Net Zero Teesside

Preliminary Environmental Information Report

Volume IV – Non-Technical Summary

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

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Net Zero Teesside

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1. Non-Technical Summary

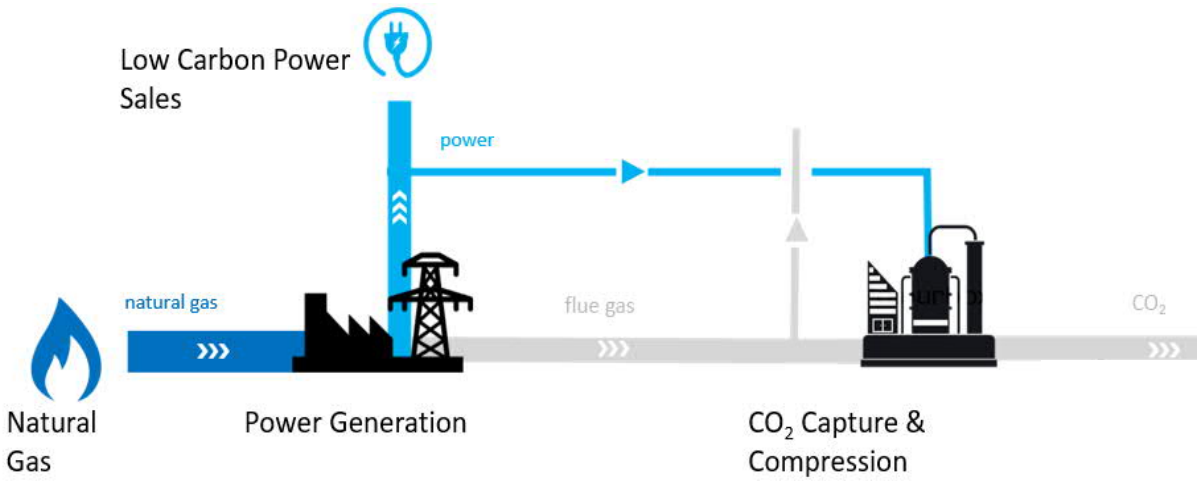
1.1 Introduction

1.1.1 This is a Non-Technical Summary (NTS) of the Preliminary Environmental Information (PEI) Report that has been prepared in support of a future Development Consent Order (DCO) Application for the construction and operation of the on-shore elements of the Net Zero Teesside project (NZT) in Teesside.

1.1.2 NZT will be the UK's first commercial scale, full chain Carbon Capture, Usage and Storage (CCUS) project, and has the potential to capture up to 10 million tonnes of carbon dioxide (CO_2) emissions per annum, the equivalent to the annual energy use of up to 3 million homes in the UK. The NZT project will therefore make a significant contribution toward the UK reaching its net zero greenhouse gas emissions target by 2050.

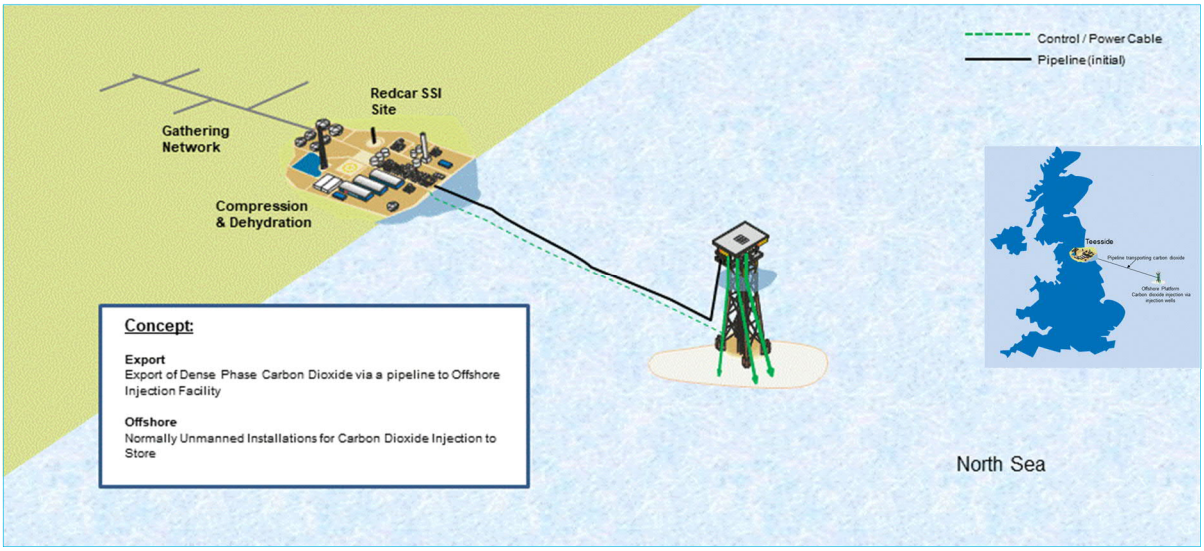
1.1.3 The Proposed Development comprises the construction and operation (including maintenance) of a gas-fired power station with a net electrical output of up to 2.1 GW together with equipment required for the capture and compression of carbon dioxide emissions from the power station. The Proposed Development also includes the provision of supporting infrastructure and connections to facilitate the Proposed Development and to develop a wider industrial carbon capture network in Teesside and high-pressure compression of gathered CO_2 for export off-shore for permanent storage (see Diagram 1.1).

Diagram NTS 1.1: The Proposed NZT Project



1.1.4 The offshore elements, including the off-shore portion of the CO_2 export Pipeline, the CO_2 store itself and CO_2 injection wells into the store and the associated off-shore infrastructure (Diagram 1.2) do not form part of the Proposed Development and will be consented separately.

Diagram NTS 1.2: Offshore Elements of the NZT Project



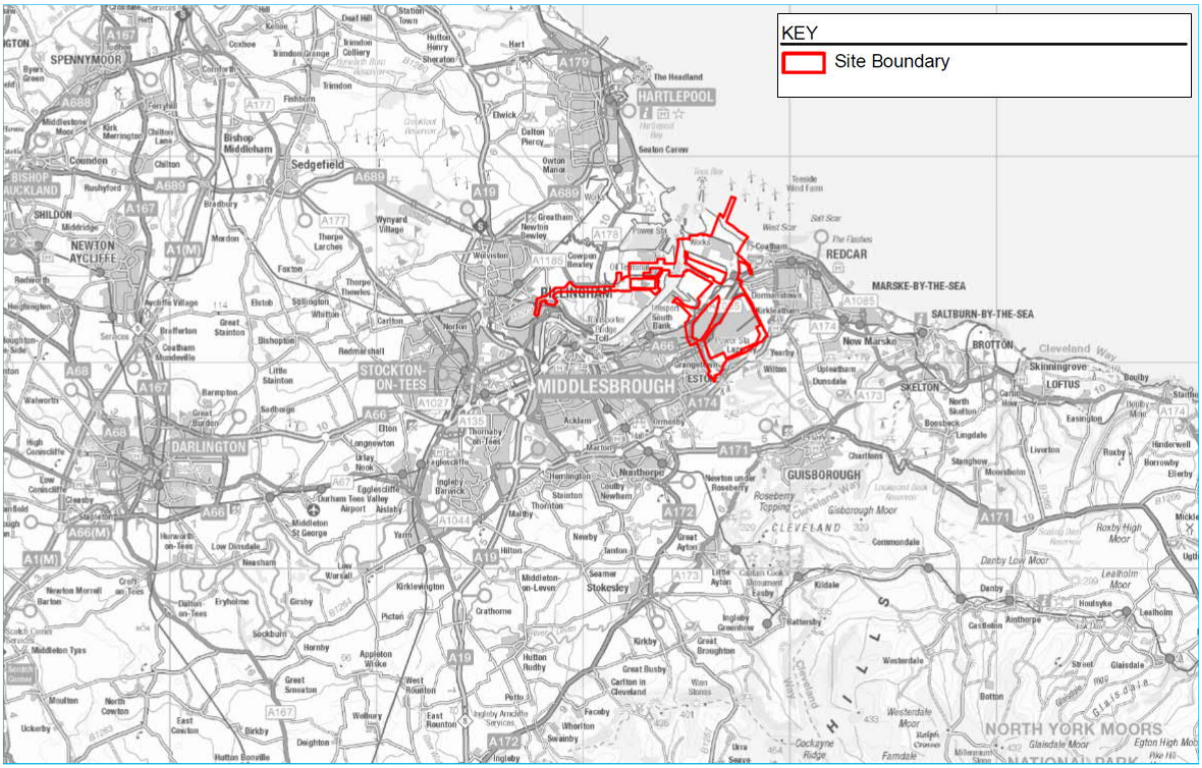
1.1.5 Whilst the Proposed Development is designed for the future collection and sequestration of CO_2 from third-party industrial emitters on Teesside, the capture of these emissions will not form part of the DCO application and is not considered in this PEI Report. Third-party connections to the wider carbon capture network will be the subject of separate consent applications.

1.1.6 The proposed DCO Application site ('the Site') covers a wide area located within the administrative boundaries of Redcar and Cleveland Borough Council (RCBC) to the south of the River Tees (South Bank and Dormanstown Wards) and in Stockton-on-Tees Borough Council (STBC) to the north of the River Tees (Billingham South Ward). A portion of the Site to the South of the Tees lies within the South Tees Development Corporation (STDC) masterplan site.

1.1.7 The final Site boundary for the purposes of the DCO application, including land for the connection corridors and temporary land required during construction of the Proposed Development, will be refined through on-going studies and taking into account the responses to the statutory consultation.

1.1.8 The proposed Site Location is shown on Diagram 1.3: Site Location Plan.

Diagram NTS 1.3: Site Location Plan



1.1.9 The purpose of this NTS is to describe the Proposed Development and provide a summary in non-technical language of the key findings of the PEI Report.

1.1.10 The PEI Report has been prepared to comply with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) ('the EIA Regulations'). Environmental Impact Assessment (EIA) is a systematic process used to predict the adverse and beneficial effects of a proposed development. An Environmental Statement (ES) will be submitted with the DCO Application for the Proposed Development.

1.1.11 The PEI Report presents:

- a description of the Proposed Development including information on the Site and the design, size and other relevant features;
- information on the reasonable alternative sites, technologies and layouts that have been considered and the main reasons for the options chosen;
- an assessment of the likely significant environmental effects of the construction, operation (including maintenance) and eventual decommissioning of the Proposed Development based on the preliminary environmental information compiled at the time of writing; and

- measures that are proposed to avoid, prevent or reduce, or if possible offset, such likely significant adverse effects.

1.1.12 Section 2 of this NTS summarises the assessment methodology. Technical details of the EIA process are provided within the Chapter 2: Assessment Methodology (PEI Report, Volume I).

1.1.13 Further information on the Proposed Development can be found in Chapter 4: Proposed Development (PEI Report, Volume I) and on the project website: https://www.netzeroteesside.co.uk/.

1.2 The Applicant

1.2.1 Net Zero Teesside Power Limited ('NZT Power') and Net Zero Teeside North Sea Storage ('NZTNS Storage') are together 'the Applicant" for the proposed DCO Application. NZT Power and NZTNS Storage have been incorporated on behalf of OGCI Climate Investments LLP (OGCI CI).

1.2.2 NZT is currently owned by OGCI CI as a non-operating shareholder. From the end of June 2020, NZT will be developed by five OGCI CI member companies: BP, Eni, Equinor, Shell and Total, with BP leading as operator. NZT Power and NZNS Storage will promote NZT on behalf of these five member companies.

1.2.3 OGCI CI is part of the Oil and Gas Climate Initiative (OGCI). OGCI comprises 12 companies from the oil and gas sector seeking to take practical actions on climate change. Members comprise BP, Chevron, CNPC, ENI, Equinor, ExxonMobil, OXY (Occidental Petroleum), BR Petrobas, Repsol, Saudi Aramco, Shell and Total.

1.2.4 OGCI has significant expertise in the field of carbon capture, with 17 of the operational large-scale CCUS projects worldwide being operated by OGCI members. OGCI is currently focussed on facilitating large-scale commercial investment in CCUS by enabling multiple low-carbon industrial hubs. These hubs capture carbon dioxide from multiple industrial sources and bring economies of scale by sharing transport and storage infrastructure. NZT is one of OGCI's key investments. Further information on OGCI can be found at: https://oilandgasclimateinitiative.com/climate-investments/#ccus.

1.3 The Development Consent Order

1.3.1 The Applicant intends to submit an application to the Secretary of State (for Business, Energy and Industrial Strategy) under Section 37 of the Planning Act 2008 (the Planning Act), seeking a DCO for the Proposed Development. It is currently anticipated that the Application will be submitted towards the end of 2020.

1.3.2 The DCO would provide the necessary authorisations and consents for the construction, operation and maintenance of the Proposed Development.

2. Assessment Methodology

2.1 EIA Methodology

2.1.1 The assessment presented in the PEI Report follows a standard Environmental Impact Assessment (EIA) methodology, which is summarised below.

2.1.2 The objective of the EIA process is to anticipate the changes (or 'impacts') that may occur to the environment as a result of the Proposed Development, such as increases in traffic and changes to air quality or noise. The changes are compared to the environmental conditions that would have occurred without the Proposed Development (defined as 'the baseline'). The EIA process identifies potentially sensitive 'receptors' that may be affected by these changes (e.g. people living near the development, local flora and fauna) and defines the extent to which these receptors may be affected by the predicted changes (i.e. whether or not the receptors are likely to experience a 'significant effect').

2.1.3 Where possible, the EIA uses standard methodologies, based on legislation, defined standards and accepted industry criteria. This is set out in detail in each technical chapter of the PEI Report (Volume I).

2.1.4 Effects on the receptors can be adverse (negative), neutral (neither negative nor positive) or beneficial (positive). They can also be temporary (e.g. noise during construction) or permanent (e.g. the views of the finished buildings).

2.1.5 For the purpose of the PEI Report, adverse and beneficial effects are described as 'significant' or 'not significant'. Where the EIA predicts a significant adverse effect on one or more receptors, mitigation measures are identified where possible to avoid or minimise the effect, or to reduce the likelihood of it happening. The use of such mitigation will be secured through requirements included within the draft DCO or through other legislation and consenting regimes. Details of the EIA Assessment Methodology are provided within Chapter 2: Assessment Methodology (PEI Report, Volume I).

2.2 EIA Scoping (Selection of Environmental Topics to be assessed)

2.2.1 EIA Scoping is a process that is designed to identify relevant topics that should be included in the EIA and reported in the PEI Report and the subsequent Environmental Statement (ES). An EIA Scoping Report and a request for an EIA Scoping Opinion under Regulation 10 of the EIA Regulations was submitted to the Planning Inspectorate (PINS) and relevant consultees on 20th February 2019 to allow them to comment of the extent and approach to the environmental assessments to be undertaken.

2.2.2 A Scoping Opinion was received from PINS on 2nd April 2019 and is presented within Appendix 1B in PEI Report, Volume III. In compliance with the Scoping Opinion, the PEI Report and the subsequent ES will include assessments of the following environmental topics:

- air quality;
- surface water environment (hydrology and water resources including flood risk);
- geology, hydrogeology and contaminated land;
- noise and vibration;
- terrestrial ecology and nature conservation;
- aquatic ecology;
- marine ecology and nature conservation;
- ornithology;
- traffic and transport;
- landscape and visual amenity;
- archaeology and cultural heritage;
- marine heritage;
- socio-economics and tourism;
- climate change;
- major accidents and natural disasters;
- population and human health; and
- cumulative and combined effects.

2.2.3 Following the completion of an EIA Scoping Report and publication of PINS' Scoping Opinion, the environmental information for a DCO is reported in two stages:

- the PEI Report is prepared to inform consultation with the public and other stakeholders about the Proposed Development, based on the preliminary environmental information available at the time of consultation; and
- the ES is then prepared to accompany the DCO Application and includes the EIA of the Proposed Development, taking account of any design evolution that has taken place as well as feedback received during consultation.

2.3 Consultation

2.3.1 The Planning Act requires applicants for development consent to carry out pre-application consultation on their proposals. This includes consultation on the PEI Report. This enables consultees to develop an informed view of the project based on preliminary findings of the environmental assessments undertaken at this time and the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings prior to the Applicant finalising the ES.

2.3.2 Consultation with key stakeholders will continue following the publication of the PEI Report and in preparation of the final ES to support the DCO Application. There will be the opportunity for both the design of the Proposed Development and the EIA to take into consideration any comments received through consultation on the PEI.

2.3.3 The PEI Report has been prepared to meet the requirements of Regulation 12(2) of the EIA Regulations. In accordance with Regulation 12(2)(b), the PEI Report presents;

"the information referred to in Regulation 14(2) which […] is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)". Regulation 14(2) describes the requirements of an ES.

2.4 PEI Report Structure

2.4.1 The format of the PEI Report is outlined below and largely reflects the proposed format of the final ES.

2.4.2 Volume I of the PEI Report is structured into chapters, as follows:

- Chapters 1 and 2 – an introduction to the PEI Report and EIA assessment methodology approach;
- Chapters 3 to 6 – a description of the Proposed Development including information on the surrounding area and on construction timescales and alternatives;
- Chapter 7 – a summary of relevant legislation and policy;
- Chapters 8 to 23 – preliminary assessments of the likely significant effects of the Proposed Development in relation to the environmental topics scoped into the EIA;
- Chapter 24 provides a preliminary assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development; and
- Chapter 25 – a summary of the identified potential significant environmental effects identified.

2.4.3 Volumes II and III of the PEI Report comprise the respective figures and technical appendices that accompany each chapter of Volume I.

2.4.4 This NTS forms Volume IV of the PEI Report.

3. Proposed Development

3.1.1 The Proposed Development is described in Chapter 4: Proposed Development of the PEI Report (Volume I) and comprises:

- A new build low carbon (clean) gas-fired power station (of up to three CCGT trains) with integrated carbon capture unit, low pressure CO_2 compression and associated utilities and buildings (on the **PCC Site**);
- High Pressure CO_2 Compression facilities (**HP Compressor Station**) - on the **PCC Site**;
- High pressure CO_2 export pipeline (**CO_2 Export Pipeline**);
- CO_2 Gathering Network connecting various industrial installations across the Tees Valley (**CO_2 Gathering Network Corridor**);
- Natural gas pipeline to supply the power station (**Natural Gas Connection Corridor**);
- Power export lines from the power station to the national transmission system (**Electrical Connection Corridor**); and
- **Water Connection Corridors** including:
  - a connection corridor to Northumbrian Water Ltd, for the provision of water for the Proposed Development (**Water Supply Connection Corridor**);
  - an intake within the River Tees for provision of water for the Proposed Development (**Water Abstraction Connection Corridor**); and
  - disposal of treated effluent or cooling water to Tees Bay via the existing outfall, subject to Environment Agency Permitting requirements (**Water Discharge Connection Corridor**).

3.1.2 The carbon capture plant will be designed to capture approximately 95% (w/w) of the CO_2 emitted from the power station using a amine-based solvent, with an anticipated capture rate of around 90%. At full load, this could equate to a capture of 1.7 to 2 million tonnes of CO_2 per unit (up to 6 million tonnes in total) per year, dependent upon the turbine equipment chosen and the running hours of the plant. This CO_2 will be compressed for off-shore storage.

3.1.3 The proposed Site Boundary and PCC is shown in Diagram 1.4 below. Furthermore, the indicative Connection Corridors are shown in Diagram 1.5 to 1.9 below.

Diagram NTS 1.4: Site Boundary and PCC

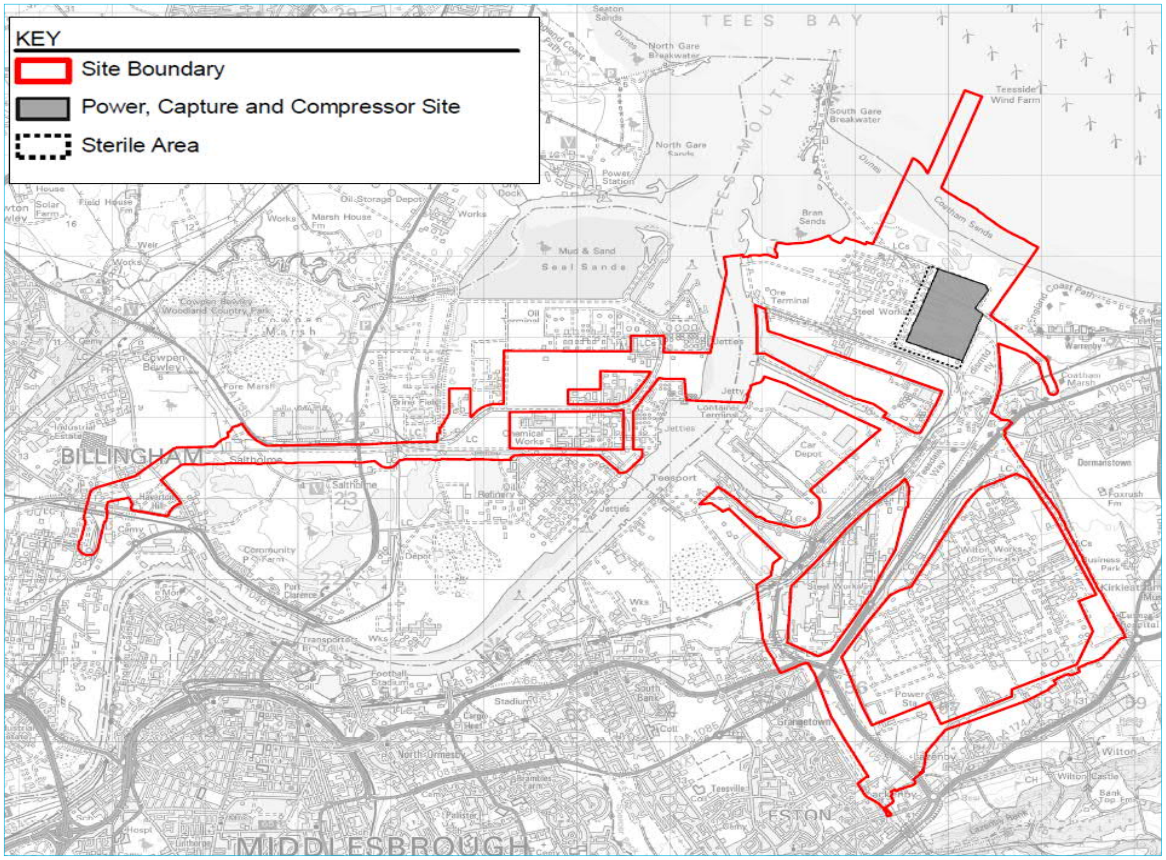


Diagram NTS 1.5: CO_2 Export Pipeline

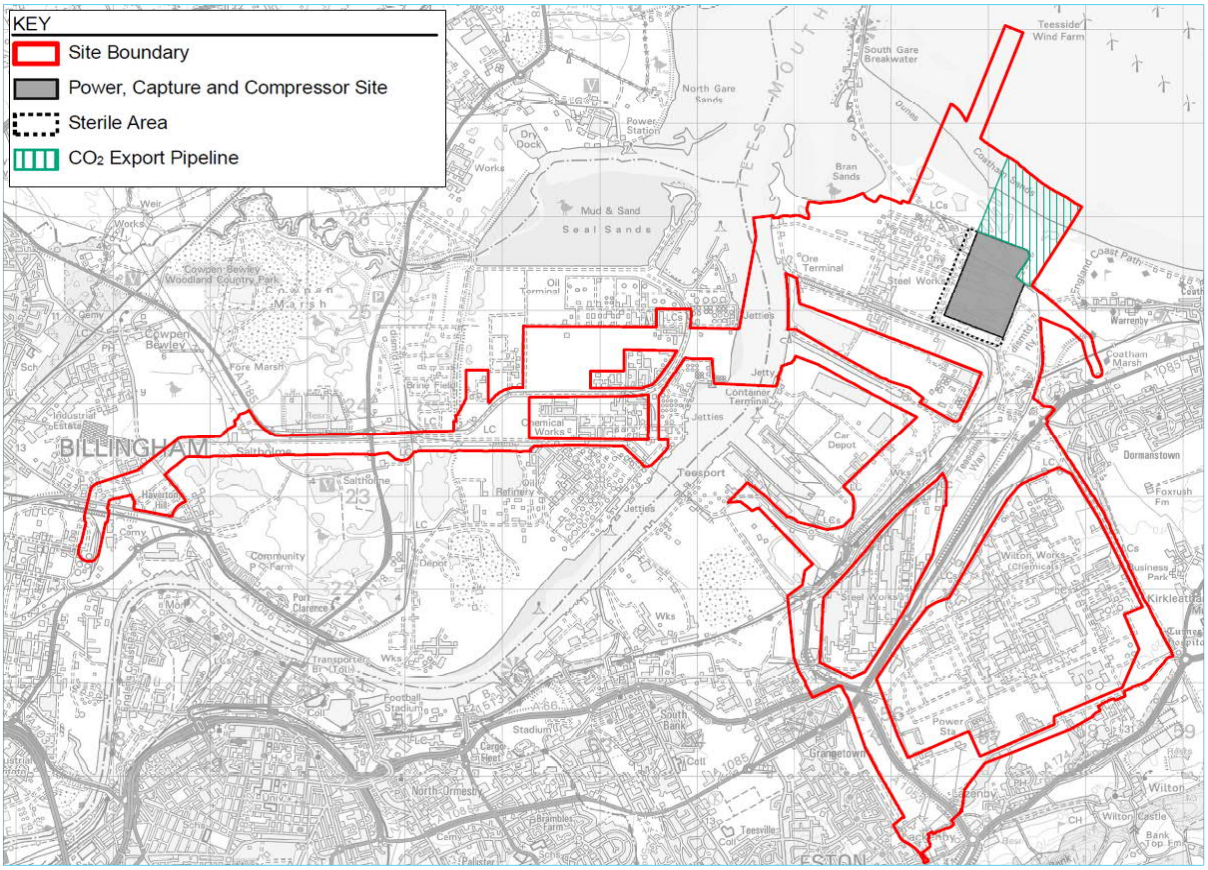


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Diagram NTS 1.6: Natural Gas Connection Corridor

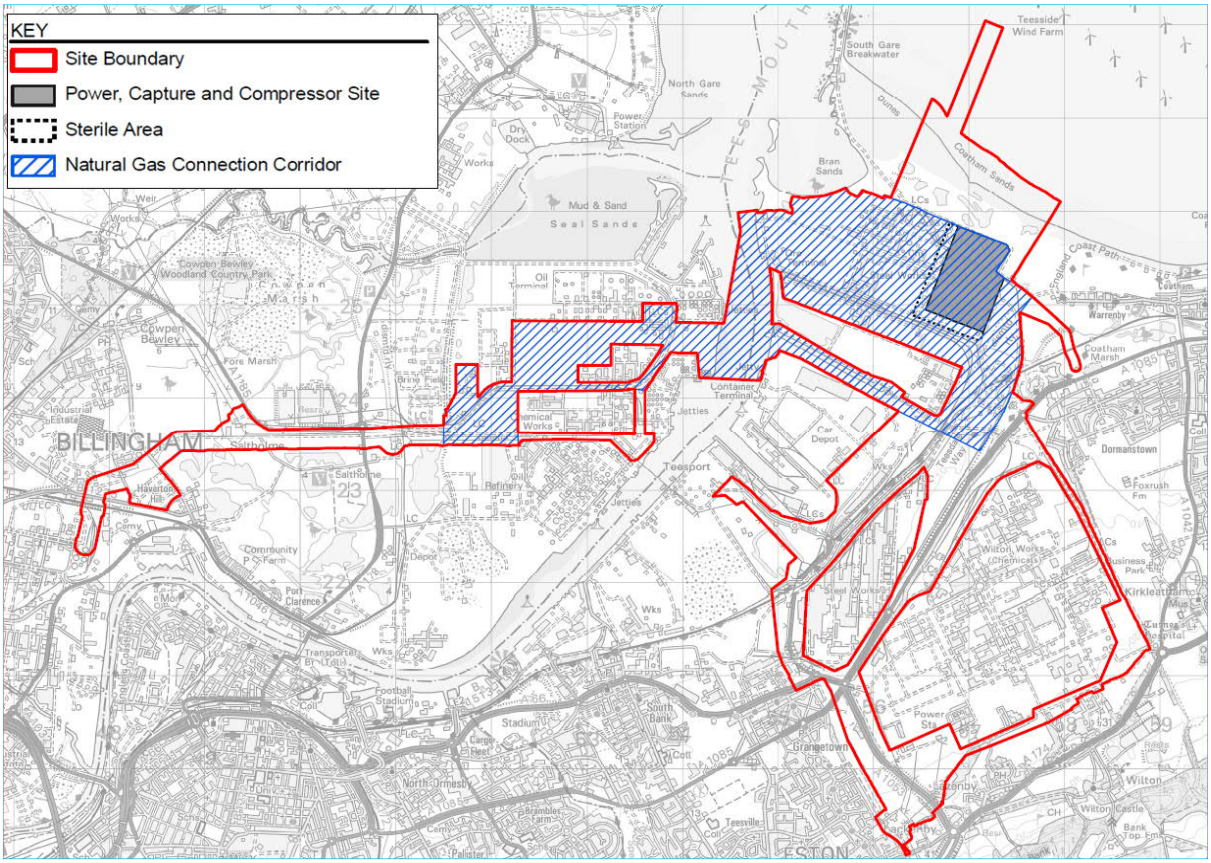

Diagram NTS 1.7: Electrical Connection Corridor

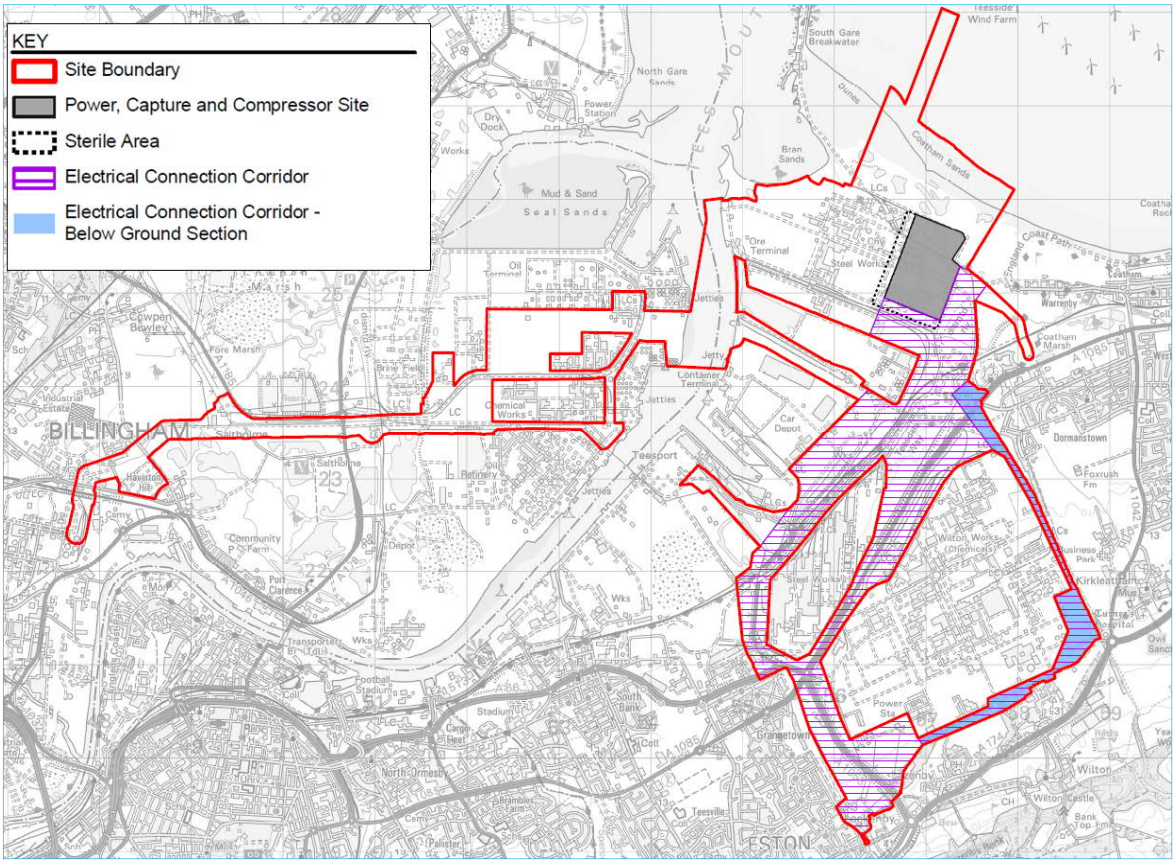

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Diagram NTS 1.8: Water Abstraction and Discharge Corridor

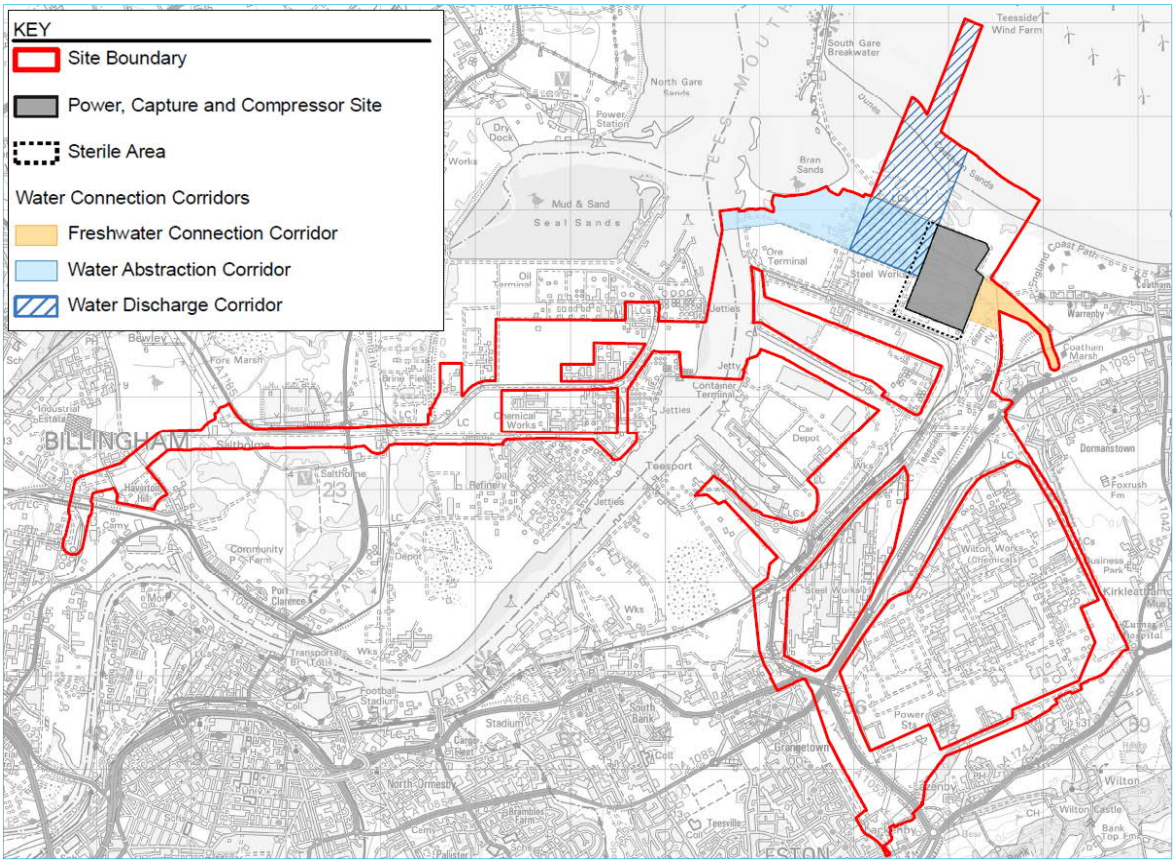
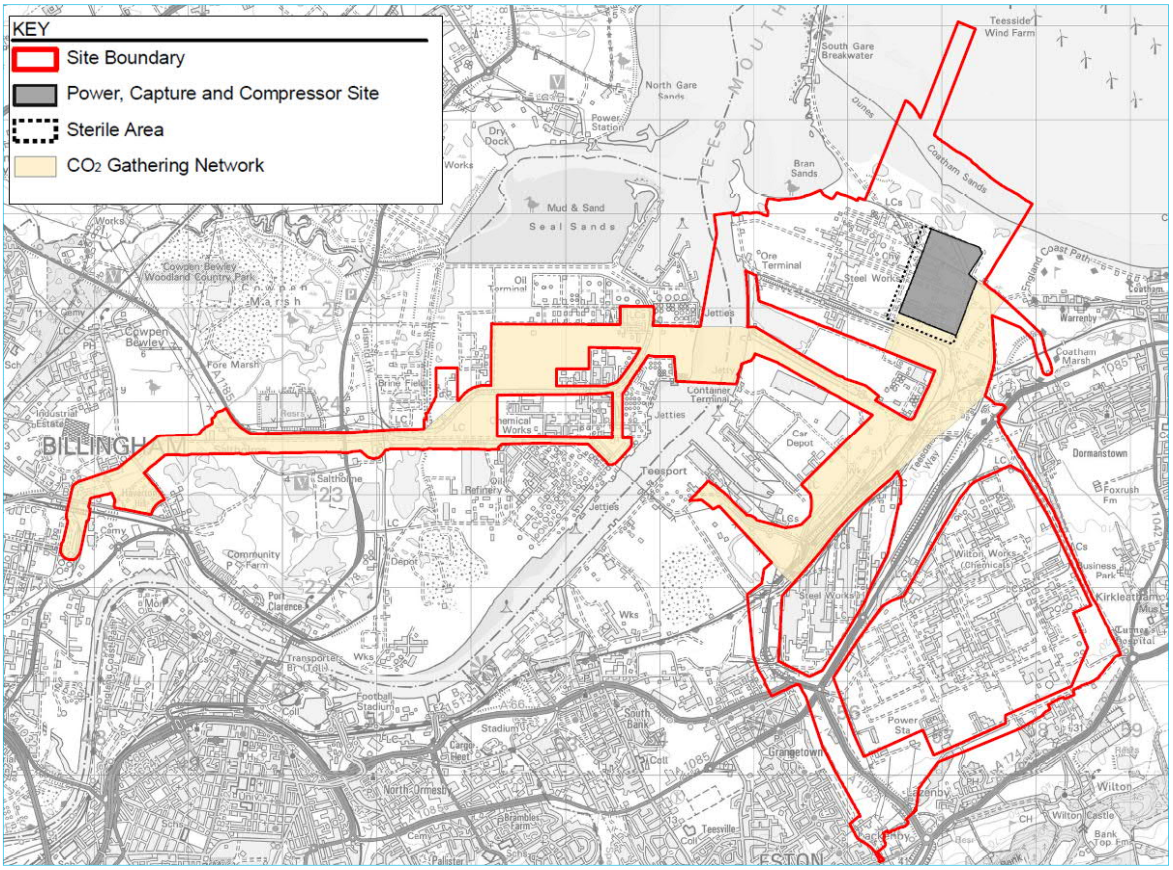


Diagram NTS 1.9: CO_2 Gathering Network Corridor



4. Description of the Existing Environment

4.1 The Site Details

4.1.1 The Site is divided into the following areas (described in more detail in Chapter 3: Description of the Existing Environment (PEI Report, Volume I). Further detail on the different areas listed below are provided in this Section of the NTS.

- The Power, Capture and Compressor site ('PCC') (refer to Diagram 1.4);
- CO_2 Export Pipeline (refer to Diagram 1.5);
- Natural Gas Connection Corridor (refer to Diagram 1.6)
- Electrical Connection Corridor (refer to Diagram 1.7);
- Water Connection Corridors (refer to Diagram 1.8); and
- CO_2 Gathering Network (refer to Diagram 1.9).

4.1.2 The PCC has an area of approximately 60 ha and will be located on part of the STDC site (the former Sahaviriya Steel Industries PCL (SSI) site) to the south-east of the Redcar Bulk Terminal, on the south bank of the River Tees in the South Bank Ward of RCBC.

4.1.3 The SSI site comprises approximately 225 ha of land previously used for iron and steel manufacture developed on land reclaimed from the Tees Estuary over the late 19th and 20th centuries. The area in which the PCC will be developed currently contains some buildings associated with the steelworks although these will be removed prior to construction of the Proposed Development.

4.1.4 The former SSI site will include the commencement of the CO_2 Export Pipeline and also the start of the Water Connection Corridors. Both the CO_2 Export Pipeline and part of the Water Connections Corridors pass northward from the PCC across Coatham Dunes before continuing seaward.

4.1.5 The Water Connection Corridors allow the options of using former Northumbrian Water raw water feed to the former SSI site and/or the existing abstraction point from the River Tees and the existing outfall to Tees Bay.

4.1.6 The other Connections Corridors pass through undeveloped land or existing utilities corridors to the south and north of the Tees:

- the Electrical Connection Corridor runs to the south and west of the PCC via Todd Point sub-station, to allow connection for electricity export to the

National Electricity Transmission System (NETS) at Lackenby Substation;

- the Natural Gas Connection Corridor runs from a connection to the National Gas Grid at Seal Sands east to the PCC via a crossing of the River Tees; and
- the CO_2 Gathering Network Corridor will connect current and potential future industries at Teesport, Billingham and Seal Sands (the latter via a crossing of the River Tees) to the PCC and the CO_2 Export Pipeline.

4.1.7 The refinement of routeing of the connections within the corridors is the subject of on-going assessment and will be informed by the feedback from the statutory consultation as well as ongoing technical studies and landowner discussions.

4.2 The Surrounding Area

4.2.1 The area surrounding the site is described in more detail in Chapter 3: Description of the Existing Environment (PEI Report, Volume I). The area surrounding the Site is predominantly characterised by industrial land uses.

4.2.2 To the north-east of the Site lie the coastal areas of South Gare and Coatham Sands. To the south and west lie Northumbrian Water's Bran Sands wastewater treatment plant, operational land of PD Ports Teesport and the Wilton International chemical complex.

4.2.3 The Proposed Development Site extends across the River Tees westwards towards Billingham and to the south around the area occupied by the Wilton International chemical complex.

4.2.4 On the north bank of the River Tees, and to the west of the PCC, industrial complexes are present at Seal Sands and Billingham, with both industrial and residential developments present at Port Clarence.

4.2.5 Land to the south of the A174 is predominantly rural with some residential and industrial development and large areas of woodland and open land.

4.2.6 Access to the Site will be via existing access roads from the A1085 "Trunk Road" between Redcar and the A1053 Tees Dock Road, north of Grangetown and approximately 4 km south of the PCC.

4.2.7 Rail lines to and from the Redcar Bulk Terminal run east/west along the southern boundary of the former SSI Steelworks and there is an existing operational rail line and dormant rail station located within the STDC site to the east of the Proposed Development Site.

4.3 Potential Sensitive Receptors

4.3.1 A number of environmental receptors have been identified within and outside the boundary of the Site and are described in more detail in Chapter 3: Description of the Existing Environment (PEI Report, Volume I). Distances are provided as the shortest distance between the receptor and the closest point of the boundary of the Site and/or the PCC.

4.3.2 Key receptors for each topic area have been identified as part of the assessment process and details are included in the relevant technical chapters (Chapters 8 to 24, PEI Report, Volume I). A brief summary is also provided below.

Sensitive Residential Receptors

4.3.3 There are no residential receptors within 500 m of the PCC, although there are areas of public/private amenity and access close to its northern and eastern boundary. The nearest residential settlements are the town of Redcar (approximately 1.8 km east of the PCC) and the suburb of Dormanstown (approximately 1.4 km to the south-east of the PCC). There are closer individual residential receptors at Marsh Farm 650 m east and Dormanstown (Broadway West) approximately 1.3 km south east.

4.3.4 There are no residential receptors within the wider Site boundary:

4.3.5 There are a number of residential receptors located close to the Site in the following locations, these are located away from the main operations at the PCC:

- Lazenby – multiple residential properties on Grange Estate, Pasture Lane and Kings Close (south of the Electrical Connection Corridor and CO_2 Gathering Network);
- Lackenby – multiple residential properties on High Street and Rosedean Farmhouse and Old Hall Farm, Crow Lane (west of the Electrical Connection Corridor);
- Eston – multiple residential properties on Hutton Road, Roseberry Crescent, Wilton Way, Coniston Road, Ullswater Close, Shakespeare Avenue and St David's Road (south-west of the Electrical Connection Corridor);
- Grangetown – multiple residential properties on Cresswell Road (west of the Electrical Connection Corridor); and
- Dormanstown – multiple residential properties on Meggitts Avenue, Armitage Road, Wilton Avenue and Broadway West (east of the electrical Connection Corridor and CO_2 gathering Network).

4.3.6 It is anticipated that these are likely to be located further away from the final Site boundary when it is refined prior to submission of the DCO application.

Ecological Receptors

4.3.7 There are no statutory designated ecological sites within the PCC. Within the Site there are areas that pass within the boundaries of three statutory designated ecological sites. These are:

- Teesmouth and Cleveland Coast SPA;
- Teesmouth and Cleveland Coast Ramsar site; and
- Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI).

4.3.8 The Teesmouth and Cleveland Coast SPA/Ramsar site is located immediately north of the PCC (at its nearest point). The SPA/Ramsar site includes a range of coastal habitats (sand and mud-flats, rocky shore, saltmarsh, freshwater marsh and sand dunes) on and around the Tees Estuary. The SPA/Ramsar site was recently extended to include Coatham Dunes. This would be crossed by the CO_2 Export Pipeline and a part of the Water Connection Corridor, noting that the outfall is currently in situ having been built and used as part of the operational steelworks.

4.3.9 Parts of the site which are within Coatham Dunes and Coatham Sands, which cross the River Tees and which pass through Saltholme, are within the SPA/Ramsar and/or SSSI designations.

4.3.10 There are no non-statutory designated ecological sites within the PCC, but the Eston Pumping Station Local Wildlife Site (LWS) is located within the Site 0.4 km to the south-east of Dabholme Gut and approximately 1 km south south-west of the PCC.

Public Rights of Way and Highways

4.3.11 There are no adopted highways within the PCC. The Site extends across a number of transport routes (highways and railways). These include (but are not limited to):

- the A1085 Trunk Road;
- The A1053 Tees Dock Road / Greystone Road;
- The A174 west of Greystone roundabout;

4.3.12 The PCC is not crossed by any public rights of way (PRoW).

4.3.13 The nearest PRoW to the PCC are:

- Bridleway 116/32/1 – the nearest point of which is approximately 630 m east of the PCC; and
- Footpath 116/31/2 – the nearest point of which is approximately 1.65 km south of the PCC.

4.3.14 Several other PRoWs cross the Site including the England Coast Path and Teesdale Way which runs through the Site to the east and south of the PCC.

Hydrology and Flood Risk

4.3.15 The PCC is located in Flood Zone 1 (low risk). There are areas within the wider Site Boundary that are within Flood Zone 1, Flood Zone 2 (medium risk) and Flood Zone 3a (high risk).

4.3.16 The nearest designated watercourse to the PCC is the River Tees, located approximately 1.6 km to the west (at its closest point).

4.3.17 The North Sea is approximately 400 m north of the PCC with the Site Boundary extending into the North Sea covering an area of shoreline at Coatham Sands. The Site Boundary crosses a number of surface water courses.

4.3.18 There are numerous other water bodies including localised drains, pools/surface water bodies and areas of marshy ground within the Site.

Cultural Heritage Receptors

4.3.19 There are no designated heritage assets within the Site.

4.3.20 There is one Scheduled Monument located within 5 km of the PCC; a World War I early warning acoustic mirror located approximately 4.7 km east of the PCC. There are 25 Scheduled Monuments within 5 km of the Site boundary.

4.3.21 There are at least 80 listed buildings within 3 km of the PCC, 5 of which are Grade I and 9 of which are Grade II*. There is a cluster of 23 listed buildings at Kirkleatham, five of which are Grade I and six of which are Grade II* which are within 1 km of the proposed Site Boundary.

4.3.22 There are a further 23 listed buildings in the vicinity of Lazenby, Wilton and Lackenby, two of which are Grade II*. There is a further Grade II* listed building located approximately 1 km south of the proposed Site Boundary at Billingham and one at South Bank located approximately 1.4 km west of the proposed Site Boundary.

4.3.23 Wilton Conservation Area is located to the south of the A174, within 400 m of the proposed Site Boundary. Yearby Conservation Area is located approximately 850 m south east of the Site.

5. Construction Programme and Management

5.1.1 The most likely construction programme scenario is currently anticipated to be the construction of the Proposed Development in a four-year construction phase commencing shortly after the DCO is granted (expected in Q3 2022).

5.1.2 It is envisaged that a single CCGT unit and associated carbon capture plant will be constructed and commissioned first, and up to two further units constructed thereafter. The first CCGT unit, the gas and electrical connections and the CO_2 Gathering Network have been assumed to be constructed between 2022 and 2024. The additional CCGT units may be constructed either between 2025 and 2026 or between 2028 and 2030.

5.1.3 Each environmental assessment topic within the PEI Report identifies and assesses the reasonable 'worst case' construction scenario from the scenarios described above for that topic, where relevant.

5.1.4 Before the Applicant takes possession of the site preliminary works will be required which will not form part of the DCO application. However, the following preliminary works have been assessed in the PEI Report:

- demolition and site clearance;
- removal of unsuitable/contaminated materials;
- removal of some underground structures; and
- surface capping in selected areas.

5.1.5 Construction activities for the Proposed Development itself will include:

- establishment of construction laydown areas (e.g. site offices, storage areas, security fencing and gates);
- earthworks to prepare the Site;
- construction of foundations, which is likely to require the piling of key structures;
- erection of buildings and structures;
- installation of utilities and utility connections (electricity, natural gas and water);
- construction of the CO_2 Gathering Network and CO_2 Export Pipeline; and
- commissioning (testing) of the plant prior to operation.

5.1.6 The Applicant would appoint contractors to undertake the construction phase of the project. The Applicant would retain overall responsibility of the project

and would ensure that the works would be undertaken in accordance with legal requirements.

5.1.7 A Construction Environmental Management Plan (CEMP) will be prepared prior to construction. The submission, approval and implementation of this will be secured by a requirement of the draft DCO. A framework CEMP will be prepared as part of the ES to support the DCO application, which will set out the key measures to be employed during construction to control and minimise the impacts on the environment

6. Need, Alternatives and Design Evolution

6.1.1 The EIA Regulations state that an ES should include a description of reasonable and relevant alternatives studied by an applicant and the main reasons for selecting the chosen development, taking into account the environmental effects.

6.1.2 Chapter 6: Need, Alternatives and Design Evolution in PEI Report, Volume I provides this information in respect of the Proposed Development. In summary, alternatives have been considered during the evolution of the Proposed Development including:

- alternative sites; and
- alternative layouts and design options within the Site.

6.1.3 The Proposed Development includes an appropriate degree of flexibility in the dimensions of buildings and structures to allow for the selection of the preferred technology and contractor.

6.1.4 In order to ensure a robust assessment, a maximum built ‘envelope’ (also referred to as the ‘Rochdale envelope’) has been defined to accommodate this necessary flexibility and to enable the EIA to consider the ‘worst case’.

6.1.5 For example, the landscape and visual impact assessment has assessed the largest massing of buildings that could be required.

6.1.6 In summary, the former steelworks site is deemed the most appropriate site for the PCC, given its location on previously developed land suitable for redevelopment, in close proximity to a number of existing industrial sources, and adjacent to the North Sea shoreline and some distance from residential properties.

6.1.7 A number of locations within the STDC site were considered for the Proposed Development taking into account the strategic masterplan for the site redevelopment, ground conditions, presence of existing structures,

proximity to residential receptors, access, and proximity to the North Sea. A plot of land to the east of the former steelworks plant was identified as the most suitable.

6.1.8 The form and approach to the Proposed Development has been identified as above, taking into account environmental effects, alongside other factors such as technical and commercial feasibility. The design and associated connection routings will continue to evolve following consultation and the final Rochdale Envelope design will be reported in the ES submitted as part of the DCO Application.

7. Summary of Environmental Effects

7.1 Introduction

7.1.1 The likely significant environmental effects of the Proposed Development are fully described within PEI Report, Volume I. This section provides a brief summary of the overall findings of the PEI Report.

7.1.2 An assessment of the environmental effects of the Proposed Development during its construction and operation (including maintenance) has been completed for each of the topics that have been scoped for inclusion within the assessment.

7.1.3 At this stage, it is envisaged that during the eventual decommissioning of the Proposed Development, the effects are likely to be comparable to, or less than, those for construction activities (and controlled similarly) and therefore these have not been considered further within the assessments unless otherwise stated.

7.2 Air Quality

Introduction

7.2.1 Chapter 8: Air Quality (PEI Report, Volume I) considers potential impacts from the Proposed Development on both human health and ecological receptors.

7.2.2 There are no Air Quality Management Areas (AQMAs) identified in the area with the potential to be affected by the Proposed Development.

7.2.3 Baseline air quality has been determined using available local authority and Defra published data and data collected by the Applicant.

7.2.4 The air quality assessment uses screening tools and computer models to predict the dispersion of air emissions from the Proposed Development including emissions associated with the construction of the Proposed

Development and emissions from the proposed stacks of the operational development. These predict concentrations of pollutants in ambient air which are compared to national air quality standards where available, or other appropriate levels as agreed with regulators.

Effects During Construction

7.2.5 During construction, impacts could arise due to:

- dust from demolition and construction activities;
- emissions from construction vehicles and mobile construction plant; and
- emissions from construction phase road traffic (using traffic data in the form of traffic flows, composition and speed).

7.2.6 Through the use of standard construction management measures, which reduce dust and emissions from site clearance and site preparation activities, emissions to air from construction activities are assessed to have no significant adverse effects on human or ecological receptors. Such measures would include standard best practice construction measures such as storage of materials, suppression of dust, cleaning of vehicles and locating construction plant away from sensitive receptors, which would be incorporated into the design of the Proposed Development.

7.2.7 Construction traffic air impacts are considered to be negligible at all human receptors and the effect is therefore not significant.

7.2.8 No additional mitigation has been identified as necessary for the construction phase of the Proposed Development.

Effects During Operation

7.2.9 During operation, impacts could arise due to:

- emissions from operational road traffic (using traffic data in the form of traffic flows, composition and speed); and
- process emissions from the operational Proposed Development (stack emissions).

7.2.10 No detailed assessment of operational traffic emissions has been required, as the numbers of additional vehicles associated with the operational phase of the Proposed Development is relatively low and below the screening threshold at which detailed modelling of traffic emissions is required.

7.2.11 Dispersion modelling has been used to calculate the predicted concentrations of pollutants arising from the emissions to atmosphere for the operation of the Proposed Development.

7.2.12 Predicted ground level concentrations of relevant air pollutants (principally nitrogen oxides, ammonia and amines) due to air emissions from the

operation of the Proposed Development have been assessed. No significant effects are expected to occur as a result of the Proposed Development at the identified human receptors.

7.2.13 At this stage in the assessment and design development, a highly conservative screening assessment has been undertaken; this assessment currently predicts a significant adverse effect from amine degradation products (N-amines), which can form from amines following their release to air. Further evaluation is ongoing to refine the assumptions used in the assessment and to prepare a more detailed assessment in order to determine the level of significance of the effect and whether additional mitigation is required.

7.2.14 The deposition of nutrient nitrogen from the air emissions of nitrogen oxides and ammonia, on sensitive ecological receptors, has also been calculated. The significance of deposition effects on ecological receptors is discussed in section 7.6 (Terrestrial Ecology) and 7.9 (Ornithology) of this NTS.

7.2.15 Emissions from the Proposed Development during operation will be carefully controlled and regulated by the Environment Agency through the Environmental Permit and in accordance with the use of Best Available Techniques (BAT). The Permit must be granted prior to operation of the Proposed Development and work is ongoing to determine BAT for carbon capture plants.

7.2.16 As the design progresses and further information becomes available about the specific technology to be used, further assessment will be undertaken and included in the ES together with the appropriate mitigation for avoiding, preventing or reducing impacts.

7.2.17 The stacks will not give rise to any visible plumes (due to water vapour condensation) during normal operation. However, the proposed use of hybrid cooling towers could result in occasional visible plumes during certain weather conditions, although the cooling towers have been designed to minimise the size of plumes. An assessment of visible plume formation will be undertaken to inform the ES and DCO application. At this stage these effects are not predicted to be significant but will be used to inform the BAT assessment for choice of cooling technology, that will accompany the Environmental Permit application.

7.3 Surface Water, Flood Risk and Water Resources

Introduction

7.3.1 Chapter 9: Surface Water, Flood Risk and Water Resources (PEI Report, Volume I) presents the findings of a preliminary assessment of likely significant effects on the surface water environment (including inland,

transitional and coastal surface waters) and flood risk as a result of the Proposed Development.

7.3.2 Key water bodies that may receive runoff or discharges from the Proposed Development during construction, operation and decommissioning have been identified, and the potential contamination risk to these water bodies has been assessed. The study area for surface water has been defined based on the potential for impacts to occur. Consideration has also been given to the potential for use of the existing abstraction from the River Tees and former steelworks outfall to Tees Bay.

7.3.3 The main surface watercourses within or close to the Proposed Development are the Tees Bay (Coastal), Tees Estuary, Holme Fleet and Greatham Creek. There are also numerous minor watercourses and water features in and around the Proposed Development. The Site is not located within a Drinking Water Protected Area, Drinking Water Safeguard Zone or near any Source Protected Zones.

7.3.4 The PCC is located within Flood Zone 1 (land at low risk of flooding) as defined by the Environment Agency. A small area of the CO_2 Gathering Network and the Natural Gas Connection Corridor lies within Flood Zone 3 (land at high risk of flooding).

Effects During Construction

7.3.5 The assessment considered potential effects for the construction phase in relation to the following:

- temporary impacts on surface water quality;
- temporary impacts on morphology of the Tees and other waterbodies; and
- increase in surface water and groundwater flood risk as a result of increased surface water and below ground installations

7.3.6 No potentially significant effects during the construction phases have been identified at this stage. Potentially significant impacts on Belasis Beck would be avoided by using trenchless technologies which do not disturb the bed or bank habitats or mobilise sediments. Potential significant adverse effects to water quality in Tees Bay, Tees Estuary and Belasis Beck from suspended fine sediments and accidental spillages will be prevented or minimised through the use of a CEMP and preventative measures. While flood risk is low at the PCC, flooding arising from surface water on the Site will be minimised through the use of an appropriate drainage design using a discharge to Tees Bay.

7.3.7 Where construction is required in areas of higher flood risk, those works are relatively minor in nature, comprising construction of a pipeline that will either be located on existing pipe racks or buried underground. These works will be

managed through the implementation of the CEMP to minimise the risk of increased flooding and to site any storage of materials away from areas of higher flood risk to reduce the risk of contamination.

Effects During Operation

7.3.8 The assessment considered potential effects for the operational phase in relation to the following:

- long term impacts on surface water quality (including those from thermal discharges);
- long term impacts on morphology of the Tees and other waterbodies;
- long term impacts on waterbodies as a result of atmospheric emissions;
- increase in surface water and groundwater flood risk; and
- potable water demand.

7.3.9 A drainage strategy will be defined and prepared for the Proposed Development in consultation with the Environment Agency, the Lead Local Flood Authorities (RCBC and STBC) and other statutory bodies, taking into account the findings of the FRA and water quality assessment.

7.3.10 The proposed drainage system would provide treatment of runoff to ensure potential adverse effects on water quality are avoided.

7.3.11 No significant effects are predicted for surface water, water resources and flood risk during operation of the Proposed Development at this stage.

7.4 Geology, Hydrogeology and Contaminated Land

Introduction

7.4.1 Chapter 10: Geology, Hydrology and Contaminated Land (PEI Report, Volume I) presents the findings of a preliminary assessment of likely significant effects on geology, soils and contaminated land as a result of the Proposed Development. Consideration has been given to geology: superficial soils and bedrock, geological and hydrogeological designations, soils and agricultural land classification, contamination and minerals.

7.4.2 A desk based assessment of historical ground condition information and information from a site investigation have been used to identify the potential effects associated with ground conditions.

Effects During Construction

7.4.3 The construction phase of the Proposed Development will involve key activities that may have potential impacts on the soils, geology, hydrogeology and potentially contaminated land resources.

7.4.4 Potential impacts during the construction phase include (but are not limited to) the following:

- mobilisation of contaminants during remediation and construction;
- changes to hydrogeological regimes (e.g. during dewatering activities); and
- changes to surface water quantity and quality.

7.4.5 Impacts will be managed by appropriate construction mitigation measures (which will be outlined in the CEMP) and as such no significant adverse effects are anticipated.

Effects During Operation

7.4.6 The operational impacts of the Proposed Development with regards to geology, hydrogeology and contaminated land are associated with the permanent site infrastructure which includes plant and buildings, roadways, service corridors and areas of hardstanding.

7.4.7 The potential impacts (without mitigation) that could arise during the operational phase of the Proposed Development include:

- permanent soil loss (until the Site is decommissioned) where permanent infrastructure is installed. However, the loss is likely to be negligible given the low quality of the existing soils and the widespread existing industrial development (hardstanding) already present across the Site;
- impacts to soil quality, groundwater and watercourses could potentially occur during operation as a result of accidental spills from the handling or leakage of fuels, lubricants, stored chemicals and process liquids.; and
- receptors may change from the assumed baseline conditions and may include site occupants, commercial users and visitors.

7.4.8 However, with appropriate management, housekeeping and preventative maintenance practices (such as appropriate storage of potentially contaminating liquid), as required by the Environmental Permit for the operational Site, potential impacts to soil and groundwater will be reduced. As such, significant adverse effects are not anticipated.

7.5 Noise and Vibration

Introduction

7.5.1 Chapter 11: Noise and Vibration (PEI Report, Volume I) presents the findings of a preliminary assessment of likely significant noise and vibration effects as a result of the Proposed Development.

7.5.2 Potential noise sensitive receptors have been identified around the boundary of the Site. Noise levels during construction and operation of the Proposed Development have been predicted and the results compared with measured baseline noise levels at the identified receptors during the day and night. National standards have been applied to determine whether there is the potential for significant effects without further mitigation measures being applied.

7.5.3 The assessment has also considered the potential for vibration effects from construction, operation and decommissioning of the Proposed Development. Vibration is likely to occur for a short period of the construction works as piling is likely to be required for some of the main structures.

Effects During Construction

7.5.4 The assessment considered potential effects for the construction phase in relation to the following:

- noise and vibration levels during site clearance, remediation, construction works; and
- predicted changes in road traffic noise levels on the local road network during the construction phase.

7.5.5 Based on the conservative assumptions made, no significant noise effects are predicted, through the implementation of best practice measures to control construction noise that will be applied in accordance with requirements secured under the DCO.

Effects During Operation

7.5.6 The operational noise assessment has indicated that predicted operational noise levels at all noise sensitive receptors are acceptable provided mitigation is in place. There are opportunities during the design process to refine mitigation requirements.

7.5.7 The current conservative assessment has concluded that no significant adverse noise effects are predicted to occur at residential or ecological receptors during operation of the Proposed Development. The sound emission data will be used to inform the noise control measures to be applied in the Proposed Development and how these are to be secured through requirements in the draft DCO

7.6 Terrestrial Ecology and Nature Conservation

Introduction

7.6.1 Chapter 12: Terrestrial Ecology and Nature Conservation (PEI Report, Volume I) presents the findings of a preliminary assessment of likely significant effects on terrestrial ecology (habitats and protected species) and nature conservation.

Effects During Construction

7.6.2 At this stage it is predicted that the construction across Coatham Dunes (e.g. the CO_2 Export Pipeline) potentially the has the potential to result in adverse effect on a terrestrial ecology receptors based on conservative assumptions about construction methods. This includes moderate adverse effects (significant) on the integrity of the Teesmouth and Cleveland Coast SSSI. It is likely (pending consultation and agreement with Natural England regarding mitigation) that this can be reduced further and to acceptable levels. This will be confirmed following further assessment and will be set out in the ES.

7.6.3 Pending completion of surveys in September 2020, it is assumed that there is potential for a foraging bat assemblage of up to county value to occur in association with the complex of wetland habitats present at Coatham Sands. Maintenance of this assemblage would require maintenance of suitable habitat conditions, and this in turn is likely to be dependent on the maintenance of suitable ground water regimes. The implications of potential open cut methods during construction of the landward section of the CO_2 Export Pipeline and the Water Connections on ground water regimes within Coatham Sands is subject to ongoing hydrological assessment and will be reported in the ES.

7.6.4 Is not yet known whether the effects of open cut construction measures on wetland habitats would be temporary, or whether there might be a permanent impact on the hydrology and therefore structure and function of existing wetland habitats for bats. Therefore, pending the completion of bat activity surveys at Coatham Sands and further hydrological assessment it is assumed that there is potential for a moderate adverse (significant) residual effect on bats from permanent loss or degradation of foraging habitats that is at the County level. This is an initial preliminary precautionary conclusion and is subject to further review and confirmation. This will be provided in the ES.

7.6.5 Engagement is ongoing with Natural England in relation to requirements to reduce construction impacts on Teesmouth and Cleveland Coast SSSI and, if required, to restore habitats to ensure no permanent effect on the integrity of the SSSI and its sand dune habitats. Use of trenchless drilling techniques is being explored which would reduce the impacts on the designated site during construction.

7.6.6 In any case it is not anticipated that the effects of construction will lead to any residual effects that are more than short term. No significant effects are predicted in respect of Grassland Habitats.

Effects During Operation

7.6.7 The main source of operational effects is from emissions from the operation of the Proposed Development.

7.6.8 Pending further engineering design, modelling and technical assessment it is considered that there is potential for the following nature conservation designations to experience significant adverse air quality effects (nutrient nitrogen deposition) as a result of operation of the Proposed Development unless successfully mitigated:

- Teesmouth and Cleveland Coast SSSI (major adverse)
- Saltburn Gill SSSI (moderate adverse); and
- Coatham Marsh LWS (moderate adverse).

7.6.9 This is an initial preliminary precautionary conclusion. Engineering design, modelling and technical assessment is ongoing and this is likely to necessitate substantive review of the initial assessment of potential air quality impacts and effects. This will be provided in the ES.

7.6.10 No other significant residual operational effects are predicted as a result of operation of the Proposed Development.

7.6.11 These predicted impacts are subject to further design work to embed mitigation and control measures so as to reduce the level of effect. Measures under consideration include changing the stack parameters or reducing the emission concentrations through primary or secondary means.

7.7 Aquatic Ecology

Introduction

7.7.1 Chapter 13: Aquatic Ecology (PEI Report, Volume I) presents a summary of the likely impacts on aquatic ecology (habitats and species) and nature conservation as a result of the Proposed Development.

7.7.2 The assessment of likely significant effects in the PEI Report is based on desk based study only, as field surveys are ongoing in Spring/Summer 2020; these will be used to inform the ES.

Effects During Construction

7.7.3 The assessment of the likely significant effects on aquatic ecology and nature conservation will be conducted following completion of the baseline surveys on identified receptors (Summer 2020).

7.7.4 At this stage some of the likely potential impacts as a result of the construction of the Proposed Development which will be assessed include:

- impacts on statutory designated sites Teesmouth and Cleveland Coast SPA, Ramsar and SSSI;
- impacts on rivers e.g. through habitat disturbance or impacts on water quality as a result of construction activities;
- impacts on ditches (habitats of up to national value);
- impacts on ponds (habitats of up to national value);
- impacts on fish e.g. through disturbance/removal of water body fish suitable habitat, unavoidable release of sediments to water bodies and noise and vibration next to waterbodies causing disturbance to fish.
- impacts on macroinvertebrates and macrophytes though habitat disturbance/ resulting in habitat quality which may result in the changes to the composition of the community.

7.7.5 The assessment of likely significant effects will assume that the following embedded mitigation has been incorporated into the design of the Proposed development.

- preparation of and implementation of a CEMP;
- the proposed PCC will be constructed largely within existing areas of bare ground/ hard standing within the former SSI Steelworks, thus minimising requirements for land take from semi-natural habitats of potential ecological value; and
- disturbance of aquatic habitats and species associated with the Ponds at Coatham Sands would be reduced through a commitment to use appropriate techniques to minimise water flow into excavations for the proposed CO_2 Export Pipeline and the Water Connection Corridor through the sand dunes and into the North Sea.

Effects During Operation

7.7.6 Potential effects on aquatic habitats and species associated with the operation of the Proposed Development are anticipated to be not-significant as run-off from the development will be appropriately managed to minimise impacts on aquatic receptors. This will be assessed in the ES following surveys in Summer 2020.

7.8 Marine Ecology and Nature Conservation

Introduction

7.8.1 Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I) presents a summary of the likely impacts on marine ecology (habitats and species) and nature conservation as a result of the Proposed Development.

7.8.2 Marine ecological receptors have been identified in and around the Proposed Development through a desk-based study and ecological surveys in the surrounding area.

7.8.3 The Site is situated within or adjacent to the Teesmouth and Cleveland Coast Special Protected Area SPA/Ramsar site and the Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI). These sites are designated for the protection of breeding / non-breeding bird species and other important waterfowl species associated with the site and include a range of coastal habitats (sandflats and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes) within and around the Tees Estuary.

7.8.4 A number of protected or notable animal species have been identified as present, or potentially present, within the marine ecology study area which incorporates some areas of the Greater North Sea Ecoregion. These include harbour porpoise, minke whale, bottlenose dolphin and white-beaked dolphin, grey seal and harbour (or common) seal. In addition, several protected or notable migratory and commercial fish and shellfish species have been identified.

Effects During Construction

7.8.5 Potential impacts to marine ecological receptors as a result of the Proposed Development have been identified and these include:

- direct loss and physical disturbance to habitat and species (including intertidal and subtidal benthic ecology, fish and shellfish and marine mammals) under the footprint of the marine construction works associated with the Water Discharge and Abstraction Corridors through:
  - potential need for installation of a temporary cofferdam within the River Tees;
  - construction (including preparatory dredging) and installation of the water intake infrastructure (including screens if required to enable compliance with the Eels Directive);
  - installation of rock armouring / scour protection around the outfall head if required;
  - creation of breakout points within the foreshore for the CO_2 Export Pipeline if installed using trenchless technologies; and

  - anchoring, grounding or positioning of work boat(s) and /or barge(s) on the seabed.
- physical disturbance to benthic habitats and species from increased suspended sediment concentrations (i.e. turbidity) and deposition;
- indirect effects to marine ecology from changes in marine water quality (excluding turbidity);
- changes in underwater soundscape; and
- changes in airborne soundscape.

7.8.6 To minimise the potential for auditory and behavioural disturbance to seals and particularly the harbour seal which is a qualifying feature of the Teesmouth and Cleveland Coast SSSI, noise abatement will be considered if required to mitigate underwater sound disturbance.

7.8.7 To minimise the potential auditory and behavioural disturbance to marine mammals and fish from marine vessel movement and equipment operation, it is proposed that idling of vessels and plant is kept to a minimum during the construction phase.

7.8.8 Having taken into account the design, good practice, mitigation and in general the temporary nature of the impacts the PEI has concluded no significant adverse effects to marine ecology from construction of the Proposed Development.

Effects During Operation

7.8.9 Potential impacts to marine ecological receptors as a result of the Proposed Development have been identified and these include:

- entrapment of marine organisms in cooling waters (including plankton, fish and shellfish, marine mammals);
- thermal effects from treated cooling water discharge;
- chemical effects from any treated wastewater discharge; and
- effects to intertidal habitats and species (including fish) from the deposition of airborne pollutants;

7.8.10 Having taken into account the design and good practice the PEI has concluded no significant adverse effects to marine ecology from the operation of the Proposed Development.

7.9 Ornithology

Introduction

7.9.1 Chapter 15: Ornithology (PEI Report, Volume I) presents a summary of the likely impacts and effects to ornithological receptors as a result of the

Proposed Development. The Site is situated within the Teesmouth and Cleveland Coast Special Protected Area SPA/Ramsar site and the Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI). The ornithology assessment is supported by a Habitat Regulations – Likely Significant Effects Screening Report.

Effects During Construction

7.9.2 Potential impacts to ornithological receptors as a result of the construction of the Proposed Development and that have been included within the assessment include:

- potential effects on Teesmouth and Cleveland Coast SPA/ Ramsar/ SSSI (noise/ vibration and visual disturbance and barrier to movement for various species) including:
  - redshank ((migratory (winter) qualifying species)):
  - sandwich term (Annex 1 qualifying species); and
  - sandwich tern, redshank, shelduck, teal, sanderling and lapwing (waterfowl *assemblage* qualifying species);
- potential effects of noise, disturbance and habitat loss relating to BoCC Red Listed Breeding Bird Breeding Bird Assemblage;
- potential effects on Schedule 1 breeding birds (barn owl) – disturbance; and
- potential destruction/damage of nests (all breeding bird species).

7.9.3 With the application of suitable mitigation it is not anticipated that the temporary effects of construction will lead to any residual significant effects that are more than short term.

Effects During Operation

7.9.4 There are no significant residual effects on ornithological receptors, arising from habitat loss associated with construction.

7.9.5 Potential impacts to ornithological receptors as a result of the operation of the Proposed Development and that have been included within the assessment include impacts of operational stack emissions from PCC on vulnerable species for which the SPA are designated. The predicted aerial emissions of nitrogen do not, under current baseline conditions, present any risk of significant impacts on breeding little tern colonies.

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

their nesting habitat, with the potential for significant adverse impacts in the long term.

7.10 Traffic and Transport

Introduction

7.10.1 Chapter 14: Traffic and Transport (PEI Report, Volume I) identifies the potential effects of the Proposed Development on traffic and transport in the surrounding area. The assessment considers the predicted number of vehicle movements generated during the construction and operation of the Proposed Development, and the sensitivity (including pedestrian and cyclist safety) and capacity of the local road network.

Effects During Construction

7.10.2 The construction phase will result in temporary increases of traffic flows, including HGVs. However, the assessment concludes that these additional traffic movements will not result in any significant effects. Any abnormal loads would be timed to minimise disruption following consultation with the local authority and secured through the requirements in the DCO. A traffic management plan will be developed by the contractor in accordance with a requirement in the DCO in order to manage and where possible, reduce the number of vehicles required. Consequently, the effects of construction traffic on all road links and junctions within the Study Area are considered to be not significant.

7.10.3 Opportunities for using public transport and the former rail station on the STDC site are being explored as a means to reduce construction worker traffic on the road network.

Effects During Operation

7.10.1 Operational staff movements (60 full-time staff working in three shifts and 40 corporate staff based at the site) would result in average of 70 cars per day (140 two-way vehicle movements).

7.10.2 HGV traffic generated by deliveries of operational and maintenance plant will be relatively limited (expected to be a maximum of four HGVs per day). Fuel for the new power station will be natural gas imported to the PCC via pipeline and there will be no vehicular movements associated directly with this.

7.10.3 Due to the very low traffic flows which will result once the Proposed Development is first operational in 2026, the vehicle numbers generated will be significantly lower than experienced during the construction period. The overall effects during operation are therefore considered to be negligible and not significant.

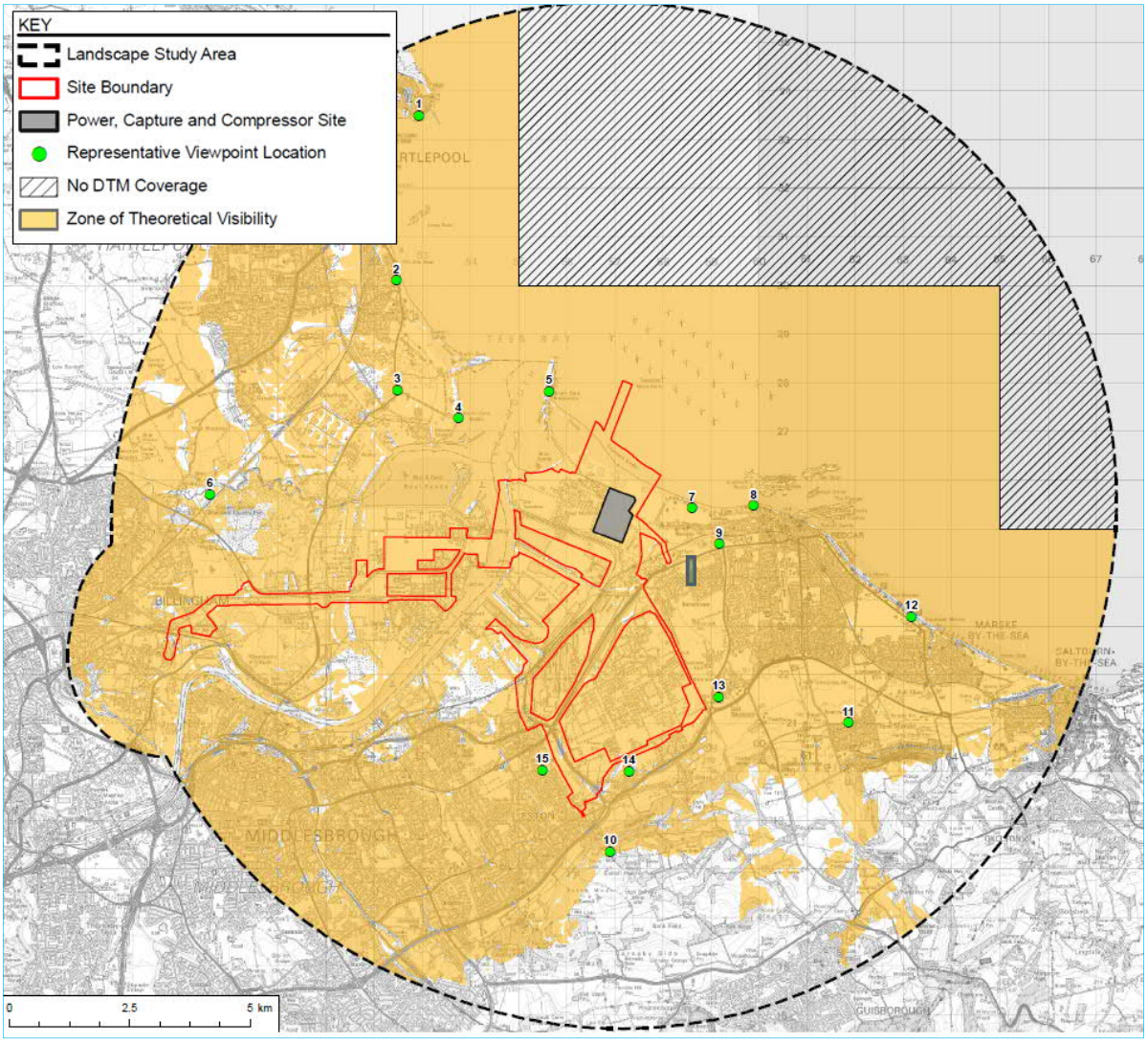
7.11 Landscape and Visual Amenity

Introduction

7.11.1 Chapter 17: Landscape and Visual Amenity (PEI Report, Volume I) addresses the potential effects of the Proposed Development on landscape character and visual amenity.

7.11.2 The study area for landscape and visual effects includes areas where it is considered that there is potential for significant direct or indirect effects on landscape character or sensitive views due to the construction or operation of the Proposed Development. The area in which the Proposed Development is likely to be visible (known as the Zone of Theoretical Visibility (ZTV)) is shown on Diagram NTS 1.10. Additionally, the visual assessment considers effects on 15 representative viewpoints located around the Proposed Development, due to changes during the construction, operation and decommissioning phases which are also shown on Diagram NTS 1.10.

Diagram NTS 1.10: ZTV and representative viewpoints



7.11.3 The assessment is based upon the largest possible dimensions for the Proposed Development and on a worst-case stack height of up to 120 m above ground level, as these are considered to represent the worst-case scenario. Using these dimensions, it is considered highly unlikely that significant effects would occur outside of the 10 km study area.

7.11.4 Due to the existing industrial character of the setting of the PCC and surrounding landscape, it is anticipated that there is a low likelihood that construction and operational effects will result in a long-term change to the existing landscape character at local, regional or national scale.

Effects During Construction

7.11.5 During construction, moderate adverse (significant) effects are expected to occur to the Redcar Flats Landscape Character Tract and the Coastal Fringe

Landscape Character Type but in both areas the Proposed Development will be viewed in context with other large-scale industrial developments. These impacts will be short term.

7.11.6 The assessment has determined that a small number of recreational receptors; North Gare Sands (Viewpoint 4), South Gare Breakwater (Viewpoint 5), England Coastal Path (Viewpoint 7) and Redcar seafront (Viewpoint 8) are likely to experience short-term moderate adverse (significant) effects during construction as a result of the close distance and limited intervening vegetation.

7.11.7 At various viewpoints surrounding the Proposed Development, views for residential receptors will either be oblique or contain clear views of structures associated with the construction of the Proposed Development. At some viewpoints, views of ground level construction activities will be limited as a result of intervening vegetation and existing large-scale structures.

Effects During Operation

7.11.8 During opening and operation there is expected to be moderate adverse (significant) effects at Viewpoint 7: England Coast Path (Warrenby) and Redcar seafront (Viewpoint 8) are likely to experience significant long-term adverse effects as a result of the close distance.

7.11.9 It is not possible to eliminate the visual impacts associated with a generating station due to the scale of the development. Mitigation is therefore to reduce the visual intrusion of the buildings in the landscape and minimise impact on visual amenity as far as reasonably practicable. The design of the Proposed Development will therefore seek to minimise adverse impacts on visual amenity through appropriate siting of infrastructure including materials and colours.

7.12 Cultural Heritage

Introduction

7.12.1 Chapter 18: Cultural Heritage (PEI Report, Volume I) considers the permanent and temporary impacts to cultural heritage assets which comprises archaeology, built heritage and historic landscape resulting from the construction and operation of the Proposed Development.

7.12.2 The desk-based assessment of the study area has identified 26 Scheduled Monuments, one Registered Park and Garden, 536 listed buildings and four Conservation Areas within 5 km of the Proposed Development, and 363 non-designated assets within 1 km, 95 of which are located within the Site.

7.12.3 There are no designated heritage assets identified within the Site.

Effects During Construction

7.12.4 With mitigation, there would be no impacts on archaeological remains or cultural heritage assets during construction.

Effects During Operation

7.12.5 With mitigation, there would be no impacts on archaeological remains or cultural heritage assets during operation.

7.13 Marine Heritage

Introduction and Baseline Conditions

7.13.1 Chapter 19: Marine Heritage (PEI Report, Volume I) assesses the potential impacts of the Proposed Development during the construction, operation and decommissioning phases. Within the 1 km study area there are no designated marine heritage assets although there are a number of undesignated assets including a palaeochannel and several undesignated maritime shipwrecks, including five which are located within the Site.

Effects During Construction

7.13.2 With mitigation, no significant effects are predicted to occur during construction of the Proposed Development on any designated or undesignated palaeoenvironmental assets or any designated maritime assets.

Effects During Operation

7.13.3 There will be no physical impact upon any heritage assets during operation of the Proposed Development. The buildings on the PCC will be visible over the Teesmouth, which forms part for the setting for the Protected Wreck Seaton Carew. However, the wreck is already situated near to an industrial complex and as such the Proposed Development is not predicted to result in any significant effects which would alter its setting.

7.14 Socio-economics and Tourism

Introduction

7.14.1 Chapter 20: Socio Economics (PEI Report, Volume I) addresses the potential effects of the Proposed Development on employment, local businesses and the local population during both the construction, operation and decommissioning phases. The assessment has taken into account the demographics of the area surrounding the Proposed Development when considering the impacts which are likely to occur.

7.14.2 Economic benefits can arise directly (through employment of local people) and indirectly (e.g. during the construction phase, when contractors may be using local accommodation and other amenities).

Effects During Construction

7.14.3 Employment opportunities created by the construction phase of the Proposed Development is likely to have a major beneficial (significant) short-term effect in the local area with increased local demand for accommodation having a positive impact on the local economy.

7.14.4 Construction is anticipated to last for up to four years and is estimated to generate a minimum of 1,760 net construction jobs for development of a single CCGT train with carbon capture, of which a minimum of 880 are expected to be from the Middlesbrough and Stockton Travel to Work Area (TTWA). Potential skills and employment enhancement programmes provided by the developer could also bring a positive impact.

7.14.5 Minor disruption on the local community, businesses, tourism and wider amenities is expected during construction but it is not expected to generate any significant effects. Additionally, some public rights of way may be temporarily disrupted during construction.

Effects During Operation

7.14.6 The Proposed Development will generate long-term jobs once operational. Operation of the Proposed Development is estimated to generate a total of 100 direct employees, of which 90 are anticipated to be from the TTWA, and 10 outside the TTWA. The direct, indirect and induced employment created by the operational phase of the Proposed Development is likely to have a moderate beneficial (significant) long-term effect.

7.14.7 There is expected to be a negligible effect on community disruption and demographic change.

7.15 Climate Change

Introduction

7.15.1 Chapter 21: Climate Change (PEI Report, Volume I) assesses the potential impacts of the construction and operation of the Proposed Development on the climate and the impact of future climate change on the Proposed Development and surrounding environment.

7.15.2 The assessment includes:

- Greenhouse Gas impact assessment (the potential effect the Proposed Development may have on GHG emissions and therefore climate change);

- In-combination climate change impacts (ICCI) (the combined effect of the Proposed Development and climate change on surrounding receptors) ; and
- Climate change resilience review (the resilience of the Proposed Development to future projections for climate change).

GHG Assessment Summary

7.15.3 The receptor for the GHG assessment is the global climate. The UKs carbon budgets are used as a proxy to assess the impacts to this receptor.

7.15.4 Emissions associated with the Proposed Development have been examined for their significance against the UK Carbon Budgets for the PEI Report and this assessment will be refined and updated to include construction data and further operational data during the ES. However, the Proposed Development is a low carbon generating station capturing more than 90% of the carbon that would otherwise be emitted. It also facilitates the future capture of carbon emitted from existing industrial sources in the area.

7.15.5 It has been concluded that the magnitude of impact of the Proposed Development is therefore considered 'low' against the current UK carbon budgets. The overall significance of effect is considered as minor adverse which is not significant and therefore the operations of the Proposed Development are not expected to affect the UK in meeting its current Carbon Budgets.

7.15.6 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 and a beneficial effect on annual UK carbon emissions.

In-Combination Climate Impact Assessment Summary

7.15.7 The In-Combination Climate Impact (ICCI) assessment considers the existing and projected future climate conditions for the geographical location and assessment timeframe. It identifies the extent to which identified receptors in the surrounding environment are potentially vulnerable to and affected by these factors.

7.15.8 Factors considered as part of the assessment include:

- extreme weather;
- precipitation change;
- temperature and humidity;
- sea level rise;

- sea temperature; and
- wind.

7.15.9 No potential ICCI impacts or effects during construction, operation or decommissioning of the Proposed Development have been identified. This will be finalised with any updates required between the PEI Report and the ES.

Climate Change Resilience Summary

7.15.10 The potential impacts and effects of projections for climate change to the Proposed Development will be finalised by the design team and environmental disciplines during the ES.

7.15.11 At this stage, likelihood and consequences during construction, operation and decommissioning have been preliminarily assessed for their significance and no significant effects have been identified. This assessment will be updated for the ES.

7.16 Major Accidents and Natural Disasters

Introduction

7.16.1 Chapter 22: Major Accidents and Natural Disasters (PEI Report, Volume I) presents an assessment of the Major Accidents and Natural Disasters (MA&ND) that have the potential to arise during the construction and operation of the Proposed Development.

7.16.2 Major accidents are incidents such as fires and explosions that could result in serious harm to people. They also have the potential to cause widespread damage to property and the environment. Disasters can be naturally occurring events, such as earthquakes, landslides and flooding. The impact of MA&D can be very significant, but the likelihood of occurrence is low.

Summary

7.16.3 Fourteen credible MA&ND scenarios were identified for the Proposed Development which have significant consequences to people and the environment, but a low probability of occurrence. These scenarios include fire, explosion, toxic release, high rainfall and storm surges from the River Tees.

7.16.4 The engineering design, construction and operation of the Proposed Development will incorporate all of the appropriate standards and mitigation measures necessary to reduce the risks of MA&ND to an acceptable level, i.e. as low as is reasonably practicable (ALARP), which is the standard expected by the Regulatory Authorities (Health and Safety Executive and Environment Agency).

7.16.5 Decommissioning of the Proposed Development is not specifically included as the hazards are anticipated to be encompassed by those assessed for the construction and operation phase, and no additional decommissioning hazards have been identified.

7.17 Population and Human Health

Introduction

7.17.1 Chapter 23: Population and Human Health (PEI Report, Volume I) addresses the potential effects of the Proposed Development upon human health, taking into account information relating to key aspects of the other technical assessments that are relevant to human health, as well as information on potential electromagnetic field (EMF) health effects from electricity cables associated with the Proposed Development.

7.17.2 The assessment identifies the communities that will be subject to impacts associated with the Proposed Development and identifies the potential effects on the health and wellbeing of those communities in Redcar and Stockton-on-Tees, Teesside as a consequence of the Proposed Development.

Summary

7.17.3 The Proposed Development will incorporate embedded mitigation measures to avoid any significant human health effects. These include (but are not limited to):

- determination of the stack height based on air quality modelling;
- process emissions to air comply with the Emission Limit Value (ELV) requirements specified in the Industrial Emissions Directive (IED);
- measures to reduce traffic for example the implementation of a Construction Worker Travel Plan;
- implementation of an appropriate drainage system for foul and surface water;
- pollution prevention measures during construction and operation; and
- operation in compliance with an Environmental Permit regulated by the Environment Agency.

7.17.4 These measures will help to ensure that impacts on the health and well-being of the local population, as well as construction workers and operational staff, are not significant.

7.17.5 As set out in the ICNIRP Guidelines (International Commission on Non-Ionising Radiation Protection, 1988), workers that may be exposed to EMF are trained to be aware of potential risk and to take appropriate precautions.

Measures for the protection of workers from potential EMF effects will include engineering and administrative controls, personal protection programmes, and medical surveillance in accordance with the relevant legislation and guidance.

7.17.6 With the appropriate precautions in place, no significant EMF related health effects in the medium to long-term for construction workers or operational staff are predicted.

7.17.7 At this preliminary assessment stage significant effects relating to population and human health are restricted to construction and operation employment (beneficial). No significant adverse human health effects have been identified.

7.18 Cumulative and Combined Effects

7.18.1 The purpose of Chapter 24: Cumulative and Combined Effects (PEI Report, Volume I) is to provide an assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development.

7.18.2 Other proposed developments that are also likely to be constructed and operated in future, and that have the potential to generate cumulative environmental effects together with the Proposed Development, have been identified in the PEI Report. These include the construction and operation of the off-shore elements of the NZT development which will be separately consented.

7.18.3 Significant cumulative effects may be possible due to the nature of these developments (e.g. the potential to release emissions to air in the vicinity of the same receptors) or their location (e.g. close enough to affect the same receptors).

7.18.4 The cumulative and combined effects assessment follows a four-stage process as set out by guidance produced by the Planning Inspectorate:

- 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.

7.18.5 The assessment included within the PEI Report (see Chapter 24 in PEI Report, Volume I) is currently at Stage 1 and has established the long list of developments. The full list is available in Table 24-3 of Chapter 24: Cumulative and Combined Assessment (PEI Report, Volume I). Stages 2-4 will be completed and presented within the ES.

8. Summary and Conclusions

8.1.1 This NTS and the PEI Report present an assessment of the preliminary environmental information for the Proposed Development to identify potential significant effects. Following consultation, the assessments will continue to progress and be updated to inform the ES for the DCO Application.

8.1.2 A number of potential environmental impact avoidance, design and mitigation measures have been identified to mitigate and control environmental effects during construction and operation of the Proposed Development. These will be reviewed and included in the ES where applicable.