scoped out -** it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and above for its impact (i.e. achieves a net gain).	NA		No residual cumulative effect
84 – STDC Lackenby	**Scoped out** - it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and	NA	As per ID 83	As per ID 83

ID	Scope of Terrestrial Ecology and Nature Conservation cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	above for its impact (i.e. achieves a net gain).			
85 – STDC The Foundry	**Scoped out** - it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and above for its impact (i.e. achieves a net gain).	NA	As per ID 83	As per ID 83
86 – STDC Long Acres	**Scoped out -** it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and above for its impact (i.e. achieves a net gain).	NA	As per ID 83	As per ID 83
87 – STDC Steel House	**Scoped out -** it is not considered likely that this development would have any point source emissions leading to cumulative operational impacts and there is no potential for cumulative effects due to habitat losses as the Proposed Development compensates over and above for its impact (i.e. achieves a net gain).	NA	As per ID 83	As per ID 83

24.5.53 The air quality impact assessment informing the Ecological Impact Assessment (EcIA) reported in Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2) considers the potential for the shortlisted developments (identified in Table 24-5) to result in cumulative air quality effects upon ecological receptors, including nature conservation designations. The results have been summarised earlier, under Air Quality Cumulative Effects (and in Table 24-6) and in detail in Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4). The shortlisted developments scoped into the assessment are as stated in the air quality cumulative effects assessment, i.e. IDs 3,16, 68 and 77 (refer to Table 24-6). The assessment concludes that there would be no cumulative effects upon ecological receptors from emissions of NO_x, ammonia emissions or acid deposition.

24.5.54 The air quality impact assessment identified potential for a cumulative effect from deposition of nutrient nitrogen on the relevant habitats of Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI). However, the assessment presented in Chapter 12: Terrestrial Ecology and Nature Conservation of the (ES Volume I, Document Ref. 6.2), Section 12.6 for the Proposed Development in isolation is equally relevant and applicable to consideration of the potential cumulative effect. The historic baseline nitrogen dose to the SSSI prior to closure of the former Redcar Steelworks did not prevent the establishment and maintenance of nationally important sand dune habitats within the SSSI (refer to Section 12.6 of Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2)). Given this, the much lower cumulative nitrogen dose received from other developments following closure of the former steelworks should also not conflict with the conservation objectives set for the SSSI. The beneficial impact on background air quality from closure of the former steelworks outweighs the comparatively small exceedance of emissions by the Proposed Development in combination with other developments. This principle was established previously during determination of the Tees CCPP DCO by the Secretary of State (SoS) and was subsequently re-agreed by Natural England during determination of the recently consented Redcar Energy Centre. Given the comparably low additional nitrogen dose from the Proposed Development, it is reasonable to rely on this established principle here. Therefore, the cumulative air quality effect from deposition of nutrient nitrogen on the relevant habitats of Teesmouth and Cleveland Coast SSSI is assessed as not significant.

24.5.55 The only other potential pathway for a potentially significant cumulative effect would be through habitat loss and land-take for the Proposed Development and other developments within the former Redcar Steel Works. The landowner of the former Redcar Steel Works, STDC, is advancing a number of developments that would affect land adjacent to and surrounding the Proposed Development. These developments are IDs 66, 73 and 83 to 87, included in the short list and listed in Table 24-5. The combined area of land encompassed by these other developments is much larger than the land permanently required for the Proposed Development. The contribution of the Proposed Development to the cumulative effect is therefore relatively small and it is possible to achieve sufficient habitat compensation within the PCC

Site to fully compensate for the permanent habitat losses at construction of the PCC and an additional biodiversity gain (refer to Section 12.7 of Chapter 12: Terrestrial Ecology (ES Volume I, Document Ref. 6.2)).

24.5.56 The proposed new habitats are consistent with the existing baseline conditions and are suitable to sustain the terrestrial species recorded using the PCC Site (bats and terrestrial invertebrates). The Proposed Development is therefore compliant with planning policy for the South Tees Area (refer to Appendix 12A: Legislation and Planning Policy Relevant to Ecology, ES Volume III, Document Ref. 6.4) requiring no net loss and enhancement of biodiversity. Given this, the Proposed Development will not contribute to biodiversity losses from other development proposals in the local area. No adverse cumulative effects are predicted for habitats or the terrestrial species dependent on these habitats are therefore predicted.

Conclusions

24.5.57 Based upon the above, the Proposed Development will not result in significant cumulative effects relating to terrestrial ecology. No additional mitigation measures are proposed, and no significant residual cumulative effects will arise.

Aquatic Ecology and Nature Conservation Cumulative Effects

24.5.58 Table 24-11 below summarises how each of the developments included in the shortlist (Table 24-5) has been considered with regard to potential cumulative aquatic ecology effects, during both construction and operation of the Proposed Development. Nine of the developments in the shortlist have been included in the assessment of cumulative aquatic ecology effects; the remaining shortlisted developments have been excluded for the reasons presented in Table 24-11.

Table 24-11: Aquatic Ecology Cumulative Assessment (Construction and Operation)

ID	Scope of aquatic ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
2 – York Potash	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
3 – Tees CCPP	**Scoped out** - Construction will be complete prior to construction of the proposed PCC Site and Connection Corridors, therefore there is no potential for cumulative effects during construction. Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4) confirms no significant nitrogen deposition effects during operation; there is no potential for aquatic ecology cumulative effects during operation.	NA	NA	No residual cumulative effect
4 – Dogger Bank Teesside	**Scoped out** – the development is adjacent to Kettle Beck, which is not relevant to the assessment within Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) and is not a tributary of any relevant features, therefore there is no potential for construction or operation cumulative effects.	NA	NA	No residual cumulative effect
13 – CBRE	**Scoped out** – the development is adjacent to Kinkderdale Beck, which is not relevant to the assessment within Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) and is not a tributary of any relevant features, therefore there is	NA	NA	No residual cumulative effect

ID	Scope of aquatic ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	no potential for construction or operation cumulative effects.			
16 – Grangetown Prairie	**Scoped out** – the development is adjacent to Knitting Wife Beck, which is relevant to the assessment within Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) and is not a tributary of any relevant features. There is no potential for cumulative effects during construction. Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4) confirms no significant nitrogen deposition impacts during operation; there is no potential for aquatic ecology cumulative effects during operation.	NA	NA	No residual cumulative effect
17 - HCA	**Scoped in** – the development is adjacent to a tributary of The Fleet, so there is potential for cumulative effects during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
27 – Sirius Minerals	**Scoped in** – the development is adjacent to a tributary of The Fleet, so there is potential for cumulative effects during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
31 – Forewind	**Scoped in** – there is potential for cumulative effects during construction and operation to watercourses potentially crossed including Main's Dike, which is a tributary of Dabholm Gut.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
36 – Graythorp Energy	**Scoped out** – the development is remote from the Proposed Development and not hydrologically connected to it. Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4) confirms no significant nitrogen deposition effects during operation. There is no	NA	NA	No residual cumulative effect

ID	Scope of aquatic ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	potential for cumulative effects during construction or operation.			
51 – Redcar & Cleveland LP Allocation	**Scoped in** – the development is adjacent to a tributary of The Fleet, so there is potential for cumulative effects during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
66 – STDC South Bank 1	**Scoped out** – the development is adjacent to Lackenby Channel, which is not relevant to the assessment within Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) and is not a tributary of any relevant features, therefore there is no potential for cumulative effects during construction or operation.	NA	NA	No residual cumulative effect
68 – MGT Teesside	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
71 – York Potash	**Scoped in** – the development is adjacent to The Mill Race, therefore there is potential for cumulative effects upon water quality of the watercourse during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
73 – STDC South Bank 2	**Scoped out** – development is remote from the Proposed Development and not hydrologically connected to it. Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Document Ref. 6.4) confirms no significant nitrogen deposition effects during operation; there is no potential for aquatic ecology cumulative effects during construction or operation.	NA	NA	No residual cumulative effect
77 – Redcar Energy Centre	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in	NA	NA	No residual cumulative effect

ID	Scope of aquatic ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).			
78 – Port Clarence	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
79 – Northern Gateway	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
83 – STDC Dorman Point	**Scoped out** – the development is adjacent to Lackenby Channel, which is not relevant to the assessment in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) and is not a tributary of any relevant features, therefore there is no potential for construction or operation cumulative effects.	NA	NA	No residual cumulative effect
84 – STDC Lackenby	**Scoped in** – the development is adjacent to Dabholm Gut therefore there is potential for cumulative impacts upon water quality of the watercourse during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect
85 – STDC The Foundry	**Scoped out** – No potential effects related to aquatic ecology relevant features, covered in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).	NA	NA	No residual cumulative effect
86 – STDC Long Acres	**Scoped in** – The development is adjacent to The Fleet, therefore there is potential for cumulative impacts on water quality of the watercourse during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect

ID	Scope of aquatic ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
87 – STDC Steel House	**Scoped in** – The development is adjacent to The Fleet, therefore there is potential for cumulative impacts on water quality of the watercourse during construction and operation.	No significant cumulative effect on aquatic ecology relevant features.	NA	No residual cumulative effect

Cumulative Effects during Construction and Operation

24.5.59 No likely significant cumulative effects upon aquatic ecology are identified given the conclusions presented in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) for the Proposed Development in isolation, and the additional considerations presented in the Table 24-11 above, and below.

24.5.60 There are several developments for which construction will overlap with the construction phase of the Proposed Development, and which are in proximity to habitats scoped in the assessment presented in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2), including The Fleet, Dabholm Gut and The Mill Race. These developments are:

- Forewind (ID 4);
- Home and Communities Agency (ID17);
- Sirius Mineral (ID 27);
- Forewind (ID 31);
- Redcar and Cleveland LP (ID 51);
- York Potash Ltd. (ID 71);
- STDC Lackenby (ID 84);
- STDC Long Acres (ID 86); and
- STDC Steel House (ID 87).

24.5.61 There is the potential for cumulative indirect impacts upon the water quality of the habitats identified in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2). However, it is considered that the above developments will not breach relevant legislation (Environmental Permitting (England and Wales) Regulations 2016 and the Water Resources Act 1991 (as amended)). Moreover, any potential indirect impacts upon the water quality of watercourses would be mitigated by the implementation of a range of pollution control measures and industry guidelines including the CIRIA report 'C532: Control of water pollution from construction sites'. Therefore, it is considered that there is no potential for significant cumulative effects upon aquatic habitats and the species they support during construction. As such, no mitigation above that described at Section 13.8 ‘Mitigation and Enhancement Measures’ of Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2) is proposed.

24.5.62 The air quality impact assessment presented at Chapter 8: Air Quality (Volume I, Document Ref. 6.2) informed the assessment of potential operational impacts on aquatic ecology presented in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2), including the assessment of cumulative effects. The air quality assessment considered a baseline which encompasses existing operational developments. However, several additional developments were identified that were not included in the operational baseline and that have the potential to interact with features relevant to the aquatic ecology assessment at Chapter 13 (ES Volume I, Document Ref. 6.2) during operation.

24.5.63 The potential for these additional developments to have a cumulative operational air quality effect on nature conservation designations was therefore assessed as part of the assessment of cumulative air quality effects. The results have been summarised earlier, under Air Quality Cumulative Effects (and in Table 24-6) and in detail in Appendix 8B, ES Volume III, Document Ref. 6.4). The other developments included in the assessment are as stated in the air quality cumulative effects assessments, i.e. IDs 3,16, 68, 77 and 83 to 87 (refer to Table 24-5). This assessment confirmed that there would be no significant cumulative effects from emissions of NO_x, ammonia and acid deposition during operation upon aquatic habitats and the species they support.

Conclusions

24.5.64 Based upon the above, the Proposed Development will not result in significant cumulative effects relating to aquatic ecology. No additional mitigation measures are proposed, and no significant residual cumulative effects will arise.

Marine Ecology and Nature Conservation Cumulative Effects

24.5.65 Table 24-12 below summarises how each of the developments included in the short list (Table 24-5) has been considered with regard to potential cumulative marine ecology effects.

24.5.66 The majority of the other developments listed in Table 24-5 have been screened out of the assessment of cumulative effects on marine ecology due to these developments having no potential impact pathways to marine ecological receptors. A number of developments have impact pathways which may result in impacts on water quality in the Tees Estuary. These, however, have been assessed within the cumulative effect assessment for surface water quality, flood risk and water resources (refer to Table 24-7, above) and are therefore not included here.

24.5.67 The cumulative developments that are relevant to this assessment due to their potential to interact with the Proposed Development with respect to marine ecology are:

- ID1: NZT Offshore Development;
- ID 2: York Potash;
- ID 4: Dogger Bank Teesside; and
- ID 79: Northern Gateway.

24.5.68 The installation of the NZT CO_2 export pipeline offshore (ID 1) will be subject to a separate consent application and falls within the scope of an assessment for in-combination effects with the Proposed Development – as such, potential combined effects of the onshore and offshore elements of the NZT project are considered within Section 14.10 ('In-Combination Effects') of Chapter 14: Marine Ecology (ES Volume I, Document Ref. 6.2) and Appendix 24C: Statement of Combined Effects, ES Volume III, Document Ref. 6.4).

24.5.69 ID 4, the Dogger Bank Teesside A / Sofia Offshore Wind Farm, includes three different elements: Dogger Bank A and B (the offshore wind farm sites) and the Dogger Bank Teesside A and B Export Cable Corridor. As the offshore wind farm sites are considered to be too far away (123 km to the closest UK mainland shore) to have cumulative effects on the Proposed Development, impact pathways have been considered for the Dogger Bank Teesside A and B Export Cable Corridor, only.

24.5.70 The exact timeframes of each activity for the above developments are currently unknown, however it is anticipated that the construction and operational phases of these projects could coincide with the those of the Proposed Development.

24.5.71 The following marine ecological impact pathways were identified for the developments included in the cumulative effects assessment:

- direct loss and physical disturbance to habitat and species;
- physical disturbance to habitats and species from increased suspended sediment concentration (SSC) (i.e. turbidity) (including deposition of contaminant remobilisation);
- changes in underwater soundscape;
- indirect effects to marine ecology from changes in marine water quality (excluding turbidity) (such as accidental spillages of fuel, and oils);
- collisions between project vessels and marine mammals;
- loss or restricted access to commercial fishing grounds;
- changes to hydrodynamic conditions; and
- changes in visual stimuli (including artificial light).

24.5.72 For the purpose of this assessment, impact pathways which are considered to be of low risk have been excluded from the assessment.

Table 24-12: Marine Ecology Cumulative Assessment (Construction and Operation)

ID	Scope of marine ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
1 - NZT Offshore	**Scoped in** - potential for cumulative effects to arise during construction due to loss of habitat in association with installation of the CO_2 Export Pipeline. Assessment is included within Appendix 24C: Statement of Combined Effects, ES Volume III, Document Ref. 6.4).	None of the impacts identified is likely to result in a significant effect (refer to Appendix 24C: Statement of Combined Effects, ES Volume III, Document Ref. 6.4).	NA	No residual cumulative effect (refer to Appendix 24C: Statement of Combined Effects, ES Volume III, Document Ref. 6.4).
2 – York Potash	**Scoped in** – during construction there is potential for cumulative effects to arise due to temporary loss of habitat, both in intertidal and subtidal zones; physical disturbance to benthic habitats and species from increased suspended sediment concentrations (i.e. turbidity) and deposition; changes in underwater soundscape (affecting migration of marine species or causing behavioural disturbance); loss or restricted access to commercial fishing grounds.	None of the impacts identified is likely to result in a significant effect (refer to text below this table).	NA	No residual cumulative effect
3 – Tees CCPP	**Scoped out** - no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
4 – Dogger Bank Teesside	**Scoped in** - during construction there is potential for cumulative effects to arise due to temporary loss of habitat, both in intertidal and subtidal zones; physical disturbance to benthic habitats and species from increased suspended sediment concentrations (i.e. turbidity) and deposition; changes in underwater soundscape (affecting migration of marine species or causing behavioural	None of the impacts identified is likely to result in a significant effect (refer to text below this table).	NA	No residual cumulative effect

ID	Scope of marine ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	disturbance); loss or restricted access to commercial fishing grounds.			
13 – CBRE	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
16 – Grangetown Prairie	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section(refer to Table 24-7 above)	NA	NA	No residual cumulative effect
17 - HCA	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
27 – Sirius Minerals	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
31 – Forewind	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
36 – Graythorp Energy	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
51 – Redcar & Cleveland LP Allocation	**Scoped out** – no potential impact pathways to marine ecological receptors.	NA	NA	No residual cumulative effect
66 – STDC South Bank 1	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources (refer to Table 24-7 above)	NA	NA	No residual cumulative effect

ID	Scope of marine ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
68 – MGT Teesside	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
71 – York Potash	**Scoped out** – no potential impact pathways to marine ecological receptors	NA	NA	No residual cumulative effect
73 – STDC South Bank 2	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
77 – Redcar Energy Centre	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
78 – Port Clarence	**Scoped out** – no potential impact pathways to marine ecological receptors	NA	NA	No residual cumulative effect
79 – Northern Gateway	**Scoped in** - during construction there is potential for cumulative effects to arise due to temporary loss of habitat, both in intertidal and subtidal zones; physical disturbance to benthic habitats and species from increased suspended	None of the impacts identified is likely to result in a significant effect (refer to text below this table).	NA	No residual cumulative effect

ID	Scope of marine ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	sediment concentrations (i.e. turbidity) and deposition; changes in underwater soundscape (affecting migration of marine species or causing behavioural disturbance); loss or restricted access to commercial fishing grounds.			
83 – STDC Dorman Point	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
84 – STDC Lackenby	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
85 – STDC The Foundry	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect
86 – STDC Long Acres	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood	NA	NA	No residual cumulative effect

ID	Scope of marine ecology cumulative assessment	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual Cumulative Effect
	Risk and Water Resources section (refer to Table 24-7 above)			
87 – STDC Steel House	**Scoped out** – no potential impact pathways to marine ecological receptors. Potential cumulative impacts on water quality in the Tees Estuary have been considered in the Surface Water, Flood Risk and Water Resources section (refer to Table 24-7 above)	NA	NA	No residual cumulative effect

24.5.73 The exact timeframes of each activity for the above shortlisted developments are currently unknown (available information regarding their projected timescales is presented within Table 24B-1, Appendix 24B: Assessment of Cumulative Effects Stages 1-3, ES Volume III, Document Ref. 6.4), however, they have been considered under the worst-case assumption that the construction and operational phases of these projects could coincide with those of the Proposed Development. The following sections summarise the potential cumulative effects during construction and operation. Further details are provided within Chapter 14: Marine Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2).

Cumulative Effects during Construction

Direct Loss and Physical Disturbance to Habitat and Species

24.5.74 All of the developments scoped into this assessment (refer to Table 24-12) would result in the temporary loss of habitat, both in intertidal and subtidal zones. For the York Potash Harbour Facilities Order (ID 2) and the Northern Gateway Container Terminal (ID 79) developments, the loss of habitat would occur in the Tees Estuary, consisting of habitat that is representative of the estuary in terms of sediment type and in faunal communities. Habitat loss from the Dogger Bank Teesside A / Sofia Offshore Wind Farm (ID 4) would occur to the south east of Tees Bay under the footprint of the wind farm export cable that would be landfall at Marske-by-the-Sea.

24.5.75 For all developments, the loss of habitat in the subtidal zone would be temporary and recovery would be expected to occur rapidly following completion, likely within 1-2 years. Soft sediments, such as those which characterise the benthic ecology Study Area, are known to be highly resilient to direct physical disturbance. Of the cumulative developments, permanent habitat loss is only expected to occur in the intertidal zone in the Tees Estuary as a result of the York Potash Harbour Facilities Order (ID 2). The habitat is mud and hard substrata of poor quality. The permanent loss as a result of the Proposed Development is predicted to be small and in the case of the York Potash Harbour Facilities Order (ID 2), will be representative of a different habitat type (in the subtidal zone).

24.5.76 Furthermore, similar habitat types can be found across broader geographical scales, meaning that the area loss (both temporary and permanent) of available habitat is considered to be of negligible significance.

24.5.77 Overall, the cumulative impact as a result of direct habitat loss and physical disturbance would be negligible and would not result in a significant cumulative effect.

Physical Disturbance to Benthic Habitats and Species from Increased Suspended Sediment Concentrations (i.e. Turbidity) and Deposition

24.5.78 Increases in SSC (i.e. turbidity) and the subsequent physical disturbance from increased deposition and turbidity (including the release and re-deposition of sediment-bound contaminants) is predicted to occur for all of the assessed shortlisted developments.

24.5.79 Capital dredging in the Tees Estuary would be required as part of the York Potash Harbour Facilities Order (ID 2) and for the Northern Gateway

Container Terminal (ID 79). Increases in SSC would also occur during Dogger Bank Teesside A / Sofia Offshore Wind Farm (ID 4) cable installation activities (cable burial), to the south east of Tees Bay.

24.5.80 Should dredging works from these developments occur concurrently with the Proposed Development, there is potential for adverse cumulative effects to occur. For example, indirect effects from physical disturbance associated with increased SSC, smothering and toxicity from the release of sediment-bound contaminants may occur on benthic ecology and fish and shellfish receptors. Furthermore, direct effects caused by concurrent dredging may result in cumulative effects on fish, predominantly migratory species, where the SSC plume may prohibit upstream movement.

24.5.81 However, dredging potentially required as part of the Proposed Development (for the new outfall head), which is anticipated in the Tees Bay, will represent a small area only. Therefore, this activity is unlikely to result in a cumulative increase in SSC in the Tees Estuary. In addition, it is considered unlikely that dredging operations associated with these developments would occur concurrently and as such the cumulative impact on marine ecology from increases in SSC is predicted to be negligible and the effect would be not significant.

Changes in Underwater Soundscape

24.5.82 There is a potential pathway for the cumulative increase in underwater sound in the marine environment as a result of piling activities and noise from vessels associated with construction works for the other developments included in the assessment.

24.5.83 If these activities were to occur concurrently with the Proposed Development, a cumulative increase in underwater sound could result in increased behavioural disturbance effects to some species. For example, the migration of marine mammals and fish and shellfish species in the Tees Estuary could be inhibited. This is particularly true for grey seals and breeding harbour seals which have a haul-out site at Seal Sands, on which potential effects are considered in the impact assessments for the York Potash Harbour Facilities Order (ID 2) and the Northern Gateway Container Terminal (ID 79).

24.5.84 However, it is unlikely that these activities will occur simultaneously for a continuous period of time. Subsequently, there would be periods during which unimpeded movement of these receptors would be possible. Furthermore, both the drilling of pin piles and dredging as part of the Proposed Development, are to be undertaken in the Tees Bay, meaning that there is not considered to be the potential for these activities to result in a temporary acoustic barrier in the River Tees which would impede migratory fish movements. Consecutive project activities producing underwater sound is possible although should this occur the likely impact zones will not overlap with the Proposed Development.

24.5.85 Given the temporary, short-term and intermittent nature of behavioural disturbance effects as a result of underwater sound from the Proposed Development, and the low likelihood that activities from cumulative developments would occur concurrently or consecutively, the potential for cumulative effects is negligible and therefore the effect is not significant.

Loss or restricted access to commercial fishing grounds

24.5.86 There is a potential for a cumulative impact pathway on the loss or restricted access to commercial fishing grounds as a result of the Dogger Bank Teesside A / Sofia Offshore Wind Farm (ID 4).

24.5.87 However, it is considered that cumulative effects would only occur for commercial fishing types found in the Tees Bay, where there is a potential for restricted access as a result of the Proposed Development. It is understood that this area is mainly used for potting and trapping by a limited number of smaller vessels (10 m and under) (Smith, pers. comms., 2021). In relation to the Dogger Bank Teesside A / Sofia Offshore Wind Farm (ID 4), similar commercial fishing would occur inshore to the south east of Tees Bay.

24.5.88 Due to the short duration of the installation of the export cables and pipelines of the Dogger Bank Teesside A / Sofia Offshore Wind Farm (ID 4), any restricted access to fishing grounds would be of a temporary nature. Any potential restricted access to commercial fishing grounds as a result of the Proposed Development would also be of a short duration and represent a very small area. Therefore, even if activities were to occur concurrently, the loss of fishing grounds would be negligible and as such the potential for cumulative effects is considered to be not significant.

Cumulative Effects during Operation

24.5.89 No potential cumulative impact pathways were identified for the operational phase of the Proposed Development.

Conclusions

24.5.90 There would be no significant cumulative effects given the conclusions presented in Chapter 14: Marine Ecology and Nature Conservation of the (ES Volume I, Document Ref. 6.2), including the considerations presented above and the mitigation and enhancement measures outlined in Chapter 14, Section 14.7: Mitigation and Enhancement Measures (ES Volume I, Document Ref. 6.2).

Ornithology Cumulative Effects

24.5.91 Chapter 13: Aquatic Ecology and Nature Conservation, Chapter 14: Marine Ecology and Nature Conservation, Chapter 12: Terrestrial Ecology and Nature Conservation, and Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, Document Ref. 6.2) identified no significant cumulative effects that would affect ornithological receptors.

24.5.92 The potential effects of cumulative habitat losses and air quality impacts upon habitats (which are used as indicators for potential impacts upon ornithological receptors) are discussed above and in Section 12.11 of Chapter 12: Terrestrial Ecology and Nature Conservation (ES Volume I, Document Ref. 6.2), which concludes that there are no significant cumulative effects.

24.5.93 Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2) has identified potential cumulative impacts that could occur within Coatham Dunes. The possibility of cumulative impacts arising from noise during construction and operation of the Proposed Development in combination with

other developments was assessed and found to have no significant cumulative effect of disturbance to birds. Additional detail is provided below.

24.5.94 The installation of the NZT CO_2 export pipeline offshore (ID 1) will be subject to a separate consent application and falls within the scope of an assessment for in-combination effects with the Proposed Development – see assessment within Section 15.10 In-Combination Effects Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2) and the Appendix 24C: Statement of Combined Effects, ES Volume III, Document Ref. 6.4).

Potential cumulative noise effects upon ornithological receptors

24.5.95 The noisiest activities associated with the Proposed Development will occur at the PCC Site and its environs south of the River Tees. There are no significant noise impacts predicted for any noise sensitive receptors north of the River Tees arising from the Proposed Development either in isolation or in combination with other developments. Cumulative noise impacts south of the River Tees in the environs of the PCC Site are considered further below.

24.5.96 Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2) gathered information from the noise assessments supporting the planning applications for which potential noise impacts were identified. The contributions of each of the other developments were determined for Coatham Dunes inclusive and exclusive of the noise emissions predicted for the Proposed Development. These are presented in Tables 15-9 and 15-10 of Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2) respectively.

Cumulative Effects during Construction (Noise)

24.5.97 The cumulative construction noise impact shows no increase in noise levels close to the PCC above those resulting from the Proposed Development alone and a negligible increase in noise levels further away from the PCC Site (refer to Table 15-10, Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2)).

24.5.98 Whilst there would be a slight increase in noise levels further away from the PCC, the cumulative noise levels would not exceed those for the Proposed Development alone at any location, remaining at or below 70dB. Subsequently, the temporary cumulative noise impacts during construction would not result in any significant adverse cumulative effects on ornithology receptors.

Cumulative Effects during Operation (Noise)

24.5.99 The baseline sound measurements for the Site show that at location E3, within Coatham Dunes, birds are subjected to daytime sound levels of 59 dB(A) LA_{max}, 46 dB(A) LAeq during the day and 43dB(A) LAeq at night arising largely from existing industry (refer to Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2)). At sound monitoring location M3 (Tod Point Road), adjacent to the SPA, the equivalent sound levels are 81dB(A), 56dB(A) and 47dB(A) respectively.

24.5.100 Sound monitoring location M2 (York Road) is more representative of habitats east of the PCC Site but outside of the SPA. The baseline sound measurements here - respectively 87 dB, 66 dB and 52 dB - indicate that

away from the Dunes, birds using the habitats to the east and south of the PCC Site are subject to higher baseline sound levels.

24.5.101 This indicates that the existing sound environment is very variable: average sound levels are not particularly high, but within a representative 15-minute period, very high baseline sound levels are experienced, especially within the habitats to the east of the PCC Site. This strongly suggests that birds in this area are exposed to (and thus likely to be habituated to) a highly variable sound environment with a significant impulsive sound element that at some locations is well above the 70 dB noise threshold (i.e. the sound level up to which birds are able to habituate) agreed by Natural England during consultation in December 2020 (for further details refer to Section 15.3 of Chapter 15: Ornithology, ES Volume I, Document Ref. 6.2).

24.5.102 Using night time ambient sound levels of 43dB LAeq as a worst-case baseline on which to base an assessment within Coatham Dunes, there would be an increase in sound levels at Coatham Dunes of 8dB due to other developments (refer to Table 15.10, Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2)), which will occur irrespective of the Proposed Development, that in turn is predicted to contribute a further 1-6 dB above this level, to a maximum ambient sound level of 57 dB.

24.5.103 While this is a relatively large increase above the current night time sound level, in the context of an environment within which birds are likely to be habituated to variable and often percussive noise emissions from existing emitters (principally road traffic and existing industry), it is not likely to result in a significant effect on birds and falls well below the 70dB noise response threshold above which significant effects on birds would occur.

24.5.104 Table 11-33 of Chapter 11: Noise and Vibration (ES Volume I, Document Ref. 6.2) shows that the contribution of the Proposed Development to cumulative noise emissions will be 1 dB above the levels predicted due to the combined operational sound levels of other major developments in the absence of the Proposed Development at Tod Point Road (NSR4). It is therefore reasonable to assume that the breeding and non-breeding birds that use habitats east and south of the PCC will be highly unlikely to alter their behaviour or habitat use in response to cumulative operational noise.

24.5.105 The cumulative effects of operational noise on ornithology receptors would therefore be negligible and not significant.

Conclusions

24.5.106 Based upon the above, the Proposed Development will not result in any significant cumulative effects relating to ornithology. As such, no additional mitigation measures are proposed about that specified within Chapter 15: Ornithology (ES Volume I, Document Ref. 6.2), and no significant residual cumulative effects will arise.

Traffic and Transportation Cumulative Effects

24.5.107 As previously stated, the 2024 baseline traffic against which the effects of construction traffic have been assessed at Chapter 16: Traffic and Transportation (ES Volume I, Document Ref. 6.2) includes any traffic that would be generated by committed ‘other developments’. The assessment of

construction traffic effects is therefore inherently cumulative. Assessment of operational traffic from the Proposed Development was scoped out as the traffic flows would be too low to give rise to a significant effect. As such there is no separate assessment of cumulative traffic and transport effects included as part of this ES.

Landscape and Visual Amenity Cumulative Effects

24.5.108 The assessment considers the potential for cumulative impacts to static views within the landscape which may be either simultaneous (where developments would be observable at the same time) or successive (where an observer would be required to turn to experience multiple developments).

24.5.109 Cumulative landscape effects may result where effects resulting from a number of developments combine, increasing the prevalence of such development within a landscape to an extent where they may become a defining characteristic. The likely significance of these effects relates to the number of developments affecting the landscape, their scale, their inter-relationship and the sensitivity and ability of the particular landscape to accommodate this type of development.

24.5.110 Cumulative visual effects may result where effects resulting from a number of developments combine to increase the appearance and dominance within a particular view. The likely significance of these effects relates to the number of developments visible and their scale, location and inter-relationship to each other within the view.

Landscape Cumulative Effects

24.5.111 The landscape cumulative assessment assesses the cumulative effects on identified landscape receptors within the landscape and visual assessment ZoI. Landscape receptors that have been assessed as having negligible adverse effects from the Proposed Development alone have not been included in the assessment of cumulative effects, as it is considered unlikely that the addition of a negligible adverse effect to the cumulative effects of other developments within the ZoI would lead to a significant cumulative impact.

24.5.112 Potential cumulative effects which may arise during the construction and operation phases of the Proposed Development are outlined in Table 24-13, below.

24.5.113 All of the shortlisted developments identified in Table 24-5 have been screened into the assessment of cumulative landscape effects, below, with the exceptions of IDs 1 and 4, due to their remoteness from the Proposed Development. The other developments were scoped into the landscape assessment due to their potential to affect the landscape, their scale, their proximity to the Proposed Development and their inter-relationship to each other within the view. For the purposes of this assessment, the unlikely worst-case scenario of all the shortlisted developments being constructed and therefore present in the landscape simultaneously has been assumed and if construction were not to occur simultaneously then the reported cumulative effect would be reduced.

Table 24-13: Assessment of Cumulative Landscape Effects – Construction, Opening (Year 1) and Operation (Year 15)

Landscape type	Receptor Sensitivity	Description of impact	Predicted magnitude of cumulative impact	Classification of effect
Eston Hills Landscape Character Tract (LCTr)	High	**Construction:** A number of the cumulative developments will introduce construction activity within views from the Landscape Character Tract (LCTr). Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCTr it is assessed that the introduction of construction activity associated with the Proposed Development would result in a limited change to the LCTr. It is assessed that the cumulative impact would remain at very low, the same as for the Proposed Development assessed in isolation.	Very low	Minor adverse (not significant)
		Opening (Year 1): A number of the cumulative developments will introduce additional built form within views from the LCTr. Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCTr it is assessed that the opening of the Proposed Development would result in a limited change to the LCTr. It is assessed that the cumulative impact would remain at very low, the same as for the Proposed Development assessed in isolation.	Very low	Minor adverse (not significant)
		Operation (Year 15): The impacts during operation are anticipated to be similar to the opening assessment scenario. The operation of the Proposed Development in addition to the cumulative developments is assessed to remain at very low, the same as for the Proposed Development assessed in isolation.	Very low	Minor adverse (not significant)
Redcar Flats LCTr	Medium	**Construction:** A number of the cumulative developments are located within or adjacent to the Redcar Flats LCTr. Due to existing large-scale industrial complexes that influence the LCTr it is assessed that the impact of construction activity associated with the Proposed Development would result in a limited influence on the LCTr. It is assessed that the cumulative impact on the LCTr would remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)
		Opening (Year 1): The built form associated with the cumulative developments within the LCTr would introduce uncharacteristic development into the LCTr alongside views of the Proposed Development. The impact is viewed in the context of the adjacent large-scale industrial developments and it is assessed that the cumulative impact on the LCTr would remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)

Landscape type	Receptor Sensitivity	Description of impact	Predicted magnitude of cumulative impact	Classification of effect
		Operation (Year 15): The impacts during operation are anticipated to be similar to the opening assessment scenario. The operation of the Proposed Development in addition to the cumulative developments is assessed to remain at very low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)
East Billingham to Teesmouth Landscape Character Area (LCA)	Medium	**Construction:** A number of the cumulative developments will introduce construction activity within views from the Landscape Character Area (LCA). Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCA it is assessed that the direct impact of construction activity associated with the Proposed Development would result in a limited change to the LCA. It is assessed that the cumulative impact would remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)
		Opening (Year 1): A number of the cumulative developments will introduce additional built form within views from the LCA. Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCA it is assessed that the impact associated with the Proposed Development would result in a limited change to the LCA. It is assessed that the cumulative impact would remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)
		Operation (Year 15): The impacts during operation are anticipated to be similar to the opening assessment scenario. The operation of the Proposed Development in addition to the cumulative developments is assessed to remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor adverse (not significant)
Coastal Fringe Local Character Type (LCT)	High	**Construction:** A number of the cumulative developments will introduce construction activity within views from the Landscape Character Type (LCT). Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCT it is assessed that the impact of construction activity associated with the Proposed Development would result in a limited change to the LCT. It is assessed that the cumulative impact would remain at low, the same as for the Proposed Development assessed in isolation.	Low	Minor[1] adverse (not significant)

Landscape type	Receptor Sensitivity	Description of impact	Predicted magnitude of cumulative impact	Classification of effect
		Opening (Year 1): A number of the cumulative developments will introduce built form within views from the CT. Due to the high number of existing large-scale industrial complexes and transport infrastructure that influence the LCT it is assessed that built form associated with the Proposed Development would result in a limited change to the LCT. It is assessed that the cumulative impact would remain at very low, the same as for the Proposed Development assessed in isolation.	Very low	Minor adverse (not significant)
		Operation (Year 15): The impacts during operation are anticipated to be similar to the opening assessment scenario. The operation of the Proposed Development in addition to the cumulative developments is assessed to remain at very low, the same as for the Proposed Development assessed in isolation.	Very low	Minor adverse (not significant)
Estuarine LCT	Medium	**Construction:** As above for Coastal Fringe LCT.	Low	Minor adverse (not significant)
		Opening (Year 1): As above for Coastal Fringe LCT.	Very low	Negligible adverse (not significant)
		Operation (Year 15): As above for Coastal Fringe LCT.	Very low	Negligible adverse (not significant)

[1] Determination of the significance of cumulative landscape and visual effects has been undertaken by employing professional judgement to combine and analyse the cumulative magnitude of change against the identified sensitivity to change. The assessment process is not a prescriptive process and follows the guidance within GLVIA 3. Therefore, a receptor that just falls within high sensitivity with a low impact can be considered, through professional judgement, to have a minor effect.

Conclusions

24.5.114 In summary, the assessment has concluded that the identified LCTr, LCA and LCT are not predicted to experience significant cumulative effects with any of the assessment scenarios.

Visual Cumulative Effects

24.5.115 The visual cumulative assessment assesses the potential for cumulative effects upon identified visual receptors within the study area, i.e. the landscape and visual ZoI, as defined in Table 24-1.

24.5.116 Development IDs 2, 3, 13, 16, 27, 36, 66, 68, 77, 79, 85, 86 and 87 were scoped into the assessment of cumulative visual effects, due to their scale, their potential to be visible from the identified sensitive receptors, and their inter-relationships within the view.

24.5.117 Table 24-14 below outlines the reasoning for the remaining shortlisted developments (presented in Table 24-5) being scoped out of the assessment of cumulative visual effects.

Table 24-14: Assessment of Cumulative Visual Effects – Scope

ID	Reason for scoping out of cumulative visual effects assessment
1 - NZT Offshore	Discounted due to distance from the Proposed Development and the majority of elements being below sea level.
4 – Dogger Bank Teesside	Discounted due to remoteness from the Proposed Development.
17 - HCA	Discounted due to lack of inter-visibility with the representative viewpoints and scale of development.
31 – Forewind	Discounted due to lack of inter-visibility with the representative viewpoints and scale of development.
51 – Redcar & Cleveland LP Allocation	Discounted due to lack of inter-visibility with the representative viewpoints and scale of development.
71 – York Potash	Discounted due to lack of inter-visibility with the representative viewpoints and distance from the Proposed Development.
73 – STDC South Bank 2	Discounted due to low height of structures and distance from the Proposed Development.
78 – Port Clarence	Discounted due to lack of inter-visibility with the representative viewpoints and distance from the Proposed Development.
83 – STDC Dorman Point	Discounted due to height of structures and distance from the Proposed Development.
84 – STDC Lackenby	Discounted due to height of structures and distance from the Proposed Development.

24.5.118 Potential cumulative visual effects of the Proposed Development are summarised in Table 24-15, below, by reference to representative viewpoints. The detailed assessments are provided in Chapter 17: Landscape and Visual Amenity (ES Volume I, Document Ref. 6.2). Viewpoint locations are shown in Figure 17-6 Representative Viewpoint Locations (ES Volume II, Document Ref. 6.3).

24.5.119 Visual receptors that have been assessed as having a negligible effect due to the Proposed Development have not been included in the assessment of

cumulative effects, as it is considered unlikely that the addition of a negligible effect to the cumulative effects of other developments would lead to a significant cumulative effect. This applies to:

- Viewpoint 1 (Albion Terrace, Hartlepool) at all assessment scenarios;
- Viewpoint 2 (The Cliff, Seaton Carew) at opening and operation;
- Viewpoint 3 (Teesmouth National Nature Reserve, England Coast Path) at opening and operation;
- Viewpoint 6 (Cowpen Bewley Country Park) at all assessment scenarios;
- Viewpoint 10 (Eston Nab) at all assessment scenarios;
- Viewpoint 11 (Longbeck Lane) at all assessment scenarios; and
- Viewpoint 12 (Carpark off A1085 Coast Road, Marske by the Sea) at all assessment scenarios.

Table 24-15: Cumulative Visual Effects during Construction, Opening (Year 1) and Operation (Year 15), from Representative Viewpoints

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
Viewpoint 2: The Cliff, Seaton Carew	York Potash (ID 2) CBRE Anaerobic Biogas (ID 13) York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only Redcar Energy Centre (ID 77) Northern Gateway Container Terminal (ID 79) STDC The Foundry (ID 85) STDC Long Acre (ID 86) STDC Steel House (ID 87)	High: residential and PRoW users.	**Construction**: Structures associated with the demolition of the areas within STDC ownership and the construction of the STDC structures will be barely visible within the view due to distance and intervening structures. The construction of the Redcar Energy Centre will appear in front of and partially screening the construction activity associated with the Proposed Development. The presence of the other characteristic, cumulative developments including stacks, will slightly intensify the built structures visible from this location. The addition of the construction activities associated with the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Opening and Operation:** scoped out - see paragraph 24.5.85, above.	No additional mitigation proposed for cumulative effects	**Construction:** Minor adverse (not significant)
Viewpoint 3: Teesmouth National Nature Reserve, England Coast Path	Graythorp Energy from Waste (ID 36) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) Northern Gateway Container Terminal (ID 79)	High: recreational users.	**Construction:** The structures associated with the demolition of the areas within STDC ownership and the construction of the STDC structures will be barely visible within the view due to distance and intervening structures. The construction of the Redcar Energy Centre will appear in front of and partially screening the construction activity associated with the Proposed Development. The construction operations associated with the Graythorp Energy from Waste development will be visible to the right of the view. The presence of the other characteristic, cumulative developments including stacks, will slightly intensify the built structures visible from this	No additional mitigation proposed for cumulative effects	**Construction:** Minor adverse (not significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			location. The addition of the construction operations associated with the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Opening and Operation:** scoped out - see paragraph 24.5.85, above.		
Viewpoint 4: North Gare Sands	York Potash (ID 2) CBRE Anaerobic Biogas (ID 13) Energy recovery facility (ID 16) York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) Northern Gateway Container Terminal (ID 79) STDC The Foundry (ID 85) STDC Long Acre (ID 86) STDC Steel House (ID 87)	High: recreational users.	**Construction:** The structures associated with the demolition of the areas within STDC ownership and the construction of the STDC structures will be visible within the view. The construction of the Redcar Energy Centre will appear in front of and partially screening the construction activity associated with the Proposed Development. The presence of the other characteristic, cumulative developments including stacks, will slightly intensify the built structures visible from this location. The addition of the construction operations associated with the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Opening (Year 1):** The presence of the identified cumulative developments including the operational Redcar Energy Centre, which will partially screen the Proposed Development will slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed	No additional mitigation proposed for cumulative effects	**Construction:** Minor adverse (not significant) **Opening:** Minor adverse (not significant) **Operation:** Minor adverse (not significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			Development in isolation. The impact will be long term and reversible, resulting in a minor adverse effect. **Operation (Year 15):** Maturing replacement planting will not be visible from this viewpoint. Therefore, there will be no change to the impacts assessed at opening. The addition of the Proposed Development will result in a cumulative impact that is no greater than that assessed for the Proposed Development in isolation. The impact will be long term and reversible, resulting in a minor adverse effect.		
Viewpoint 5: South Gare Breakwater	York Potash (ID 2) Tees CCGT power station (ID 3) CBRE Anaerobic Biogas (ID 13) Energy recovery facility (ID 16) York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) Northern Gateway Container Terminal (ID 79) STDC The Foundry (ID 85) STDC Long Acre (ID 86) STDC Steel House (ID 87)	High: recreational users.	**Construction:** The construction of the Redcar Energy Centre will be visible to the right of the construction activity associated with the Proposed Development. The construction of the Energy recovery facility will be partially visible behind the Proposed Development. The presence of the other characteristic, cumulative developments including stacks, will slightly intensify the built structures visible from this location. The addition of the construction operations associated with the Proposed Development will result in a medium cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a moderate adverse effect. **Opening (Year 1):** The presence of the identified cumulative developments will intensify the visibility of characteristic built structures from this location. The Proposed Development will be located in front of and partially screening the Energy recovery facility. The addition of the structures associated with the Proposed Development to the operational Redcar Energy Centre (which will appear more prominent from this location in	No additional mitigation proposed for cumulative effects	**Construction:** Moderate adverse (significant) **Opening:** Minor adverse (not significant) **Operation:** Minor adverse (not significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			comparison to the Proposed Development) and the Energy recovery facility will result in a cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be long term and reversible, resulting in a minor adverse effect. **Operation (Year 15):** Maturing replacement planting will not be visible from this viewpoint. Therefore, there will be no change to the impacts assessed at opening. The addition of the Proposed Development will result in a cumulative impact that is no greater than that assessed for the Proposed Development in isolation. The impact will be long term and reversible, resulting in a minor adverse effect.		
Viewpoint 7: England Coast Path, Warrenby	Cumulative Developments York Potash (ID 2) York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) STDC Long Acre (ID 86) STDC Steel House (ID 87)	High: recreational users.	**Construction:** The activity associated with the STDC demolition will be partially visible in the foreground. Construction activity associated with the MGT Teesside and the STDC Long Acre and Steel House developments will be visible in the foreground. Construction activity associated with the Redcar Energy Centre will be visible in the background of the view. The presence of the other characteristic, cumulative developments, will intensify the built structures visible from this location. The addition of the construction operations associated with the Proposed Development will result in a medium cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a moderate adverse effect. **Opening (Year 1):** The structures associated with the MGT Teesside, Redcar Energy Centre and the STDC Long Acre and Steel House will be visible, partially	No additional mitigation proposed for cumulative effects	**Construction:** Moderate adverse (significant) **Opening:** Moderate adverse (significant) **Operation:** Moderate adverse (significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			screened by landform in the foreground. The presence of the identified cumulative developments will intensify the visibility of characteristic built structures from this location. The addition of the Proposed Development will result in a medium cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a moderate adverse effect. **Operation (Year 15):** Maturing replacement planting will not be visible from this viewpoint. Therefore, there will be no change to the impacts assessed at opening. The addition of the Proposed Development will result in a cumulative impact that is no greater than that assessed for the Proposed Development in isolation. The impact will be long term and reversible, resulting in a moderate adverse effect.		
Viewpoint 8: Redcar Seafront	York Potash (ID 2) York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) STDC The Foundry (ID. 85) STDC Long Acre (ID 86) STDC Steel House (ID 87)	High: residential and recreational users.	**Construction:** The construction activity and completed structures associated with the identified cumulative developments will be visible from this location, spread across the majority of the visible landform on the horizon. The presence of the other characteristic, cumulative developments will intensify the built structures visible from this location. The addition of the construction operations associated with the Proposed Development will result in a medium cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a moderate adverse effect. **Opening (Year 1):** The structures associated with the cumulative developments will be visible, spread across the horizon, intensifying the built structures visible from	No additional mitigation proposed for cumulative effects	**Construction:** Moderate adverse (significant) **Opening:** Minor adverse (not significant) **Operation:** Minor adverse (not significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			this location. The addition of the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Operation (Year 15):** Maturing replacement planting will not be visible from this viewpoint. Therefore, there will be no change to the impacts assessed at opening. The addition of the Proposed Development will result in a cumulative impact that is no greater than that assessed for the Proposed Development in isolation. The impact will be long term and reversible, resulting in a minor adverse effect.		
Viewpoint 9: Coatham Marsh Nature Reserve	York Potash overhead conveyor (ID 27) STDC South Bank 1 (ID 66) – construction period only MGT Teesside (ID 68) Redcar Energy Centre (ID 77) STDC Long Acre (ID 86) STDC Steel House (ID 87)	Medium: recreational users.	**Construction:** The construction activity and completed structures associated with the identified cumulative developments will be visible from this location, spread across the majority of the visible landform on the horizon. The presence of the other characteristic, cumulative developments, will intensify the built structures visible from this location. The addition of the construction operations associated with the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Opening (Year 1):** The structures associated with the cumulative developments will be visible, spread across the horizon, intensifying the built structures visible from this location. The addition of the Proposed Development will result in a low cumulative impact, although no greater than that assessed for the Proposed Development in	No additional mitigation proposed for cumulative effects	**Construction:** Minor adverse (not significant) **Opening:** Minor adverse (not significant) **Operation:** Minor adverse (not significant)

Viewpoint	Developments included in assessment (ID numbers)	Sensitivity of receptor	Assessment of cumulative effect with the Proposed Development	Proposed mitigation applicable to the Proposed Development	Residual cumulative effect
			isolation. The impact will be short term and reversible, resulting in a minor adverse effect. **Operation (Year 15):** Maturing replacement planting will not be visible from this viewpoint. Therefore, there will be no change to the impacts assessed at opening. The operational development will be clearly visible in the view. The impact is assessed to be low, long term and reversible, resulting in a minor adverse effect.		

Conclusions

24.5.120 In summary, the cumulative viewpoint assessment identified that viewpoint 5 (recreational receptors at South Gare Breakwater) and viewpoint 8 (recreational and residential receptors at Redcar seafront) would be subject to a moderate adverse significant cumulative effect as a result of views of the construction of the Proposed Development if concurrent with the construction and operation of a number of the identified cumulative developments. This cumulative effect is the same overall classification of effect as that for construction of the Proposed Development alone. Viewpoints 5 and 8 would be subject to minor adverse (not significant) cumulative effects during opening and operation of the Proposed Development.

24.5.121 Viewpoint 7 (recreational receptors at England Coast Path, Warrenby) would be subject to a moderate adverse significant cumulative effect as a result of views of the Proposed Development construction if concurrent with the construction and operation of a number of the identified cumulative developments and during opening and operation as a result of the operation of the cumulative developments. This cumulative effect is the same overall classification of effect as that for the Proposed Development alone.

24.5.122 The remaining scoped in viewpoints (viewpoints 2, 3, 4, 8 and 9) are all predicted to be subject to minor adverse cumulative effects during construction, opening and operation that are not significant; these cumulative effects are again the same overall classification of effect as that for the Proposed Development alone.

24.5.123 As none of the cumulative effects are greater than that for the Proposed Development alone, no mitigation above that which is outlined at Chapter 17: Landscape and Visual Amenity (ES Volume I, Document Ref. 6.2) is proposed.

Archaeology and Cultural Heritage Cumulative Effects

24.5.124 The potential for cumulative archaeology and/or cultural heritage effects has been considered during the construction and operational phases of the Proposed Development (refer to Chapter 18: Archaeology and Cultural Heritage (ES Volume I, Document Ref. 6.2)).

24.5.125 For a cumulative effect to arise as a result of a physical impact to a heritage asset during construction, a development would have to affect the same heritage asset as the Proposed Development. Cumulative effects during operation could arise where the operational components of a development, when viewed alongside or combined with those from the Proposed Development, could interrupt lines of inter-visibility or, for example, create an increase in massing within a view of historical importance.

24.5.126 None of the shortlisted developments identified at Table 24-5 would result in additional physical impacts to the heritage assets considered in Chapter 18: Archaeology and Cultural Heritage of this ES. None of the developments in Table 24-5 would interrupt lines of inter-visibility or create an increase in massing within a view of historical importance. As all of the developments in Table 24-5 can be scoped out of the assessment of cumulative archaeology and heritage effects, there is no potential for cumulative effects on heritage

assets or their setting either during construction or operation of the Proposed Development.

Marine Heritage Cumulative Effects

24.5.127 The potential for cumulative marine heritage impacts has been considered during construction and operation of the Proposed Development (refer to Chapter 19: Marine Heritage (ES Volume I, Document Ref. 6.2)).

24.5.128 For a cumulative effect to arise as a result of impacts to marine heritage assets, a development would have to affect the same heritage asset as the Proposed Development.

24.5.129 None of the shortlisted developments identified at Table 24-5 would result in any additional physical impacts to the marine heritage assets considered in Chapter 19: Marine Heritage of this ES. As all of the developments in Table 24-5 can be scoped out of the assessment of cumulative marine heritage effects, there is no potential for cumulative effects on marine heritage assets, either during construction or operation of the Proposed Development.

Socio-economics and Tourism Cumulative Effects

24.5.130 The potential for cumulative socio-economic and tourism effects has been considered in Chapter 20: Socio-economics and Tourism (ES Volume I, Document Ref. 6.2). The potential for cumulative effects on navigation and shipping is discussed within Appendix 20B: Navigational Risk Assessment.

24.5.131 With regards to socio-economic and tourism effects, it is assumed that all of the developments identified in Table 24-5 would cumulatively generate additional employment opportunities and associated socio-economic benefits to add to the benefits of the Proposed Development during construction and operation.

24.5.132 In addition, it has been assumed that all of the other developments considered (in Table 24-5) constitute development that is broadly in line with the relevant Local Plan employment designations and policies, namely those included in:

- Redcar and Cleveland Local Plan (2018a);
- Stockton-on-Tees Local Plan (2019);
- Hartlepool Local Plan (2018); and
- Middlesbrough Publication Local Plan (2018).

24.5.133 Whilst there might be a short-term risk of temporary labour shortage or local accommodation shortage should multiple projects progress simultaneously, the cumulative socio-economic effects of the other developments together with the Proposed Development, are considered to be significantly beneficial overall.

24.5.134 With regards to navigation and shipping Appendix 20B: Navigational Risk Assessment (ES Volume III, Document Ref. 6.4), discusses the potential for there to be cumulative effects on marine vessels as a result of construction of the CO_2 Export Pipeline above the Mean Low Water Springs (MWLS) and works around the existing treated water outfall and any potential replacement outfall, for which consent is being sought as part of the Proposed

Development, and construction of the CO_2 Export Pipeline from the MWLS to 3 km offshore to connect with the offshore storage facility, consent for which will be sought separately as part of the Offshore Works (Table 24-5, ID 1). No other plans, projects or marine consents applications have been identified within the search area around the Proposed Development site.

24.5.135 At this stage, there is minimal detail surrounding the offshore works associated with the CO_2 Pipeline. It is currently anticipated that the construction of the CO_2 Export Pipeline will require use of vessels such as work boat(s) and/or barge(s). The pipeline, which will be constructed using HDD is expected to be drilled beneath Coatham Dunes and Sands, from approximately 3 km offshore, where there is a minimum 5 m water depth, to onshore at the PCC Site (or vice versa).

24.5.136 Vessel activity associated with construction of the Proposed Development will primarily take place within the inner reaches of the Tees Bay (i.e. around the locality of the existing Outfall Tunnel or the Replacement Outfall Tunnel). The separation distance between the Offshore Works and the working areas for the existing Outfall Tunnel and Replacement Outfall Tunnel are approximately 2.75 km and 1.25 km respectively (or 2.25 km and 750 m when likely potential exclusion zones of 500 m are applied). It is therefore considered that there is sufficient navigable room between both working areas and their associated exclusion zones.

24.5.137 In terms of vessel displacement, the marine working areas for the Proposed Development (i.e. the existing Outfall Tunnel and the replacement Outfall Tunnel) are within the vicinity of some local third party traffic (such as that associated with the Teesside Wind Farm and localised potting and trapping effort, as discussed above). On this basis, there could be some short-term temporary displacement of other mariners through the presence of workboats and potential exclusion zones. Similarly, for the Offshore Works, there may be some temporary displacement of mariners through vessels and potential exclusion zones for this activity.

24.5.138 A typical exclusion zone for vessels such as involved in both the construction of the Proposed Development and Offshore Works (i.e. barges and jack-up rigs) is likely to be approximately 500 m. Simultaneous works at the Existing Outfall location and the potential working area for Offshore Works have been considered cumulatively; this has included application of a likely exclusion zone for each working area. In this scenario, there is approximately 2.25 km of navigable sea room between the Proposed Development and the Offshore Works. On this basis, it is considered that there is a very low risk of a potential cumulative (significant) effect on shipping and navigation arising from the simultaneous construction of the Proposed Development and Offshore Works.

24.5.139 The exact location for the Replacement Outfall, if required, has not yet been confirmed. Following a precautionary approach, the most seaward extent of the Water Connection Corridor to the south east of the Proposed Development Site has been modelled; this is highly conservative. Simultaneous works at this indicative Replacement Outfall location and the potential working area for Offshore Works have been considered cumulatively; this has included application of a likely exclusion zone for each

working area. In this scenario, there is approximately 750 m of navigable sea room between the Proposed Development and Offshore Works.

24.5.140 Considering the likely potential nature, size and capability of third-party mariners utilising this area (i.e. MAR-D and MAR-F traffic)[3], it is considered highly unlikely that their navigation would be impeded by simultaneous works and exclusion zones. On this basis, it is considered that there is a very low risk of a potential cumulative (significant) effect on shipping and navigation arising from the simultaneous construction of the Proposed Development and Offshore Works.

Climate Change Cumulative Effects

24.5.141 Chapter 21: Climate Change (ES Volume I, Document Ref. 6.2) assesses the contribution that the Proposed Development makes to climate change as a result of GHG-emitting activities.

24.5.142 Climate change is the result of cumulative impacts as it is the result of innumerable GHG-emitting activities. The cumulative effects of GHG emissions on the global climate are acknowledged as being potentially significant but it is not possible to quantitatively assess these effects within this assessment. Whilst the emissions from the Proposed Development alone can be estimated and compared against sectoral national carbon budgets, the combined effect together with all other GHG-emitting activities cannot be assessed due to data not being available.

24.5.143 Once neighbouring industries are able to connect to the CO_2 gathering network and carbon can be captured from existing sources, it is envisaged that the project as a whole could result in a net reduction in carbon emissions from current levels. The objective of achieving net zero status for the NZT plant and connected industrial users will have a beneficial effect on annual UK carbon emissions.

24.5.144 The Climate Change Resilience (CCR) assessment reported in Chapter 21: Climate Change (ES Volume I, Documents Ref. 6.2) considers the influence of climate change upon the Proposed Development itself and therefore a cumulative or combined assessment of CCR not applicable.

24.6 Combined Effects Assessment

24.6.1 Details of the combined effects assessment are discussed in the sections below. The outcomes of the combined effects assessment are summarised in Tables 24-16 and 24-17.

24.6.2 Each of the technical assessments reported in the ES (ES Volume I, Document Ref. 6.2) has identified effects which may occur as result of the Proposed Development, ranging from negligible or minor (not significant) to moderate and major (significant). Multiple effects upon one or more common receptors could theoretically interact or combine, to result in a combined effect which is more or less significant than the effects individually.

[3] MAR_D: Powered Vessel (Small): Fishing vessels of 10 m and under; small recreational powered craft such as jet skis or small Rigid Inflatable Boats (RIBs); inshore lifeboat launches; MAR_F: Commercial Vessel (Small): Fishing vessels of 10 m and over; North Sea barges; work boats; pilot boats; harbour tugs; dive support RIBs; windfarm O&M craft; other miscellaneous support craft (Refer to Table 20B-6 in Appendix 20B: Navigational Risk Assessment)

24.6.3 As described in Section 24.3.1, some of the technical assessments have already considered effects that result from the combination or interaction of different types of impacts on individual receptors. For example, the potential for multiple effects to affect the Teesmouth and Cleveland Coast SSSI, SPA and RAMSAR sites is considered within Chapter 12: Terrestrial Ecology and Nature Conservation and Chapter 15: Ornithology. Any effects arising from the interaction of impacts on individual receptors which have already been assessed within the technical assessments are not repeated here. This section considers only those combined effects which have not been identified elsewhere within the technical assessments. As such, this chapter considers only the potential combined effects on human receptors.

24.6.4 When considering combined effects, the mitigation measures as set out in Chapters 8 to 23 (including embedded mitigation measures built into the Proposed Development's design and measures embedded in the Framework CEMP (Appendix 5A (ES Volume III, Document Ref. 6.4)) must be taken into account. Therefore, only residual effects (post-mitigation) are considered.

24.6.5 In assessing potential combined effects, human receptors experiencing effects of minor or greater magnitude have been considered. The types of impacts that could be experienced by these receptors and which may interact are noise, air quality and visual effects, during both construction and operation.

24.6.6 Mitigation of any combined effects identified is best achieved through management and control measures employed to prevent or reduce the individual effects in the first instance, thereby reducing the likelihood of the effects interacting and combining.

24.6.7 The following sections provide a qualitative assessment of the potential for combined effects to arise, following a review of ES Chapters 8-23 (Volume I). Common receptors have been identified.

Combined Effects During Construction

Residual air quality, noise, landscape and visual and socio-economic and tourism effects

24.6.8 The Air Quality assessment presented in Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2 and Appendix 8A: Air Quality - Construction Assessment, ES Volume III, Document Ref. 6.4) identified one location with human receptors sensitive to construction dust emissions, at Broadway. The assessment concluded that, without mitigation, dust impacts would be 'low to medium risk' for human health receptors at Broadway. However, with mitigation measures applied as part of the CEMP, there would be no residual effects.

24.6.9 The Air Quality assessment identified no sensitive human receptors within 200 m of the Site and therefore the potential for Non-Road Mobile Machinery, NRMM) emissions within the Site to result in air quality impacts on local human health receptors is considered negligible with reference to the IAQM/EPUK screening criterion. No residual air quality effects associated with construction traffic or construction plant (Non-Road Mobile Machinery, NRMM) were identified. Therefore, there would be no combined effects on human receptors associated with air quality or dust during construction.

24.6.10 The Noise and Vibration assessment presented in Chapter 11: Noise and Vibration (ES Volume I, Documents Ref. 6.2) identifies that there would be up to a minor adverse residual effect on the nearest sensitive receptors during the construction of the CO_2 Gathering Network and during the construction of the Natural Gas Connection. Receptors affected by construction of the CO_2 Gathering Network are represented by NSR7 - Northumbrian Water site offices and NSR8 - Seal Sands offices. Should the construction of these two networks take place at the same time the effect could increase to moderate adverse. However, it would be unlikely that both sets of construction works would be undertaken at the closest approach simultaneously. There could also be residual minor adverse effects, during any night-time or evening works, at NSR4- Marsh House Farm, during construction of the PCC and on NSR1 – 58, Broadway West, NSR3 - 131 Broadway West and NSR4 - Marsh House Farm during other night-time construction works. Wherever possible, evening and night-time works would be avoided. Residual effects on other residential receptors during the construction works associated with the Proposed Development would be negligible or not applicable and have therefore been excluded from any consideration of combined effects.

24.6.11 There would be negligible adverse effects due to construction traffic noise and it is considered that any noise from occasional rail transport to import materials would be negligible. Hence any construction traffic and transport-related noise effects have been excluded from the consideration of combined effects.

24.6.12 The Landscape and Visual assessment presented in Chapter 17: Landscape and Visual Amenity (ES Volume I, Document Ref. 6.2) identifies a number of moderate adverse effects on visual receptors including recreational users at, South Gare Breakwater (viewpoint 5), the England Coastal Path (viewpoint 7) and Redcar Seafront (viewpoint 8) during construction of the Proposed Development. These receptors would experience short-term moderate adverse effects during construction due to their close distance to the works and limited intervening vegetation. There would also be minor adverse effects on a number of other visual receptors including residential properties and recreational users at The Cliff, Seaton Carew (viewpoint 2), recreational users of Teesmouth National Nature Reserve (viewpoint 3); North Gare Sands (viewpoint 4); and Coatham Marsh Nature Reserve (viewpoint 9).

24.6.13 Chapter 20: Socio-economics and Tourism (ES Volume I, Document Ref. 6.2) identifies a number of minor adverse effects during construction of the Proposed Development including minor adverse effects on: temporary worker accommodation; demographics and community disruption; local businesses; tourism amenities; and marine users, including commercial and recreational fishing.

Combined visual and noise effects

24.6.14 None of the viewpoints which would experience residual effects of minor or greater magnitude during construction are in close proximity to either NSR7 - Northumbrian Water site offices or NSR8 - Seal Sands offices or to any of the receptors (NSR1 – 58, Broadway West; NSR3 - 131 Broadway West; and NSR4 - Marsh House Farm) which could experience residual minor adverse

noise effects during evening or night-time working. Therefore, there would be no combined visual and noise effects during construction.

Combined socio-economic, tourism and visual effects

24.6.15 There would be combined effects on some marine users, including recreational anglers and members of South Gare Marine Club in the vicinity of South Gare Breakwater, due to the combined effects of temporary restrictions on access and visual effects. The sensitivity of the marine users is considered to be low due to the ability to conduct marine-focused activity away from those areas disrupted during construction. As the effects would be short term and temporary on receptors of low sensitivity, the combined effect would be minor adverse.

Combined Effects During Operation

Residual air quality, noise, landscape and visual and socio-economic and tourism effects

24.6.16 The Air Quality assessment presented in Chapter 8: Air Quality (ES Volume I, Document Ref. 6.2) and Appendices 8B: Air Quality - Operational Assessment and 8C: Air Quality – Amines Assessment (ES Volume III, Document Ref. 6.4) concluded that the magnitude of operational impacts on human health associated with emissions of all pollutant species from the operational Proposed Development would result in negligible adverse effects, i.e. a less than minor effects, at all receptors within the air quality assessment study area. There would therefore be no combined effects associated with air quality effects during the operational phase of the Proposed Development.

24.6.17 The Noise and Vibration assessment presented in Chapter 11: (ES Volume I, Document Ref. 6.2) concludes that there would be a residual minor adverse effect on NSR4 – Marsh House Farm, during operation of the PCC. Residual noise effects on human receptors at all other NSRs assessed would be negligible.

24.6.18 Operational vibration was scoped out of further assessment (refer to Chapter 11: Noise and Vibration, Section 11.3 (ES Volume I, Document Ref. 6.2) and is therefore not applicable to the combined effects assessment.

24.6.19 The Landscape and Visual assessment presented in Chapter 17: Landscape and Visual Amenity (ES Volume I, Document Ref. 6.2) identifies that there would be a moderate adverse effect on visual receptors including recreational users on the England Coastal Path (viewpoint 7) during operation of the Proposed Development, due to the close proximity and prominence of structures associated with the Proposed Development. There would be minor adverse effects on visual receptors at Teesmouth National Nature Reserve (viewpoint 3); North Gare Sands (viewpoint 4); South Gare Breakwater (viewpoint 5); and at Redcar Seafront (viewpoint 8).

24.6.20 Chapter 20: Socio-economics and Tourism (ES Volume I, Document Ref. 6.2) identifies that there would be a moderate beneficial (positive) effect during operation due to the creation of employment. There would be a negligible adverse effect associated with community disruption / demographic change. No other residual effects on socio economics and tourism have been

identified during operation. There would therefore be no combined socio-economic and tourism effects.

Combined visual and noise effects

24.6.21 None of the viewpoints which would experience residual effects of minor or greater magnitude during operation are in close proximity to NSR4 – Marsh House Farm. Therefore, there would be no combined visual and noise effects during operation.

Table 24-16: Potential combined effects (construction)

Receptor	Value/ Sensitivity	Summary of potential residual effects*						Mitigation	Magnitude of combined effect	Combined effect
		Air quality	Dust	Noise	Vibration	Visual	Socio-economic			
NSR1 - 58 Broadway West	High	NR	NR	Minor adverse effect during construction away from the PCC during night-time	NR	NR	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	No combined effect	NA
NSR3 -131 Broadway West	High	NR	NR	Minor adverse effect during construction away from the PCC site during night-time.	NR	NR	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	No combined effect	NA
NSR4 – March House Farm	High	NR	NR	Minor adverse effect during construction of the PCC during evening / nigh-time works and minor adverse effects during construction away from the PCC site during night-time.	NR	NR	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	No combined effect	NA
NSR7- Northumbrian Water site offices; and NSR8 - Seal Sands offices	High	NR	NR	Up to a minor adverse residual effect on the nearest sensitive receptors during the construction of the CO_2 Gathering Network and during the construction of the Natural Gas Connection.	NR	NR	NR	NR	No combined effect	NA
Viewpoint 2 - , The Cliff, Seaton Carew; Viewpoint 3 - Teesmouth National Nature Reserve; Viewpoint 4 – North Gare Sands; and Viewpoint 9 - Coatham Marsh Nature Reserve	High	NR	NR	NR	NR	Short-term, minor adverse visual effects on residential and/or recreational users during construction due to medium to long distance views of works	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	No combined effect	NA
Viewpoint 5 - South Gare Breakwater; Marine users in vicinity of South Gare Breakwater	Low	NR	NR	NR	NR	Short-term, moderate adverse visual effects on recreational users during construction due to proximity to works and limited	Minor adverse effects during construction	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	There would be combined effects on some marine users, including recreational anglers and members of South Gare Marine Club in the vicinity of South Gare Breakwater, due to the combined effects of	Minor adverse (not significant)

Receptor	Value/ Sensitivity	Summary of potential residual effects*						Mitigation	Magnitude of combined effect	Combined effect
		Air quality	Dust	Noise	Vibration	Visual	Socio-economic			
						intervening vegetation.			restrictions on access and visual effects. As the effects would be short term and temporary on receptors of low sensitivity, the combined effects would be minor adverse.	
Viewpoint 7 – England Coastal Path; and Viewpoint 8 – Redcar Seafront	High	NR	NR	NR	NR	Short-term, moderate adverse visual effects on recreational users during construction due to proximity to works and limited intervening vegetation.	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters, including implementation of mitigation through the CEMP	No combined effect	NA

*NSR: Noise Sensitive Receptor; NR- no residual effect; NA – not applicable

Table 24-17 Potential combined effects (operation)

Receptor	Value/ Sensitivity	Summary of potential residual effects*						Mitigation	Magnitude of combined effect	Combined effect
		Air quality	Dust	Noise	Vibration	Visual	Socio-economic			
NSR4 – Marsh House Farm	High	NR	NA	Minor adverse effects during operation of the PCC	NA	NA	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters.	No combined effect	NA
Viewpoint 3 - Teesmouth National Nature Reserve; Viewpoint 4 - North Gare Sands; Viewpoint 5 - South Gare Breakwater; and Viewpoint 8 - Redcar Seafront.	High	NR	NA	NR	NA	Minor adverse effects on visual receptors, including recreational users during operation due to the close proximity and prominence of structures associated with the Proposed Development.	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters.	No combined effect	NA
Viewpoint 7 – England Coastal Path	High	NR	NA	NR	NA	Moderate adverse effects on visual receptors, including recreational users during operation due to the close proximity and prominence of structures associated with the Proposed Development.	NR	No additional mitigation measures are proposed beyond those recommended in the technical chapters.	No combined effect	NA
Employees of local businesses	Medium	NR	NA	NR	NA	NR	There would be a moderate beneficial (positive) effect during operation due to the creation of employment.	No additional mitigation measures are proposed beyond those recommended in the technical chapters.	No combined effect	NA

*NSR: Noise Sensitive Receptor; NR- no residual effect; NA – not applicable

24.7 Limitations or Difficulties

24.7.1 Limitations or difficulties relating to the individual assessments are detailed within Chapters 8 to 23 of the ES (ES Volume I, Document Ref. 6.2).

24.7.2 The cumulative assessment is based upon currently available information regarding other potential or committed developments in the vicinity of the Site.

24.8 Residual Effects and Conclusions

24.8.1 The assessment of combined effects has considered the potential for the effects of minor significance and above, identified within each of the technical assessments reported within Chapters 8 to 23 of the ES (ES Volume I, Document Ref. 6.2), to interact and combine to affect common receptors, and has concluded that there would be no significant combined effects during either construction or operation of the Proposed Development.

24.8.2 The assessment of cumulative effects has considered other developments within 15 km of the PCC Site (identifying 89 developments for consideration at Stage 1 in the long list, and 23 for inclusion in the shortlist of developments and assessment at Stages 3 and 4); the potential for cumulative effects to arise, from one or several of these developments in combination with the Proposed Development has been assessed. Through consideration of the available information for each of the identified developments, it has been concluded there is the potential for:

- significant beneficial cumulative socio-economic effects due to the construction of the Proposed Development together with the other developments;
- a minor adverse (not significant) cumulative noise effect upon one NSR (NSR3) during the construction phase of the Proposed Development, compared to a negligible adverse effect for the Proposed Development in isolation. All other cumulative noise effects would be of the same magnitude and significance as those for the Proposed Development in isolation; and
- significant, moderate adverse short-term cumulative visual effects would occur at viewpoint 5 (recreational receptors at South Gare Breakwater), viewpoint 8 (recreational and residential receptors at Redcar seafront) and viewpoint 7 (recreational receptors on the England Coast Path, Warrenby) during construction of the Proposed Development, if this is concurrent with the construction and operation of the identified cumulative developments. These effects are no greater than for the Proposed Development on its own. As far as reasonably practicable the design of the Proposed Development will seek to minimise adverse impacts on visual amenity through appropriate siting of infrastructure and architectural design of the development (including choice of materials and colours).

24.8.3 There would be no significant cumulative effects relating to air quality, contaminated land, terrestrial ecology, aquatic ecology, marine ecology,

ornithology, landscape receptors, archaeology and cultural heritage, marine heritage or geology and hydrogeology.

24.9 References

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