

Net Zero Teesside Project

Planning Inspectorate Reference: EN010103

Land at and in the vicinity of the former Redcar Steel Works site, Redcar and in Stockton-on-Tees, Teesside

The Net Zero Teesside Order

Document Reference: 5.4 – Design and Access Statement

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Regulation 5(2)(q)



Applicants: Net Zero Teesside Power Limited (NZN Power Ltd) & Net Zero North Sea Storage Limited (NZNS Storage Ltd)

Date: ~~August~~ April 2022

DOCUMENT HISTORY

Document Ref	5.4		
Revision	32.0		
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Signed	RB	Date	23.08.22 28-02-22
Approved By	Geoff Bullock (GB)		
Signed	GB	Date	23.08.22 28-04-22
Document Owner	DWD		

GLOSSARY

Abbreviation	Description
AGI	Above Ground Installation - installations used to support the safe and efficient operation of a pipeline; above ground installations are needed at the start and end of a cross-country pipeline and at intervals along the route.
AOD	Above Ordnance Datum - a spot height (an exact point on a map) with an elevation recorded beside it that represents its height above a given datum.
BEIS	Department of Business, Energy and Industrial Strategy - a department of the UK Government.
CCGT	Combined Cycle Gas Turbine - a highly efficient form of energy generation technology. An assembly of heat engines work in tandem using the same source of heat to convert it into mechanical energy which drives electrical generators and consequently generates electricity.
CCP	Carbon Capture Plant - equipment used to capture carbon dioxide emissions from a power plant or industrial installation.
CCUS	Carbon Capture, Usage and Storage - is group of technologies designed to reduce the amount of carbon dioxide (CO ₂) released into the atmosphere from coal and gas power stations as well as heavy industry including cement and steel production. Once captured, the CO ₂ can be either re-used in various products, such as cement or plastics (usage), or stored in geological formations deep underground (storage).
CO ₂	Carbon Dioxide - an inorganic chemical compound with a wide range of commercial uses.
DAS	Design and Access Statement - a document detailing the design of a proposed development including the design process that has been followed.
DCO	Development Consent Order - a Development Consent Order made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be

	required for a development. A DCO can also include rights of compulsory acquisition.
EIA	Environmental Impact Assessment - a term used for the assessment of environmental consequences (positive or negative) of a plan, policy, program or project prior to the decision to move forward with the proposed action.
EPC	Engineering, Procurement and Construction.
ES	Environmental Statement - a report in which the process and results of an Environment Impact Assessment are documented.
FEED	Front End Engineering Design - engineering which comes after the conceptual design or feasibility study focusing on the technical requirements and estimated investment cost for the project.
FID	Final Investment Decision - a financial decision that needs to be made in order to proceed with a project.
Ha	Hectares - a metric unit of measurement for area. There are 10,000 square metres in a hectare. One hectare is equal to 2.471 acres.
HP	High Pressure.
HRSG	Heat Recovery Steam Generator - an energy recovery heat exchanger that recovers heat from a hot gas stream. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).
Km	Kilometre - a metric unit of measurement for distance, equal to 1,000 metres.
kV	Kilovolts - a unit of electrical potential. There are 1,000 volts in a kilovolt.
LPA	Local Planning Authority - the planning department within the local authority where a development is situated.
MLWS	Mean Low Water Springs - the height of the mean low water springs is the average height obtained by the two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
m	Metres - a metric unit of measurement for length, equal to 100 centimetres.
mm	Millimetres - a metric unit of measurement for length. There are 1000 millimetres in a metre and 10 millimetres in a centimetre.
Mt	Million Tonnes - a metric unit of weight.
NIZ	Northern Industrial Zone -- part of the South Tees Area/Teesside area.
NPPF	National Planning Policy Framework- a document setting out the Government's planning policies for England.
NPS	National Policy Statement - a statement produced by Government under the Planning Act 2008 providing the policy framework for Nationally Significant Infrastructure Projects. They include the Government's view of the need for and objectives for the development of Nationally Significant Infrastructure Projects in a particular sector such as energy and are used to determine applications for such development.

NSIP	Nationally Significant Infrastructure Project - defined by the Planning Act 2008 and covering projects relating to energy (including generating stations, electric lines and pipelines); transport (including trunk roads and motorways, airports, harbour facilities, railways and rail freight interchanges); water (dams and reservoirs, and the transfer of water resources); waste water treatment plants and hazardous waste facilities. These projects are only defined as nationally significant if they satisfy a statutory threshold in terms of their scale or effect.
NTS	National Transmission System for gas - the gas national grid used to transport natural gas around the UK.
NZNS	Net Zero North Sea Storage Limited - one of the Applicants.
NZT	Net Zero Teesside - the name of the Proposed Development.
NZT Power	Net Zero Teesside Power Limited - one of the Applicants.
PA 2008	The Planning Act 2008 - setting out the legislative regime for Nationally Significant Infrastructure Projects.
PCC Site	Power, Capture and Compression Site - the part of the Proposed Development Site that will accommodate the Electricity Generating Station, its Carbon Capture Plant and the High-Pressure Compressor Station.
PPG	Planning Practice Guidance - supplements the National Planning Policy Framework and provides detailed planning guidance to local planning authorities and applicants in England.
Q2	Quarter 2 - the months of April, May and June in any calendar year.
RBT	Redcar Bulk Terminal - a deep-water marine terminal situated on the South Bank of the River Tees on the North-East coast of the UK.
RCBC	Redcar and Cleveland Borough Council - the Local Planning Authority for part of the Site.
SoS	Secretary of State - the decision maker for DCO applications and head of Government department.
SPD	Supplementary Planning Document - a document that supplements the policies contained in the statutory development plan for the area.
SSI	Sahaviriya Steel Industries - the former owner of part of the former Redcar Steel Works Site.
STBC	Stockton-on-Tees Borough Council - the Local Planning Authority for part of the Site.
STDC	South Tees Development Corporation - a Mayoral Development Corporation responsible for approximately 400 hectares of land south of the River Tees in the borough of Redcar and Cleveland.
2015 Order	The Town and Country Planning (Development Management Procedure) (England) Order 2015 - the Order setting out the requirements for Design and Access Statements.

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1.0 EXECUTIVE SUMMARY

- 1.1.1 This Design and Access Statement (Document Ref. 5.4) has been prepared on behalf of Net Zero Teesside Power Limited and Net Zero North Sea Storage Limited (the 'Applicants'). It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy, under Section 37 of The Planning Act 2008 (the 'PA 2008') for the Net Zero Teesside Project (the 'Proposed Development').
- 1.1.2 The Proposed Development will be the UK's first commercial scale, full chain Carbon Capture, Usage and Storage ('CCUS') project and will initially capture up to 4 million tonnes (Mt) of carbon dioxide (CO₂) emissions per annum. It will comprise a number of elements, including a new Low Carbon Electricity Generating Station (including a Combined Cycle Gas Turbine), with state-of-the art carbon capture technology; gas, water and electricity connections (for the Low Carbon Electricity Generating Station); a CO₂ pipeline network (a 'gathering network') for collecting CO₂ from a cluster of local industries on Teesside; a CO₂ compressor station and a CO₂ export pipeline. The CO₂ captured from the Low Carbon Electricity Generating Station and local industries will be transported (via the export pipeline) for secure storage within the Endurance saline aquifer located 145 kilometres offshore from Teesside under the North Sea. The offshore CO₂ transport and storage elements below Mean Low Water Springs will be separately consented and do not form part of the Proposed Development.
- 1.1.3 The Design and Access Statement ('DAS') has been prepared by the Applicants to describe the approach that has been taken to the design of the Proposed Development and to demonstrate how regard has been had to the surrounding context and to good design. While there is no statutory requirement for a DAS to accompany a DCO application, the Planning Inspectorate's Advice Note Six advises that 'other documents' may include information that the applicant would normally want to submit for the development proposal or which has been requested or suggested by respondents to pre-application consultation and publicity, and which the applicant wishes to include. The Applicants consider it beneficial to set out in the DAS how the design of the Proposed Development has developed.
- 1.1.4 The DAS explains where the Applicants are seeking flexibility in the design of the Proposed Development and sets out the design parameters that have been used for the purposes of the Environmental Impact Assessment ('EIA') of the Proposed Development to ensure that its likely significant effects have been robustly assessed. The DAS also sets out the design information that is available at the consenting stage and how the detailed design of the Proposed Development will ultimately be controlled and secured. It also sets out how good design principles have been included within the Proposed Development.
- 1.1.5 The main focus of the DAS is upon the Low Carbon Electricity Generating Station, its Carbon Capture Plant and the High-Pressure CO₂ Compressor Station, known collectively as the Power, Capture and Compression ('PCC') Site. This is because the other works that form part of the Proposed Development – with the exception of the Gas Connection Above Ground Installations ('AGIs'), a new Net Zero Teesside ('NZT')

electrical substation (the 'New Tod Point Substation) adjacent to the existing National Grid Electricity Transmission Plc ('NGET') substation at Tod Point south-east of the PCC Site (the 'Existing Tod Point Substation') and extensions to the Existing Tod Point Substation (the substation works form part of the Electrical Connection) – involve the installation of pipelines and cables, which are for the most part below ground and/or within existing infrastructure and service corridors, temporary laydown areas and limited access and highway works. Those works therefore comprise engineering works, which are more appropriately covered in other Application documents rather than the DAS.

- 1.1.6 The Proposed Development Site (the 'Site') lies within the administrative boundaries of both Redcar and Cleveland Borough Council ('RCBC') and Stockton-on-Tees Borough Council. It also partly lies within the boundary of the land controlled by the South Tees Development Corporation ('STDC') that is now known as Teesworks and which includes the former Redcar Steel Works complex.
- 1.1.7 The PCC Site is located on the eastern part of the former Redcar Steel Works complex, immediately south of South Gare and Coatham Dunes and Sands and to the west of Dormanstown and Redcar. To the south is PD Teesport ('Teesport'), a deep-water port facility and to the west the Redcar Bulk Terminal ('RBT') and the River Tees. The PCC Site until recently accommodated a number of large buildings and structures that formed part of the former Steel Works, including the Raw Materials Handling Facility, the Sinter Plant and their extensive conveyor systems. These buildings and structures have recently been demolished by STDC but have formed a prominent part of the landscape for decades.
- 1.1.8 The PCC Site sits within an industrialised context, with the Redcar Blast Furnace and Coke Ovens still dominating the landscape. The surrounding area is very much dominated by industrial land uses, including port related uses, with the nearest residential area being Dormanstown, approximately 1.4 km to the south-east. There are undeveloped areas nearby that are used by the local community and are of environmental importance, notably South Gare and Coatham Dunes and Sands. A section of the England Coast Path runs across this area along the PCC Site's eastern and southern boundaries. The connection corridors for the most part pass through areas of existing and former industrial land.
- 1.1.9 Much of the Site, including the whole of the PCC Site, is allocated in the Redcar and Cleveland Local Plan (adopted May 2018) as a 'Protected Employment Area', which is subject to Policy ED6 'Promoting Economic Growth'. Policy ED6 seeks to promote heavy industries and port-related uses within the South Tees Area. Furthermore, Development Principle STDC6 of the South Tees Area Supplementary Planning Document ('SPD') states that RCBC will, in partnership with STDC and other partners, promote and support the development of new energy generation within the South Tees Area, including renewable energy development and the promotion of other innovative energy projects.
- 1.1.10 The South Tees SPD has been prepared by RCBC to guide the development of the South Tees Area and defines five main zones for future development. These include

the North Industrial Zone ('NIZ'). The NIZ comprises the former Steel Works and is subject to Development Principle STDC11. This states that RCBC, in partnership with STDC, will encourage development proposals in the NIZ relating to port related industry, major space users/large scale manufacturing, energy innovation, power generation and storage.

- 1.1.11 STDC has produced a Design Guide for the Teesworks area. In line with the SPD the Design Guide divides Teesworks into five principal zones, including the NIZ, where potentially suitable uses are identified as being bulk materials handling, mineral processing, energy innovation and large-scale manufacturing. The NIZ itself is divided into three main development zones – 'The Foundry', 'Net Zero Teesside' ('NZN') and 'RBT'. The NZN Zone intentionally corresponds with the extent of the PCC Site.
- 1.1.12 The PCC Site is not identified with the Design Guide as a Gateway Plot and does not have a frontage onto the main infrastructure corridor or any other primary route within the Teesworks area.
- 1.1.13 The Design Guide sets out a number of design principles for Teesworks and additional guidance is provided in respect of four major plot typologies, including 'Large-Scale Industrial Operations' which covers 'Major energy generation'. This is the Plot Typology of most relevance to the Proposed Development and the PCC Site. The Design Guide recognises that in design terms these types of developments will primarily be driven by the functional requirements of the industrial processes involved.
- 1.1.14 The proposed use of the PCC Site is for power generation and the capture and compression of CO₂ prior to this being exported for storage offshore. That use is consistent with the allocation of the land within the Local Plan and also the uses identified as appropriate to the NIZ within the South Tees Area SPD and the Teesworks Design Guide. Furthermore, as confirmed above, the PCC Site corresponds with the specific zone identified for NZN within the Design Guide.
- 1.1.15 The various connection corridors (gas, water, electrical, CO₂ gathering and export) largely involve existing and former industrial land either side of the River Tees, while the pipelines and cables will be for the most part installed below ground or upon existing pipe-racking and structures and within existing infrastructure and service corridors. This is with the exception of the Water Discharge Connection Corridor (replacement outfall option) and the CO₂ Export Pipeline, which cross South Gare and Coatham Dunes/Sands. Within these areas, it is proposed that the pipelines will be installed using horizontal directional drilling ('HDD') techniques in order to minimise impacts and disruption. The infrastructure required for the connections will not therefore be highly visible, nor significantly alter the use or character of the land to which they relate.
- 1.1.16 The tallest, and most visually prominent, buildings and structures at the PCC Site will be the Absorber Stack (128m AOD), Absorber Tower (93m AOD), Heat Recovery Steam Generator ('HRSG') Stack (98m AOD) and HRSG Building (63m AOD). The Gas

- Turbine and Steam Turbine Halls will each be 43m AOD high and the banks of Cooling Towers 38m AOD.
- 1.1.17 The main buildings and structures at the PCC Site have been grouped together where feasible from a technical and safety perspective to consolidate their built form. Consistent with the Teesworks Design Guide and the Large-Scale Industrial Operations typology, the buildings and structures and main process areas are set well back from the Site boundaries.
- 1.1.18 The appearance of the buildings and structures at the PCC Site will be in keeping with the industrialised context within which they will sit, with the area already being characterised by large industrial structures, including on the former Redcar Steel Works complex and other industrial sites within the surrounding area. The appearance of the buildings and structures is representative of their function and purpose, a characteristic recognised as a primary driver behind the design typology of Large-scale Industrial Operations (including major energy generation) within the Teesworks Design Guide.
- 1.1.19 The buildings and structures at the PCC Site will be simple and functional in form and detailing, predominantly comprising steel framed enclosures that will be clad in appropriate materials. While the buildings and structures are functional, reflective of their industrial setting and the fact they do not sit on a Gateway Plot or primary route within the Teesworks Site, the decision has been taken to enclose the main items of plant and equipment in line with Design Guide recommendations having regard to the fact they will be visible from South Gare and Coatham Dunes/Sands.
- 1.1.20 The approach taken to landscaping at the PCC Site has been influenced by functional and safety requirements. The areas around and between the main buildings and structures will comprise for the most part of hardstanding and crushed stone, with some grassed areas. These areas need to be kept free of planting for safety and security reasons. The internal access roads and other hardstanding areas (e.g. for parking) will be of concrete or tarmac.
- 1.1.21 However, the perimeter areas of the PCC Site will be landscaped and there will be opportunities for planting and biodiversity enhancement in line with the landscaping and biodiversity plans that form part of the Application, including wildflower grassland and native scrub creation.
- 1.1.22 The buildings and structures within the Gas AGIs will have maximum height of 16m AOD. Those associated within the New Tod Point Substation and the extensions to the Existing Tod Point Substation will have a maximum height of 22m AOD. Given the industrialised context these buildings and structures will not be highly prominent while those associated with the electrical substation works will sit next to the Existing Tod Point Substation. The approach to the external finishes for the Gas AGI and substation buildings and structures will mirror that for the PCC Site. No landscaping is proposed around the Gas AGIs, the New Tod Point Substation or the extension to the Existing Tod Point Substation.

- 1.1.23 The Proposed Development incorporates appropriate access arrangements. The internal access roads within the PCC Site will be designed to provide safe access and movement for all vehicle types and users. There will be clear segregation of and demarcation of routes for all users. Where possible, pedestrian routes, parking areas and buildings within the PCC Site will be designed to provide for inclusive access. This will need to take account of operational and safety considerations given the nature of the use and operations. There will be appropriate access and parking facilities at the Gas AGIs and the new Tod Point Substation. There are facilities already in place at the Existing Tod Point Substation.
- 1.1.24 In summary, it is considered that the Proposed Development represents ‘good design’ for the purposes of energy infrastructure and policy set out in the relevant National Policy Statements for energy infrastructure, other planning policy documents, including the South Tees SPD and also the Teesworks Design Guide.

2.0 INTRODUCTION

2.1 Overview

- 2.1.1 This Design and Access Statement (Document Ref. 5.4) has been prepared on behalf of Net Zero Teesside Power Limited and Net Zero North Sea Storage Limited (the 'Applicants'). It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy, under Section 37 of 'The Planning Act 2008' (the 'PA 2008').
- 2.1.2 The Applicants are seeking development consent for the construction, operation and maintenance of the Net Zero Teesside Project ('NZT'), including associated development (together the 'Proposed Development') on land at and in the vicinity of the former Redcar Steel Works site, Redcar and in Stockton-on-Tees, on Teesside (the 'Site'). The former Steel Works site, along with other land required for the Proposed Development, lies within the boundary of the land controlled by the South Tees Development Corporation ('STDC'), which is now known as 'Teesworks'.
- 2.1.3 A DCO is required for the Proposed Development as it falls within the definition and thresholds for a 'Nationally Significant Infrastructure Project' (a 'NSIP') under Sections 14(1)(a) and 15 of the PA 2008, associated development under Section 115(1)(b) and by direction under Sections 35(1) and 35ZA of the same Act. The DCO, if made by the SoS, would be known as the 'Net Zero Teesside Order'.
- 2.1.4 The Proposed Development will be the UK's first commercial scale, full chain Carbon Capture, Usage and Storage ('CCUS') project and will initially capture up to 4 million tonnes (Mt) of carbon dioxide (CO₂) emissions per annum. It will comprise a number of elements, including a new gas-fired electricity generating station with post-combustion carbon capture plant; gas, water and electricity connections (for the generating station); a CO₂ pipeline network (a 'gathering network') for collecting CO₂ from a cluster of local industries on Teesside; a CO₂ compressor station (for the compression of the CO₂) and a CO₂ export pipeline.
- 2.1.5 The CO₂ captured from the electricity generating station and local industries will be compressed and then transported (via the export pipeline) for secure storage within the Endurance saline aquifer located 145 kilometres offshore from Teesside under the North Sea. The export pipeline has the capacity to carry up to 10Mt of CO₂ per annum. The Proposed Development will therefore make a significant contribution toward the UK reaching its greenhouse gas emissions target by 2050.

2.2 The Applicants

- 2.2.1 NZT encompasses proposals to both decarbonise electricity generation and a cluster of carbon intensive industries on Teesside. In line with the CCUS business models published by BEIS in December 2020, there will be separate entities who will be responsible for:
- electricity generation with post-combustion carbon capture (including the gas, water and electricity connections);

- CO₂ gathering (from industrial emitters), CO₂ compression and CO₂ transportation and storage; and
- industrial (including hydrogen production) carbon capture and connections to the CO₂ gathering network.

2.2.2 The entities are set out in **Table 2.1** below:

Table 2.1 – NZT Entities

Onshore works scope	Partnership	NZT Entity	Within the scope of the DCO Application?
Electricity generating station with post-combustion carbon capture (including the gas, water and electricity connections)	bp*and Equinor	Net Zero Teesside Power Limited	Yes
CO ₂ gathering network, CO ₂ compression and the onshore section of CO ₂ export pipeline	bp*, Equinor, National Grid, Shell and Total	Net Zero North Sea Storage Limited	Yes
Industrial and hydrogen production carbon capture and connection to the CO ₂ gathering network	Individual industrial emitters	N/A	No

*Operator on behalf of the relevant Partnership

2.2.3 NZT is being promoted by Net Zero Teesside Power Limited ('NZT Power') and Net Zero North Sea Storage Limited ('NZNS Storage'). NZT Power and NZNS Storage

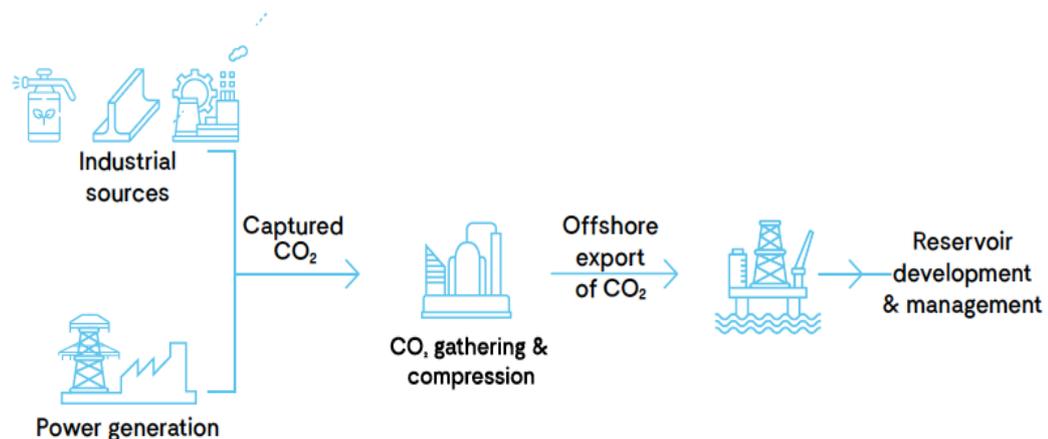
(together the Applicants for the purposes of the DCO Application) have been incorporated on behalf of bp as operator of the two Partnerships.

- 2.2.4 The electricity generation with post-combustion carbon capture Partnership comprises bp and Equinor, with bp leading as operator. NZT Power will be responsible for the Proposed Development in so far as it relates to the construction, operation and eventual decommissioning of the Low Carbon Electricity Generating Station together with its carbon capture plant (both within the scope of the DCO Application).
- 2.2.5 The CO₂ gathering network, CO₂ compression and onshore section of CO₂ export pipeline Partnership comprises bp, Equinor, National Grid, Shell and Total, with bp leading as operator. NZNS Storage will be responsible for the Proposed Development in so far as it relates to the construction, operation and eventual decommissioning of the equipment required for the high-pressure compression of CO₂ from the Low Carbon Electricity Generating station and industrial emitters via the CO₂ gathering network and the onshore section of the CO₂ export pipeline (these are all within the scope of the DCO Application).
- 2.2.6 NZNS Storage will also be responsible for the offshore elements of NZT, comprising the offshore section of the CO₂ export pipeline (below Mean Low Water Springs ('MLWS')) to a suitable offshore geological CO₂ storage site under the North Sea, CO₂ injection wells and associated infrastructure. The offshore elements of NZT (with the exception of the gas and CO₂ pipeline crossings of the River Tees and the water outfall from the Low Carbon Electricity Generating Station) do not form part of the DCO Application.

2.3 What is Carbon Capture, Usage and Storage?

- 2.3.1 Carbon Capture, Usage and Storage ('CCUS') is a process that removes CO₂ emissions at source, for example emissions from a power station or chemical manufacturing installation, and then compresses the CO₂ so that it can be safely transported to secure underground storage sites. It is then injected into layer of solid rock filled with interconnected pores where the CO₂ becomes trapped and locked in place, preventing it from being released into the atmosphere. **Figure 2.1** below shows what is involved in the process.

Figure 2.1 – CCUS Process



2.3.2 The technologies used in CCUS are proven and have been used safely across the world for many years. Storage sites are located several kilometres underground and are subject to stringent tests to ensure that they are geologically suitable. In the UK, it is expected that the storage sites will be located offshore, in areas such as the North Sea.

2.3.3 CCUS is one of a number of technologies that are crucial to reducing CO₂ emissions and combatting global warming. The UK Government has committed to achieving net zero in terms of greenhouse gas emissions by 2050. This is a legally binding target.

2.4 The Site

2.4.1 The Site lies within the administrative boundaries of both Redcar and Cleveland Borough Council and Stockton-on-Tees Borough Council. It also partly lies within the boundary of the Teesworks area that is controlled by the STDC.

2.4.2 Most of the Site lies within the administrative area of Redcar and Cleveland Borough Council, although parts of Site (for the electricity generating station's gas supply connection to the National Transmission System for gas and the CO₂ gathering network) cross the River Tees into the administrative area of Stockton-on-Tees Borough Council. At this location, the River Tees is tidal. In addition, there are elements of the Site which extend into South Gare, Coatham Dunes/Sands and the North Sea. Those sections of the Site that are below MLWS are outside the jurisdiction of either local authority being part of the UK marine area.

2.4.3 The Site extends to approximately 267.4304 hectares ('ha') in area. Much of it comprises previously developed (including part of the former Redcar Steel Works Site) and existing industrial land, some of which was reclaimed from the Tees Estuary in the late C19th and during the C20th. The Site is relatively flat and low-lying and sits at a level of between sea level and approximately 9 metres Above Ordnance Datum ('AOD'). The area surrounding the Site is largely characterised by industrial

and commercial uses, although there are open areas of land to the north in the form of South Gare and Coatham Sands, which are used for recreational purposes and that are of nature conservation importance.

2.4.4 A more detailed description of the Site and its surroundings is provided at Chapter 3 'Description of the Existing Environment' in the Environmental Statement ('ES') Volume I (Document Ref. 6.2).

2.5 The Proposed Development

2.5.1 The Proposed Development will work by capturing CO₂ from the electricity generating station in addition to a cluster of local industries on Teesside and transporting it via a CO₂ export pipeline to the Endurance saline aquifer under the North Sea. The Proposed Development will initially capture and transport up to 4Mt of CO₂ per annum, although the CO₂ export pipeline has the capacity to accommodate up to 10Mt of CO₂ per annum thereby allowing for future expansion.

2.5.2 The Proposed Development comprises the following elements:

- **Work Number ('Work No.') 1** – a Combined Cycle Gas Turbine ('CCGT') electricity generating station with an electrical output of up to 860 megawatts and post-combustion carbon capture plant (the '**Low Carbon Electricity Generating Station**');
- **Work No. 2** – natural gas supply connection and Above Ground Installations ('AGIs') (the '**Gas Connection Corridor**');
- **Work No. 3** – an electricity grid connection (the '**Electrical Connection**');
- **Work No. 4** – water supply connections (the '**Water Supply Connection Corridor**');
- **Work No. 5** – waste water disposal connections (the '**Water Discharge Connection Corridor**');
- **Work No. 6** – a CO₂ gathering network (including connections under the tidal River Tees) to collect and transport the captured CO₂ from industrial emitters (the industrial emitters using the gathering network will be responsible for consenting their own carbon capture plant and connections to the gathering network) (the '**CO₂ Gathering Network Corridor**');
- **Work No. 7** – a high-pressure CO₂ compressor station to receive and compress the captured CO₂ from the Low Carbon Electricity Generating Station and the CO₂ Gathering Network before it is transported offshore (the '**HP Compressor Station**');
- **Work No. 8** – a dense phase CO₂ export pipeline for the onward transport of the captured and compressed CO₂ to the Endurance saline aquifer under the North Sea (the '**CO₂ Export Pipeline**');

- **Work No. 9** – temporary construction and laydown areas, including contractor compounds, construction staff welfare and vehicle parking for use during the construction phase of the Proposed Development (the ‘**Laydown Areas**’); and
 - **Work No. 10** – access and highway improvement works (the ‘**Access and Highway Works**’).
- 2.5.3 The Low Carbon Electricity Generating Station and the HP Compressor Station will be located on part of the STDC Teesworks area (on part of the former Redcar Steel Works Site). The Low Carbon Electricity Generating Station and the HP Compressor Station are known collectively as the ‘Power, Capture and Compression’ (‘PCC’) Site. The CO₂ Export Pipeline will start in this location before heading offshore. The various connections for the Low Carbon Electricity Generating Station and the CO₂ Gathering Network will require corridors of land within both Redcar and Stockton-on-Tees, including crossings beneath the River Tees.
- 2.5.4 All of the above elements are included in the scope of the DCO Application, with the exception of the CO₂ Export Pipeline, with only the section of pipeline above MLWS being included. The CO₂ Export Pipeline below MLWS and the CO₂ storage site under the North Sea (the Endurance saline aquifer) will be the subject of separate consent applications, including under the Petroleum Act 1998 and the Energy Act 2008. These applications will be supported by an Offshore Environmental Statement.
- 2.5.5 The ancillary development required in connection with and subsidiary to the above elements of the Proposed Development is detailed in Schedule 1 of the draft DCO (Ref. 2.1). A more detailed description of the Proposed Development is provided at Schedule 1 ‘Authorised Development’ of the draft DCO and Chapter 4 ‘The Proposed Development’ in ES Volume I (Document Ref. 6.2) and the areas within which each of the main elements of the Proposed Development are to be built are denoted by the coloured and hatched areas on the Works Plans (Document Ref. 4.4).
- ## 2.6 The Purpose and Structure of this Document
- 2.6.1 The PA 2008 and related regulations do not require an application for a DCO to be accompanied by a Design and Access Statement (‘DAS’). However, Section 10 ‘Sustainable development’ of the PA 2008 (subsection (3)(b)) states that in setting policy for NSIPs (through National Policy Statements) the SoS must have regard to the desirability of achieving ‘good design’. Additionally, the Planning Inspectorate’s Advice Note Six advises that ‘other documents’ may include information that the applicant would normally want to submit for the development proposal or which has been requested or suggested by respondents to pre-application consultation and publicity, and which the applicant wishes to include. The Applicants consider it beneficial to set out in the DAS how the design of the Proposed Development has developed.
- 2.6.2 ‘The Overarching National Policy Statement for Energy (EN-1)’, Part 4 ‘Assessment Principles’ 4.5 ‘Criteria for good design for energy infrastructure’, is clear that applicants should have regard to achieving ‘good design’ in energy infrastructure projects, and that these should be as attractive, durable and adaptable as possible.

- 2.6.3 This DAS has therefore been prepared to describe the approach that has been taken to the design of the Proposed Development and to demonstrate how regard has been had to the surrounding context and to good design.
- 2.6.4 The main focus of the DAS is on Works Nos. 1 and 7, the Low Carbon Electricity Generating Station and the HP Compressor Station, which will be located together on part of the former Redcar Steel Works Site and are known collectively as the Power, Capture and Compression Site (the 'PCC Site'). This is on the basis that the other elements of the Proposed Development – with the exception of the Gas AGIs, a new Net Zero Teesside ('NZT') electrical substation (the 'New Tod Point Substation') adjacent to the existing NGET substation at Tod Point south-east of the PCC Site (the 'Existing Tod Point Substation') and extensions to the Existing Tod Point Substation (the substation works form part of the Electrical Connection) – encompass the installation of pipelines and cables (which will be installed below ground or within existing infrastructure corridors), temporary construction laydown areas and limited access and highway works. Those elements comprise engineering works (for which there is no requirement to produce a DAS) and are described in detailed within other Application documents, notably ES Chapter 4 'The Proposed Development' and 6 'Alternatives and Design Evolution' (Document Ref. 6.2) and the Electricity Grid Connection Statement (Document Ref. 5.5) and the Gas Connection and Pipelines Statement (Document Ref. 5.6) rather than the DAS.
- 2.6.5 The structure of the DAS is set out below:
- **Section 3: Site Description** – Describes the location of the Proposed Development, its context, the main parts of the Site and its surroundings.
 - **Section 4: Legislative and Policy Context** – provides a summary of relevant policy and guidance relating to design.
 - **Section 5: Design Flexibility and Information** – Explains the design flexibility that is being sought by the Applicants and sets out the design information being provided with the Application.
 - **Section 6: Design Approach and Development** – Describes the design process that has been followed, including the broad approach that the Applicants have taken to the design of the Proposed Development and where the design has developed.
 - **Section 7: Design Components** – Describes the final design of the Proposed Development with reference to its key design components, including use, layout, amount, scale, appearance and also landscaping.
 - **Section 8: Access Arrangements** – Considers access both to and within the Site.
 - **Section 9: Securing Detailed Design** – Sets out how the detailed design of the Proposed Development will be secured in accordance with the design details and parameters upon which the Environmental Impact Assessment of it has been based.

- **Section 10: Conclusions** – Sets out the conclusions that can be drawn with regard to design and access matters.

3.0 SITE DESCRIPTION

3.1 Site Location

3.1.1 The Site is located approximately 9km to the north-east of Middlesbrough and encompasses land on either side of the River Tees between Dormanstown and Redcar in the east and Billingham in the west. Parts of the Site also extend north across South Gare and Coatham Dunes/Sands into the North Sea and to the south along Teesdale Way toward Lackenby and South Bank. The location of the Site is shown in **Figure 3.1**.

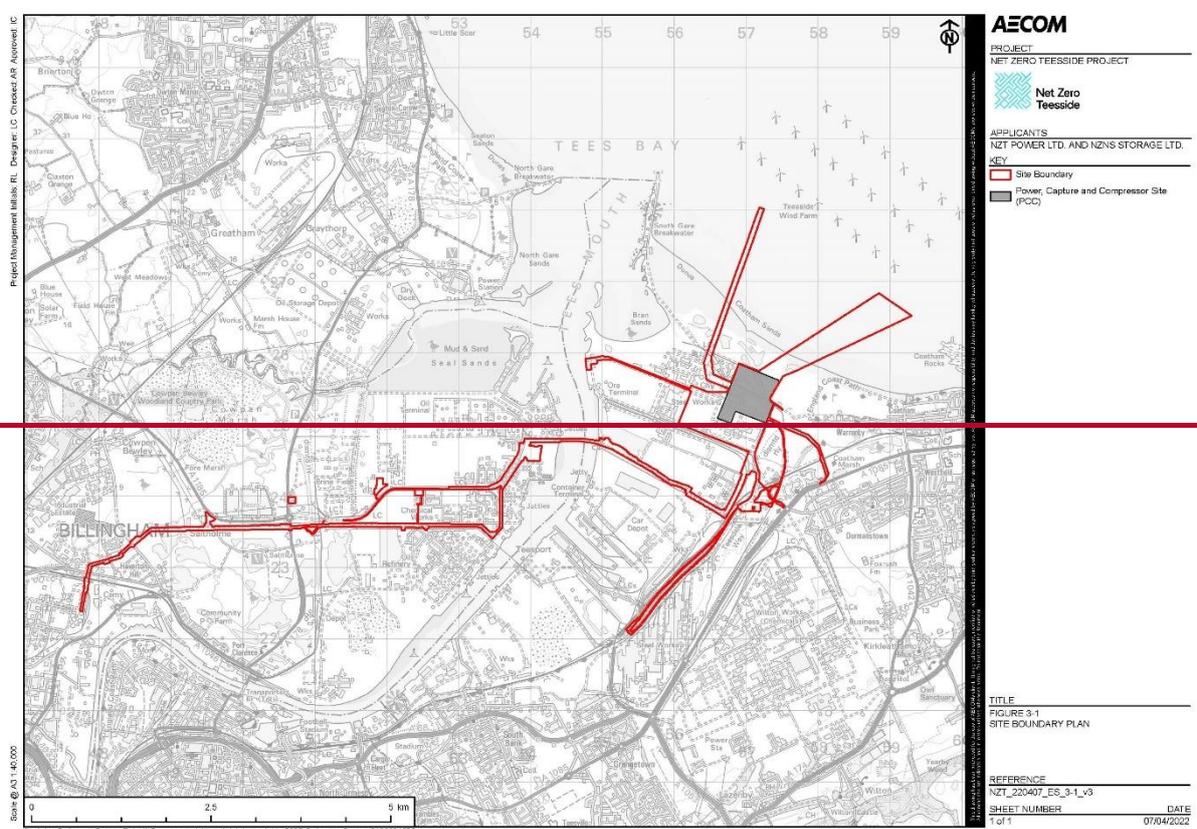
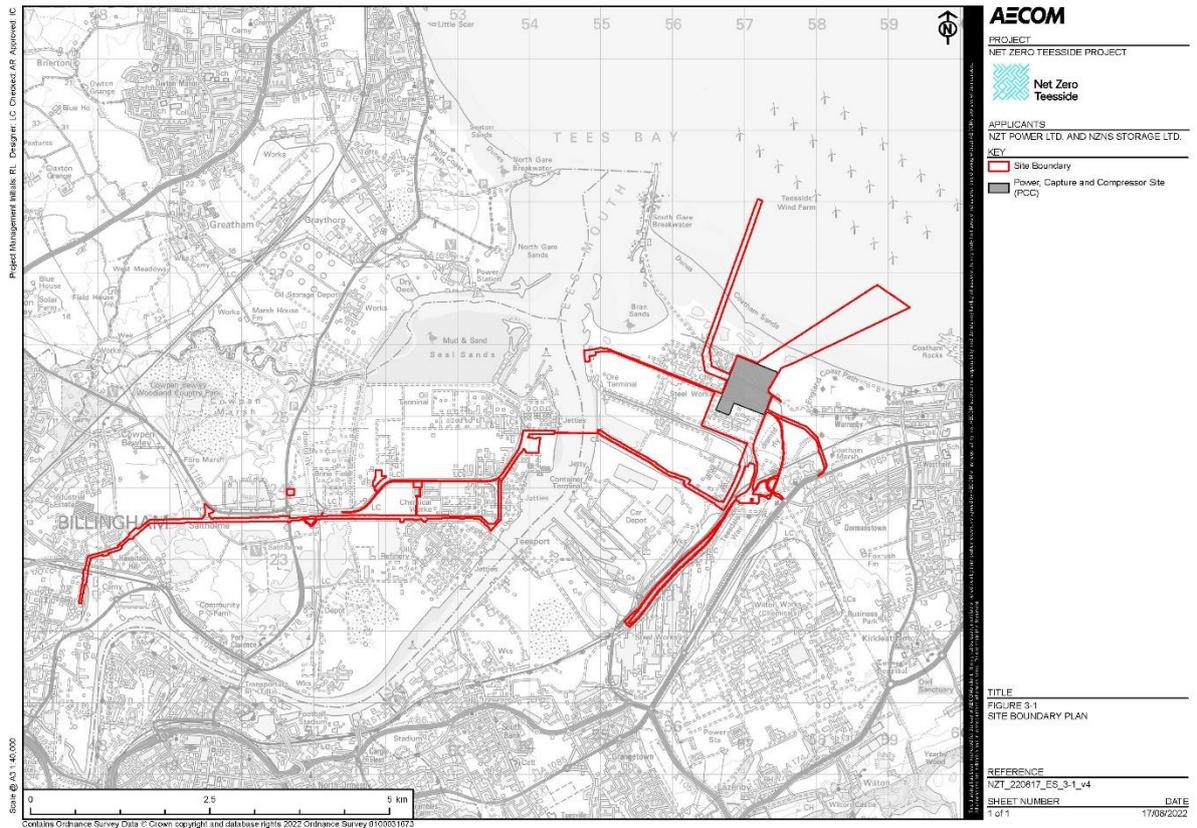
Figure 3.1 – Site Location





- 3.1.2 The Site lies within the administrative boundaries of both Redcar and Cleveland Borough Council ('RCBC') and Stockton-on-Tees Borough Council ('STBC'). It also partly lies within the boundary of the land within the administrative area of the South Tees Development Corporation ('STDC').
- 3.1.3 Most of the Site, including the PCC Site, which is the primary focus of this DAS, lies within the administrative area of RCBC, although parts of Site (the Gas Connection Corridor and the CO₂ Gathering Network Corridor) cross the River Tees into the administrative area of STBC. As mentioned above, at this location the River Tees is tidal, while there are parts of the Site that extend into Coatham Dunes/Sands and the North Sea. These parts of the Site, which are below MLWS, are outside the jurisdiction of either local authority. The extent of the Site is shown in **Figure 3.2**. The PCC Site is shaded grey.

Figure 3.2 – Site Boundary (PCC Site shaded grey)



3.2 Site Context and History

- 3.2.1 Teesside has a long history of being a location for heavy industry, dating back to the 1870s when steel making first became established on a large scale, to the later development of the chemical industry during the First World War at Billingham. There was further significant expansion of the chemical industry at Billingham in the 1920s and 1930s followed by the development of a major chemicals complex at Wilton from the mid-1940s. Land was reclaimed from the Tees Estuary over the years to accommodate the growth of these and other industries.
- 3.2.2 The Teesside steel works complex eventually formed a continuous stretch of development along the south bank of the River Tees from Middlesbrough up to Redcar. At the height of production there were 91 blast furnaces within a 10-mile radius of the area. By the late 1970s most of the steel works in the area had been taken over by British Steel Corporation, and only one blast furnace remained in operation. Opened in 1979 and located near the mouth of the River Tees, the Redcar Blast Furnace, which formed part of the wider British Steel Redcar Integrated Steel Works complex, was the second largest in Europe. Images of the area taken in the mid-twentieth century, as well as more recent images of the Redcar Steel Works are shown in **Figures 3.3 to 3.7** below.

Figures 3.3 – 3.7 – Historic Images of the Site and surrounding area

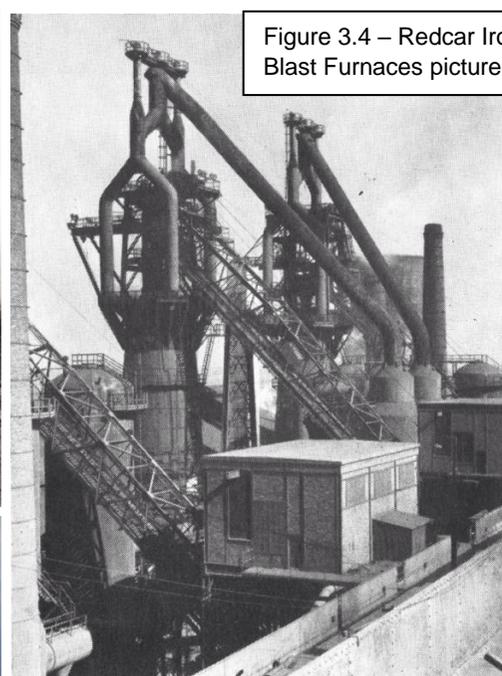
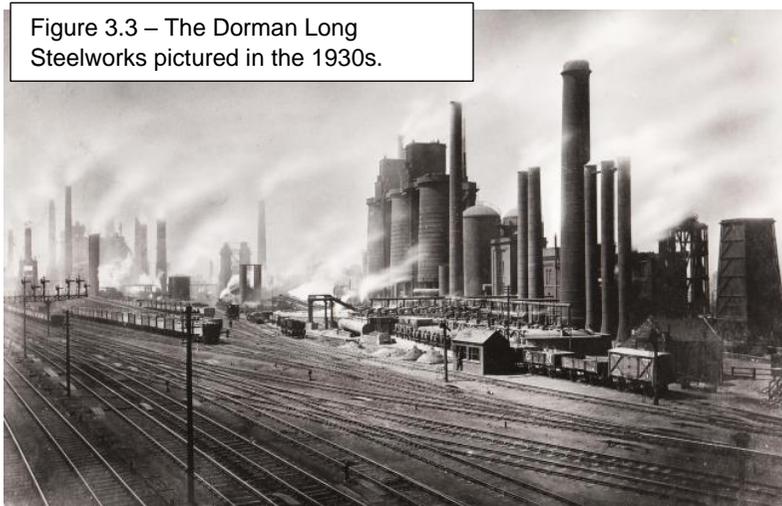


Figure 3.5 – Lackenby Steel Works facing east towards Redcar Steel Works in the 1980s



Figures 3.6 & 3.7 – Redcar Blast Furnace, taken in recent years.

Image Sources: Teesside Archives and Wikipedia Commons

- 3.2.3 Following the privatisation of British Steel Corporation in 1988 to form British Steel Plc (later Corus Group), the Redcar Steel Works were purchased by Thai-based Sahaviriya Steel Industries ('SSI') in 2011 and were reopened in April 2012 after a period of partial mothballing. However, the Steel Works were again mothballed in September 2015 due to poor steel trading conditions and a drop in the price of steel, with the UK arm of SSI going into liquidation shortly after in October 2015.
- 3.2.4 With the liquidation of SSI, the Redcar Steel Works, including the Redcar Blast Furnace, the Redcar and South Bank Coke Ovens and the Basic Oxygen Steel Plant at Lackenby, closed. The Teesside Beam Mill and some support services still operate at Lackenby.
- 3.2.5 The former Redcar Steel Works complex (and other land on the south bank of the Tees) is now controlled by STDC following land acquisitions and a compulsory purchase order (confirmed in 2020) and has been rebranded as 'Teesworks'. STDC is in the process of bringing forward a number of major development proposals, including on what is now known as the 'Foundry Site', which forms the western part of the former Steel Works complex adjoining the PCC Site.

3.3 Site Description

- 3.3.1 The Site extends to approximately ~~267.4304~~ hectares ('ha'). It is relatively flat and low lying and sits at a level of between sea level and 9 metres ('m') Above Ordnance Datum ('AOD').
- 3.3.2 The Site can be divided into the following main parts:
- **PCC Site** – the Low Carbon Electricity Generating Station (Work No. 1) and the HP Compressor Station (Work No. 7).
 - **Gas Connection Corridor** – Work No. 2.
 - **Electrical Connection** – Work No. 3.
 - **Water Supply Connection Corridor** – Work No. 4.
 - **Water Discharge Connection Corridor** – Work No. 5.
 - **CO₂ Gathering Network Corridor** – Work No. 6.
 - **CO₂ Export Pipeline** – Work No. 8.
 - **Laydown Areas** – Work No. 9.
 - **Access and Highway Works** – Work No. 10.
- 3.3.3 The main parts of the Site are shown by the coloured and hatched areas on the Works Plans (Document Ref. 4.4) that form part of the Application.
- 3.3.4 The PCC Site extends to 42.5ha and comprises the eastern part of the former Redcar Steel Works complex. To the north is South Gare and Coatham Dunes/Sands and to the east Dormanstown and Redcar. To the south is Teesport, while to the west it adjoins the remainder of the Steel Works complex, including the Blast Furnace and

Coke Ovens (now known as the Foundry Site). Further to the west is the Redcar Bulk Terminal ('RBT') and the River Tees.

- 3.3.5 Until Q2 2020, the PCC Site accommodated a number of large buildings and structures that formed part of the former Redcar Steel Works complex. These included the Raw Materials Handling Facility, the Sinter Plant and their extensive conveyor systems. These buildings and structures have recently been demolished but have been a prominent part of the landscape within the area for decades. There are also areas of land at the PCC Site that were previously used for raw materials processing and open storage. In addition, there are some areas of grass and scrub vegetation.
- 3.3.6 The PCC Site very much sits within an industrialised context, with the Redcar Blast Furnace still dominating the area's landscape. It is relatively remote from residential areas, the nearest one being Dormanstown, approximately 1.4km to the south-east. A section of the England Coast Path runs around the PCC Site's eastern and southern boundaries and South Gare and Coatham Dunes/Sands to the north are used for recreational purposes.
- 3.3.7 A description of the other main parts of the Site outside the PCC Site is provided below:
- **Gas Connection Corridor** – the Gas Connection will involve a tie-in to the National Transmission System ('NTS') on the north bank of the River Tees and a tie-in to the existing disused 24" Sembcorp Gas Pipeline located approximately 100m north of the NTS tie-in. The existing Sembcorp pipeline then runs south-east across Seal Sands and the under the River Tees to Bran Sands and on to the Wilton Industrial Area. There will be a new tie-in located next to the Bran Sands Effluent Treatment plant and from this location natural gas will flow via a new 24" buried gas pipeline to the PCC Site. There will be two new Above Ground Installations ('AGIs') constructed next to the NTS at Seal Sands – the first will receive gas from the tie-in to the NTS and the second will receive gas from the NTS before it is fed into the Sembcorp Gas Pipeline. An additional AGI will be constructed at Bran Sands to facilitate the tie-in of the gas connection to the PCC Site from the Sembcorp Gas Pipeline.
 - **Electrical Connection** – the Electrical Connection runs underground (apart from a section that crosses a railway line - here the cable will ~~either use existing or consented (but not yet built)~~ structures for the crossing), for approximately 1.3 km south from the PCC Site to provide a connection to the National Grid Electricity Transmission System at the 275kV NGET Tod Point Substation (the 'Existing Tod Point Substation'). A new NZT electrical substation (the 'New Tod Point Substation') will be built adjacent to the Existing Tod Point Substation as part of the Electrical Connection works. The Existing Tod Point Substation will also be extended by NGET by the addition of two additional bays (one to the north and one to the south) as part of these works.

- **Water Supply Connection Corridor** – the corridor extends from the PCC Site to the south-east to the existing Northumbrian Water Limited Meter House located just off the A1085 in the vicinity of Coatham Marsh.
- **Waste Discharge Connection Corridor** – the corridor extends from the PCC Site to the north/north-east across Coatham Sands into the North Sea and also south to provide for potential alternative connections for:
 - use of the existing (former Steel Works) outfall (north and to the south); or
 - a new (replacement) outfall (north-east) should this be required.

This element of the Proposed Development also includes a potential pipeline connection for the transportation of process water to the Bran Sands Waste Water Treatment Plant and return for discharge.

- **CO₂ Gathering Network Corridor** – the CO₂ Gathering Network is for the majority of the route an above ground pipeline that starts in Billingham and then runs east through Seal Sands before running south-east under the River Tees. On the south bank of the River Tees, the pipeline will run along the existing pipeline corridor next to Dabholm Gut and then at the corner of the Bran Sands Effluent Treatment Plant, the pipeline will head northeast to the PCC Site. The crossing of the CO₂ Gathering Network under the River Tees will be achieved ~~either~~ by installing the pipeline within the existing Sembcorp No.2 Tunnel from the Navigator Terminals area to the northern bank of the mouth of Dabholm Gut.:
 - ~~— installation of the pipeline within the existing Sembcorp No. 2 Tunnel from Navigator Terminals area to the northern bank of the mouth of Dabholm Gut; or~~
 - ~~— installation of the pipeline using a horizontal directional drilled ('HDD') bore from Navigator Terminals area to the northern bank of the mouth of Dabholm Gut.~~
- **CO₂ Export Pipeline** – the CO₂ Export Pipeline extends from the PCC Site to the north-east across Coatham Dunes/Sands into the North Sea.
- **Laydown Areas** – the Laydown Areas include an area of land to the south of and overlapping with the PCC Site on part of the former Steel Works Site as well as areas either side of the River Tees (to facilitate the pipeline crossings of the Tees) and three areas in the vicinity of and adjoining the CO₂ Gathering Network Corridor on the Stockton side of the Tees.
- **Access and Highway Works** – limited improvement works in the main to private access roads across the Site to facilitate construction of the Proposed Development.

3.3.8 The connection corridors for the most part pass through areas of existing and former industrial land and there are numerous existing pipeline and infrastructure crossing of the River Tees. The Water Discharge Connection Corridor (replacement outfall

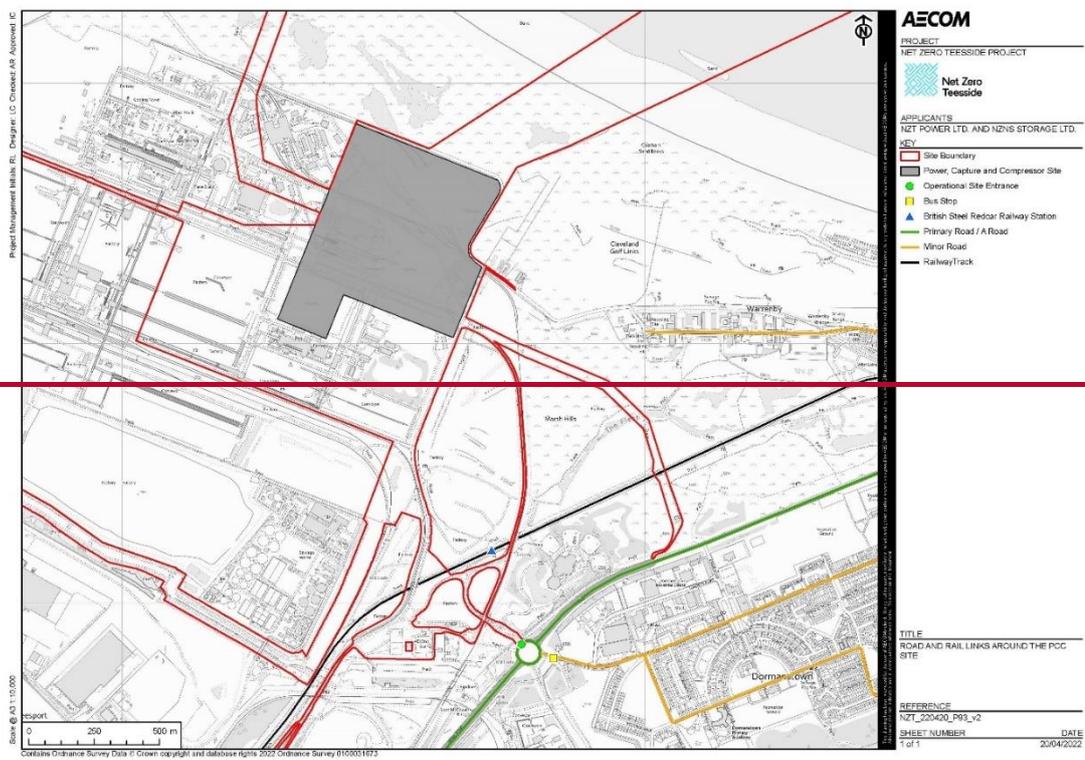
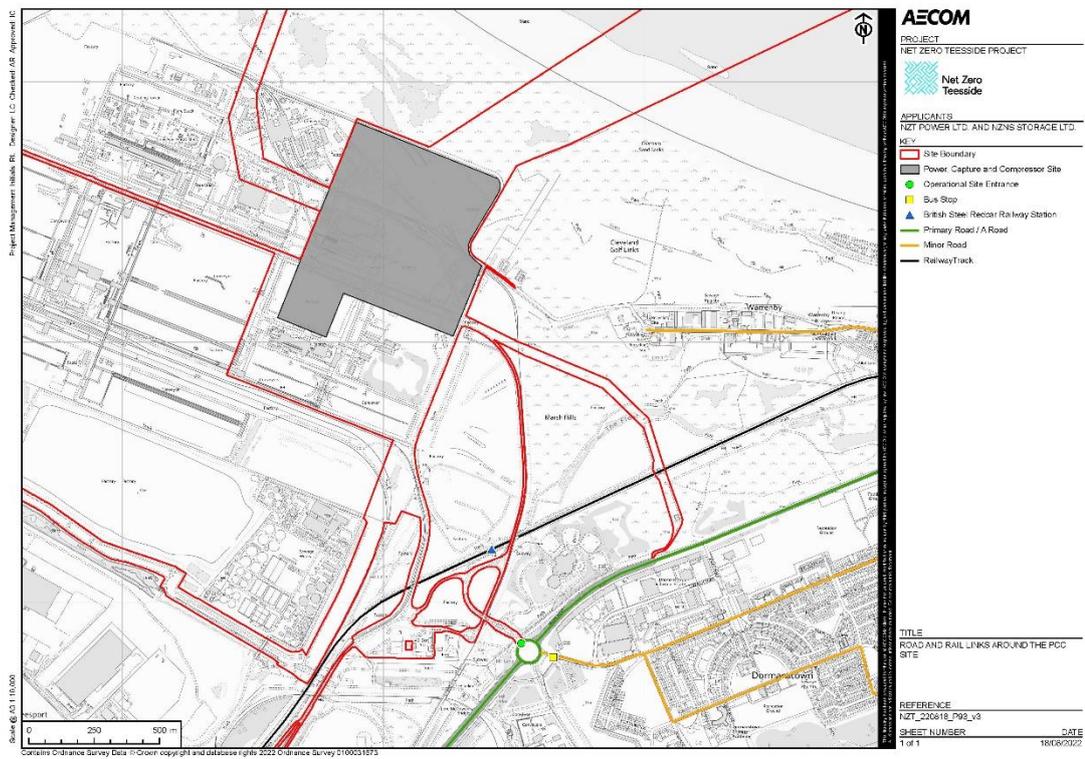
option) and the CO₂ Export Pipeline do cross South Gare and Coatham Dunes/Sands. These are undeveloped areas that are used for recreation and are of nature conservation value. Within these areas, it is proposed that, where existing infrastructure cannot be utilised, the pipelines will be installed using HDD and bored tunnel techniques in order to minimise impacts and disruption.

- 3.3.9 A more detailed description of the various connection corridors is provided within Chapter 4 'The Proposed Development' of the ES (Document Ref. 6.2). The approach that has been taken by the Applicants to the selection and refinement of the corridors is set out in Chapter 6 'Alternatives and Design Evolution' of the ES.

3.4 Site Access

- 3.4.1 The main vehicular route to the Site is via existing largely private access roads from the A1085 Trunk Road to the east near Redcar and the A1053 Tees Dock Road to the north of Grangetown. There is access from these roads to the A19 and the wider strategic road network from either the A66, passing north of Middlesbrough, or the A174, which passes to the south of the Town.
- 3.4.2 There is currently a single main access point to the PCC Site in its south east corner via an existing private access road. This links to the A1085 to the east and the A1053 to the south.
- 3.4.3 Rail lines to and from RBT run along the southern boundary of the former Steel Works complex, including the PCC Site. A public railway line (travelling between Middlesbrough and Redcar) also intersects the Site boundary and runs adjacent to and to the south of the former Steel Works and includes the Redcar British Steel train station.
- 3.4.4 The main road and rail connections within the vicinity of the Site are shown in **Figure 3.8** below.

Figure 3.8 – Road and Rail Connections Plan



3.5 The Surrounding Area

3.5.1 The surrounding area is very much dominated by industrial land uses, including port related uses, although there are undeveloped areas that are used by the local

community and are of nature conservation value, notably South Gare and Coatham Dunes/Sands, which lie immediately to the north of the PCC Site. A section of the England Coast Path runs across this area around the eastern and southern boundaries of the PCC Site.

- 3.5.2 The Teesside Wind Farm is located offshore approximately 2.4km north-east of the Site and is oriented north-west to south-east, parallel with the shoreline at Coatham Dunes/Sands.
- 3.5.3 There is a concentration of industrial and port uses around the mouth of the River Tees (Teemouth) to the west of the PCC Site. These include the operational RBT and the ConocoPhillips operated North Sea Terminal across the River Tees at Seal Sands.
- 3.5.4 To the south lies Teesport and its associated operational land as well as Northumbrian Water Limited's Bran Sands effluent treatment works and the remaining steel works at Lackenby. To the south-east, across the A1085, is Sembcorp's Wilton International Site. The Wilton Site extends to approximately 800 ha and is a major location for primary chemicals manufacturing on Teesside.
- 3.5.5 There are further concentrations of heavy industry with the vicinity of the parts of the Site across the River Tees in Stockton. These include an oil terminal and refinery uses and large chemical works south of Seal Sands and to the east of Saltholme (close to Billingham).
- 3.5.6 The nearest main settlements are Dormanstown, Redcar, Eston and Middlesbrough. Dormanstown is the nearest, being located approximately 1.4 km to the south-east of the PCC Site. There are no residential properties within the Site boundary.

4.0 LEGISLATIVE AND POLICY CONTEXT

4.1.1 This section of the DAS summarises the design related legislative context and policy framework in respect of NSIPs, with particular emphasis on the relevant National Policy Statements. Regard has also been had to statutory development plan policy (local development plan policy), supplementary planning documents and other local design guidance and guidelines. Planning policy more generally, and the Proposed Development's compliance with this, is considered in detail within the Planning Statement (Document Ref. 5.3).

4.2 Legislative Context

4.2.1 Section 10 'Sustainable development' of the PA 2008 (subsection (3)(b)) states that in setting policy for NSIPs (through National Policy Statements), the SoS must have regard to the desirability of achieving 'good design'. However, the PA 2008 and related regulations do not require applications for NSIPs to be accompanied by a DAS.

4.2.2 The Town and Country Planning (Development Management Procedure) (England) Order 2015 (S.I 2015 No. 595) (the '2015 Order'), while applying to applications for planning permission under the Town and Country Planning Act 1990, is of relevance as it sets out the matters to be addressed within a DAS. Article 9 'Design and access statements' of the 2015 Order confirms (paragraph 3) that a DAS must:

- explain the design principles and concepts that have been applied to the development;
- demonstrate the steps taken to appraise the context of the development and how the design of the development takes this context into account;
- explain the policy adopted as to access, and how policies relating to access in relevant local development documents have been taken into account;
- state what, if any, consultation has been undertaken on issues relating to access to the development and what account has been taken of the outcome of any such consultation; and
- explain how any specific issues which might affect access to the development have been addressed.

4.2.3 Article 9 (paragraph 4 (c)) confirms that a DAS is not required for applications involving engineering or mining operations.

4.2.4 With regard to Article 9, it is relevant to note that while the PCC Site (Work Nos. 1 and 7) involve new buildings and structures, the other elements of the Proposed Development – with the exception of the Gas AGIs, the New NZT Tod Point Substation and the northern and southern extensions to the Existing NGET Tod Point Substation, which will contain some buildings and structures – encompass the installation of pipelines and cables (which will be installed below ground or within existing infrastructure corridors), temporary construction laydown areas and limited access and highway works. Those elements comprise engineering works (for which

there is no requirement to produce a DAS under the 2015 Order) and are described in other Application documents, notably ES Chapters 4 'The Proposed Development' and 6 'Alternatives and Design Evolution' (Document Ref. 6.2) and the Electricity Grid Connection Statement (Document Ref. 5.5) and the Gas Connection and Pipelines Statement (Document Ref. 5.6). The main focus of the DAS is therefore upon the PCC Site.

4.3 National Policy Statements

4.3.1 The planning policy framework for examining and determining applications for NSIPs is provided by a number of National Policy Statement ('NPSs'). Section 1 of the PA 2008 confirms that where NPSs are in place, these shall be the primary basis for decisions by the SoS on applications for NSIPs. Policy relating to design contained with the NPSs of relevance to the Proposed Development is set out below.

Overarching NPS for Energy (EN-1)

4.3.2 The Overarching NPS for Energy (EN-1) defines the need for nationally significant energy infrastructure and sets out certain assessment principles and criteria against which applications for such infrastructure should be considered. This includes Section 4.5 'Criteria for good design for energy infrastructure'.

4.3.3 Paragraph 4.5.1 recognises that while the visual appearance of a building is sometimes considered to be the most important factor in good design, high quality and inclusive design goes far beyond aesthetic considerations. The functionality of buildings and infrastructure, including fitness for purpose and sustainability, are as equally important. It goes on to state that applying good design to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates 'good aesthetic' as far as possible. It is acknowledged however:

"...that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of an area."

4.3.4 Paragraph 4.5.2 of EN-1 notes that good design is also a means by which many policy objectives in EN-1 can be met, for example, good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts such as noise.

4.3.5 Paragraph 4.5.3 confirms that in assessing applications, the SoS will need to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be. In doing so, paragraph 4.5.3 goes on to state that the SoS should be satisfied that:

"...the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible. Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good

design in terms of siting relative to existing landscape character, landform and vegetation. Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area.”

- 4.3.6 Paragraph 4.5.4 stresses the importance of applicants being able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved. However, it is clear that in considering applications the SoS should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements that the design has to satisfy.

NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2)

- 4.3.7 EN-2 provides limited additional guidance on ‘good design’ for fossil fuel generating stations over and above what is set out in EN-1. Paragraph 2.3.15 does, however, state that the principles of good design set out at Section 4.5 of EN-1 should be applied to all energy infrastructure.

- 4.3.8 Paragraph 2.3.16 states that applicants should demonstrate good design in respect of landscape and visual amenity and in the design of the development to mitigate impacts such as noise and vibration, transport impacts and air emissions. Notably, paragraph 2.6.5 of EN-2 states that:

“It is not possible to eliminate the visual impacts associated with a fossil fuel generating station.”

NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

- 4.3.9 Paragraph 2.3.1 refers to Section 4.5 of EN-1 that sets out the principles of good design that should be applied to all energy infrastructure. Paragraph 2.3.2 states that for the reasons given at Section 4.5 of EN-1, applicants should demonstrate good design, in particular, when mitigating the impacts relevant to the infrastructure.

NPS for Electricity Networks Infrastructure (EN-5)

- 4.3.10 Paragraph 2.5.1, as with EN-4, refers to the principles of good design set out at Section 4.5 of EN-1. Paragraph 2.5.2 states that proposals for electricity networks infrastructure should demonstrate good design in mitigating the potential adverse impacts that can be associated with overhead electric lines, particularly impacts upon biodiversity and geological conservation, landscape and visual, noise and vibration and electro-magnetic fields.

4.4 National Planning Policy Framework and Planning Practice Guidance

- 4.4.1 The National Planning Policy Framework (‘NPPF’), introduced in March 2012 (updated July 2021), sets out the Government’s planning policies for England. It is a material consideration in planning decisions. Although the NPPF confirms that NSIPs are to be determined in accordance with the decision-making framework of the PA 2008 and relevant NPSs, decisions on NSIPs should also take account of any other matters that are “*relevant*”, which may include the NPPF.

4.4.2 Section 12 of the NPPF 'Achieving well-designed places' sets out policies on design. Paragraph 126 confirms that good design is a key aspect of sustainable development. Much of the guidance is of limited relevance for energy infrastructure, however, the overall aim is to promote developments that function well, create attractive places, optimise the potential of sites, are sympathetic to local character, incorporate good architecture and appropriate landscaping.

4.4.3 The Planning Practice Guidance ('PPG'), launched in March 2014 (last updated June 2021), brings together planning practice guidance for England in an online format. It includes a section of design and, in line with the NPPF, it states that good quality design should be an integral part of sustainable development. In designing new developments, it sets out a number of issues that should be considered, including local character and landscape setting.

4.5 Local Planning Policy

4.5.1 The Site encompasses land within the administrative boundaries of both RCBC and STBC and therefore, the development plan documents ('DPDs') produced by the two Local Planning Authorities ('LPAs') represent the statutory development plan for the purposes of the Proposed Development. The PCC Site lies entirely within RCBC's area.

4.5.2 Parts of the Site, notably the PCC Site, lie within the boundary of the area controlled by STDC. STDC has produced a Master Plan (the 'South Tees Regeneration Master Plan') to provide a flexible framework for the regeneration of the South Tees Area. The Master Plan has informed RCBC's preparation of the South Tees Area Supplementary Planning Document ('SPD'), which was formally adopted in May 2018. Although not a DPD, the South Tees Area SPD is a material planning consideration.

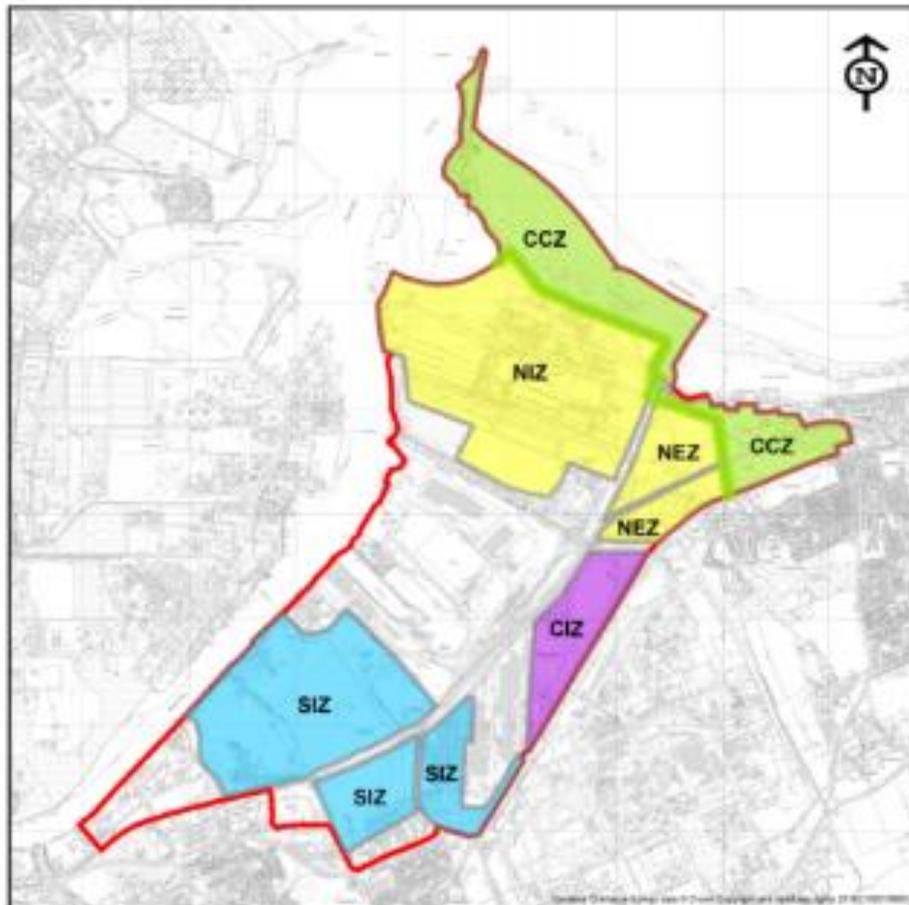
4.5.3 Much of the Site, including the whole of the PCC Site, is allocated in the Redcar and Cleveland Local Plan (adopted May 2018) as part of a 'Protected Employment Area', which is subject to Policy ED6 'Promoting Economic Growth'. Policy ED6 seeks to promote heavy industries and port-related uses within the South Tees Area and states that development proposals should have regard to the South Tees Area SPD and contribute toward growth and regeneration. It goes on to state that proposals will need to demonstrate that no adverse effects will result on the integrity of the Teesmouth and Cleveland Coast Special Protection Area and Ramsar site, or other European designated nature conservation sites. Proposals will also be encouraged to improve the quality of the environment.

4.5.4 Policy SD4 'General Development Principles' states that all development must be designed to a high standard; involve the effective and efficient use of land; respect the character of the site in question and its surroundings; improve the character and quality of the area; be sustainable in design and construction; minimise pollution; respect or enhance the landscape, biodiversity and geological features; be suitable and safe in terms of vehicular access and parking; and involve inclusive design.

- 4.5.5 Policy LS4 ‘South Tees Development Corporation’ supports Policy ED6 by stating that new employment development within the South Tees Area should be of a high quality in terms of design and enhance the environmental quality of the area.
- 4.5.6 The South Tees Area SPD is intended to support the economic and physical regeneration of the South Tees Area, setting out the vision and core objectives for the area and providing greater detail on how adopted planning policies will be interpreted.
- 4.5.7 Section 2 of the South Tees Area SPD sets out the ‘Vision’ for the area, including a number of objectives. Objective 1 is aimed at ensuring strong alignment with the UK Government’s Industrial Strategy by shaping regeneration proposals to ensure the Tees Valley can make a contribution to the UK Government’s aspirations for the Northern Powerhouse Initiative. Objective 4 (page 10) is to:
- “Promote and support development uses aligned with a low carbon, circular economy, while delivering redevelopment within a framework of reduced energy costs and waste minimisation”.*
- 4.5.8 Both the above objectives are re-iterated in Development Principle ‘STDC1: Regeneration Priorities’ (page 15 of the SPD). STDC1 states that the LPA, in partnership with STDC, will seek to achieve the comprehensive redevelopment of the South Tees Area in order to *“realise an exemplar world class industrial business park”*. It identifies a number of priorities for the area including to prioritise uses connected with advanced manufacturing and advanced new technologies and to promote and support uses and infrastructure connected to a low carbon and circular economy. Figure 2 (page 19) shows the PCC Site as being a location for manufacturing and energy.
- 4.5.9 Development Principle ‘STDC6: Energy Innovation’ (pages 33 - 34) states that the LPA will, in partnership with STDC and other partners, promote and support the development of new energy generation within the South Tees Area, including renewable energy development and the promotion of other innovative energy projects. Energy generation which contributes to meeting the Area’s assessed energy needs will be supported while all energy development should be appropriately sited and designed so as to avoid unacceptable effects. Paragraph 3.49 goes on to state:
- “... provision will include opportunity for the siting of nationally significant energy generators that connect to the grid as well as supporting the Area through private energy supply. Specific requirements relating to these zones are identified within the Site Specific Development Principles.”*
- 4.5.10 Following on from the above, Development Principle ‘STDC10: Utilities’ states that the LPA will support the development of new infrastructure relating to energy generation, including power generation facilities utilising both conventional and renewable resources and carbon capture and storage.
- 4.5.11 Section 4 of the SPD sets out ‘Site specific development principles’ for the five main zones of the South Tees Area. These are the North Industrial Zone; North East

Industrial Zone; Central Industrial Zone; South Industrial Zone; and Coastal Community Zone (Figure 6: Development Zones - page 48). The main zones are shown in **Figure 4.1** below.

Figure 4.1 – Development Zones as identified in the South Tees Area SPD



4.5.12 The North Industrial Zone ('NIZ') encompasses much of the former Redcar Steel Works complex (including the PCC Site) and is subject to Development Principle STDC11 (page 49 of the SPD). This states that the LPA, in partnership with STDC, will encourage development proposals in this zone relating to port related industry, major space users/large scale manufacturing, energy innovation, power generation and storage, bulk materials and mineral processing. It goes on to state that in accordance with Policy N4 'Biodiversity and Geological Conservation' of the Local Plan, proposals will need to take account of the need for and definition of a buffer zone to protect existing environmental assets within and adjacent to the NIZ.

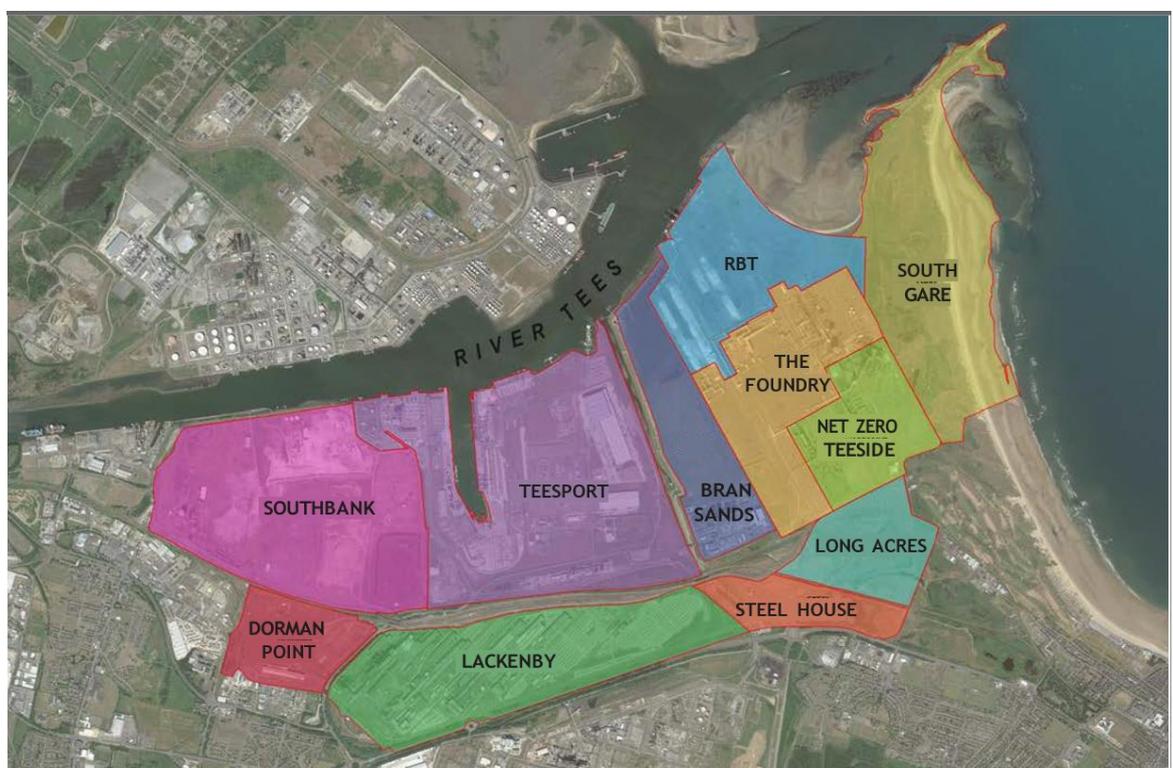
4.6 Local Design Guidelines

4.6.1 STDC has recently produced a design guide for the Teesworks area ('Teesworks - Design Guide for Development'). The document is intended to guide the development of the Teesworks area, including a number of major development

proposals that are being brought forward by STDC (Teesworks Limited) within the area.

- 4.6.2 The Design Guide provides an overview of the importance of good design in creating a world class destination for business in the Teesworks area with specific guidance for the types of development that are expected to be attracted. It includes a number of technical appendices providing additional information to help inform the application of the guidance.
- 4.6.3 The Design Guide is a non-statutory document to help inform development proposals. It contains design principles and parameters aimed at suiting many forms of development, although it is accepted that some industrial operations and developments will fall outside the realm of the Guide. It is intended to supplement and expand on the Development Principles of the South Tees Area SPD.
- 4.6.4 In line with the SPD, the Design Guide divides the Teesworks area into five principal zones. These include the NIZ comprising the former Steel Works complex and also RBT. Potential uses identified for the NIZ include bulk materials handling, mineral processing, energy innovation and large-scale manufacturing. The NIZ itself is divided into three main development zones within the Design Guide – The Foundry, Net Zero Teesside ('NZT') and RBT. The NZT Zone broadly corresponds with the extent of the PCC Site. Figure 4 from the Design Guide showing the three development zones is reproduced in **Figure 4.2** below.

Figure 4.2 – Development zones identified in the Teesworks Design Guide



4.6.5 The Design Guide sets out four key design principles and associated questions, which are intended to be applied across the Teesworks area. These are reproduced below:

1. PLOT ARRANGEMENT AND ACCESS

- *Does the proposal relate well to its surroundings?*
- *Is the site accessible to all and easy to move around?*
- *Does the plot layout and arrangement of buildings form a coherent structure?*
- *Is the proposal located on a Gateway Plot?*

2. BOUNDARIES AND LANDSCAPE

- *Do the proposed boundary treatments relate well to their surroundings?*
- *Does the landscape setting enhance the proposed buildings?*

3. BUILDING FORM AND MATERIALS

- *Are the proposed buildings and materials functional and attractive?*
- *Are the proposals adaptable and robust?*

4. COLOUR, LIGHTING AND SIGNAGE

- *Does the proposal create a distinctive sense of place?*
- *Are colours and signage used in a coherent way?*

4.6.6 The Design Guide is however clear that the design principles are to be applied proportionately across Teesworks depending on the building typology and its location. With regard to this, the Design Guide confirms that (page 21):

“The most visible areas of the site are referred to with the guidance as ‘Gateway plots’. These are plots that will make a significant contribution to the way that the overall development is perceived and will help to create an outward looking and welcoming environment.

For the purposes of this design guide, a Gateway plot is defined as a development plot that has a significant visible frontage onto the infrastructure corridor or other primary route (see illustrative diagram in Figure 4). Gateway plots are not fixed in the masterplan but will be determined by Teesworks in line with the Public Realm strategy and emerging development opportunities.”

4.6.7 The PCC Site is not a Gateway Plot and does not have a frontage onto the infrastructure corridor or any other primary route within Teesworks.

4.6.8 Alongside the four key design principles, additional guidance is provided in respect of four major plot typologies. This is intended to aid the designers and developers of specific industrial building types where certain principles may be particularly important.

4.6.9 The plot typologies include ‘Large-Scale Industrial Operations’ which cover ‘Major energy generation’. This is the plot typology of most relevance to the Proposed Development and the PCC Site.

4.6.10 Specific guidance for the plot typologies is provided at Section C, with that guidance cross-referenced back to the four design principles for ease of application. C.5 (pages 39 to 43 of the Design Guide) deals with Large-Scale Industrial Operations. It is recognised that in design terms these developments will primarily be driven by the functional requirements of the industrial processes but that:

“There is also a growing awareness that these facilities can act as strong visual beacons to engage people with the industries that operate within these plots.”

4.6.11 The design guidance provided at C.5 for Large-Scale Industrial Operations is reproduced below:

C5.1 ACCESS AND ARRANGEMENT

- *Large-scale industrial operations will typically be set within substantial open plots, with major buildings and infrastructure set deeper within the plot to accommodate requirements for utilities, stand-off distances, access roads and servicing zones. Plot access points and on-plot roads should be designed to ensure safe access and movement for all users and vehicle types (including movement of bulks) in accordance with section C1.*
- *Where the plot includes occupied buildings (e.g. ancillary offices or control rooms) access to and arrangement of these buildings will require additional consideration to separate users from service zones and service routes. This includes separate entrances and safe routes for pedestrians, cyclists, and cars.*
- *Orientation and arrangement within the plot will likely to be driven by functional requirements and spatial constraints.*
- *At feasibility and concept stages, options for the orientation of buildings and infrastructure should be tested in response to key axes relating to the principal site boundaries and topographical features.*

C5.2 BOUNDARIES AND LANDSCAPE

- *Boundary treatments to large-scale industrial operations will generally be driven primarily by functional and security requirements.*
- *Where developments (including ancillary buildings) front onto primary routes or are located on Gateway plots, the guidance in section C2 should be followed to reduce the visual impact of fencing on the public realm.*
- *Where required, large-scale industrial operations may provide scope to incorporate larger areas of biodiversity or water management systems.*

C5.3 BUILDING FORM AND MATERIALS

- *Large-scale industrial operations vary significantly in their scale and massing, which will be driven predominantly by functional requirements. Material specification will also be driven by the function of the building(s) and infrastructure.*

- *The height and volume of large-scale industrial structures have the potential to act as iconic ‘beacons’ and can create a visual counterpoint to other building types in the masterplan.*
- *A key decision in the early-stage design of large-scale industrial facilities is whether to enclose bulk processing equipment. Designers and developers should consider the enclosure of bulk processing equipment if the development meets all of the following criteria:*
 - *The development is clearly visible from the public realm or environmentally sensitive coastal areas (South Gare and Coatham Sands SSSI).*
 - *Enclosures would not impact on the overall functionality of the development or facility.*
 - *Enclosing bulks is economically and structurally feasible.*
- *Where bulk functions are enclosed by cladding, careful selection of form and materials can help to express the internal processes.*
- *Use of transparent or translucent materials should be considered to reveal internal processes where appropriate.*
- *A limited and consistent palette of materials should be applied to all ancillary buildings and functions in order to unify them as a group. Other occupied buildings should follow the general form and massing guidance in section C3.*

C5.4 COLOUR, LIGHTING AND SIGNAGE

- *Key elements of the structures may be highlighted through the use of contrasting materials, colours and lighting. These should be limited in their application in order to stand out against their context.*

4.6.12 Part D ‘Technical Appendices’ of the Design Guide at D.2 provides example materials and specifications for development at Teesworks that will be considered acceptable. It confirms that proposed materials should be practical, durable, affordable and attractive.

5.0 DESIGN FLEXIBILITY AND INFORMATION

5.1.1 This section of the DAS explains the design flexibility that the Applicants have incorporated within the Application and the reasons for this. It also sets out the design information that has been submitted as part of the Application.

5.2 Design Flexibility

5.2.1 It is important to recognise that the Proposed Development is a 'First of its Kind' project. Although the individual elements are well understood and are proven technology, this is the first project in the UK where power, carbon capture and compression technologies have been deployed in combination and at scale and the first project in the World where a CO₂ gathering network is being developed to capture CO₂ emissions from industrial sources. It has therefore been necessary within the Application to allow for a degree of optionality and flexibility in the design and layout of the Proposed Development albeit within defined parameters, which have been used as the basis for the assessment of environmental effects in the ES (Document Refs. 6.1 to 6.4).

5.2.2 The Applicants are proposing to deliver the PCC Site design through a competitive Front End Engineering Design ('FEED') arrangement with a consortium of companies, including a:

- CCGT plant provider;
- carbon capture plant technology licensor;
- specialist CO₂ compressor manufacturer; and
- a design integrator (the appointed EPC Contractor).

5.2.3 The main reason for needing to incorporate flexibility in the design and layout of the Proposed Development is that the equipment providers/vendors and carbon capture technology licensors have not yet to be selected. The Proposed Development will be supported by the Government through various financial mechanisms and as such there is a requirement to provide value for money through a competitive tendering process for the CCGT plant, carbon capture plant and compression components. Prior to the appointment of an EPC contractor, it is proposed that different consortia will prepare designs for the required plant and components (each with their own individual sizes, capacities and configurations). A single consortium of companies is expected to be employed at the EPC stage at which time the design will be fixed.

5.2.4 It is anticipated that the completion of the tendering process, including design competition, selection of the EPC contractor and the Applicants' Final Investment Decision ('FID') will take place after development consent has been granted. At the point of submitting the Application, it is therefore not possible to finalise the design of the Proposed Development.

5.2.5 This approach to the design process allows for commercial collaboration and will result in slightly different sizes, capacities and configurations for the CCGT plant, carbon capture plant and compression components. The Works Plans (Document

Ref. 4.4) therefore show a degree of overlap between the various Works Nos. in order to cater for the different design configurations expected.

5.2.6 In order to provide sufficient flexibility and ensure a robust Environmental Impact Assessment ('EIA'), the Applicants have therefore adopted the principles of the 'Rochdale Envelope' approach and assessed (as part of the EIA) fixed maximum design parameters for the elements of the Proposed Development where flexibility needs to be retained at the consenting stage. These parameters include:

- Maximum scale parameters (length, height and width) for the main buildings and structures at the PCC Site (these maximum parameters are set out in **Table 5.1** below).
- Maximum limits within which the various elements of the Proposed Development can be constructed within the Site (these are defined on the Works Plans – Document Ref. 4.4). The Works Plans show a degree of overlap between the various Works Nos. (Work Nos. 1A, 1B, 1C and 1D and Work no. 7) within the PCC Site in order to accommodate the different design configurations that are expected.

Table 5.1 – Maximum Scale Parameters for PCC Site

Component	Maximum length (m)	Maximum width (m)	Maximum height (m) (AOD)
Gas Turbine Hall	76	76	43
Heat Recovery Steam Generator ('HRSG') Building	63	28	63
Steam Turbine Hall	64	54	43
HRSG Stack	n/a	6.5 (inner diameter)	98
Cooling Tower Banks	400	40	38
Absorber Tower	35	25	93
Absorber Stack	n/a	6.5 (inner diameter)	128
Low Pressure Compression Facilities	80	60	23
HP Compression Facilities	250	120	23
Low Carbon Electricity Generating Station Electrical Substation	130	120	42

- 5.2.7 The existing ground levels across the PCC Site for the proposed locations of the main buildings and structures range between 4m and 8m AOD.
- 5.2.8 The maximum compound area for the Gas Connection AGIs (Work No. 2) will be 55m (length) by 33m (width). The maximum height of the buildings and structures within the Gas AGIs will be 16m AOD.
- 5.2.9 The maximum compound area for the New Tod Point Substation (adjacent and to the west of the Existing Tod Point Substation), which forms part of the Electrical Connection (Work No. 3), will be 80m (length) by 60m (width). The maximum height of the buildings and structures within the New Tod Point Substation will not exceed 18m AOD.
- 5.2.10 As part of Work No. 3, the Existing Tod Point Substation will be extended by the addition of two additional bays (one to the north and one to the south). The area for the northern extension will have a maximum length of 75m and width of 60m and that for the southern extension will have a maximum length of 60m and width of 30m. The maximum height of the buildings and structures within the two extension areas will not exceed 22m AOD.
- 5.2.11 The Proposed Development retains also incorporates a degree of flexibility in respect of ~~some of the connections where a number of potential options remain under consideration – notably, as indicated above, the River Tees crossing of the CO₂ Gathering Network (two potential river crossing options) and the~~ Water Discharge Connection Corridor, where – (two potential connection options remain under consideration). Further information on the options ~~under consideration~~ is provided at Chapters 4 ‘The Proposed Development’ and 6 ‘Alternatives and Design Evolution’ of the ES. ~~A The selection of a single option for the CO₂ Gathering Network crossing of the Tees is subject to further detailed design work while a~~ decision on the Water Discharge Connection Corridor will be dependent upon the completion of an inspection of the existing water outfall from the former Steel Works Site and a decision on whether it can be refurbished.
- 5.2.12 The connections will be installed within the limits of the corridors defined on the Works Plans. Where possible, existing infrastructure such as existing gas pipelines and pipe racking within existing infrastructure and service corridors will be used for the connections, subject to commercial agreements and asset integrity inspections. Where new connections are to be installed, these will be a combination of above and below ground installations. Typical construction working widths will vary from 5m to 35m dependent on the constraints present. A degree of flexibility is included within the limits shown upon the Works Plans to optimise the final route of the pipelines and cables based on ground conditions. The pipelines for natural gas, water, CO₂ gathering and CO₂ Export will be up to 600mm, 1100mm, 550mm and 800mm nominal bore diameter, respectively.

5.3 Design Information

- 5.3.1 The design information that has been submitted as part of the Application is based upon the maximum design parameters. This information is listed in **Table 5.2** below.

Table 5.2 – Design information submitted as part of the DCO Application

Application Document Ref.	Application Document	Purpose
4.4	Works Plans.	Confirms the location and extent of the Works Nos. comprised within the Proposed Development, as set out at Schedule 1 of the draft DCO, and also the limits within which these works may occur.
4.6	Indicative Power, Capture and Compression Facility Plans. ('PCC')	Showing the indicative layout, elevations and sections for the main buildings and structures at the PCC Site.
4.7	Indicative Gas Connection Plans and Indicative Above Ground Installations Plans.	Showing the route and connection points for the Gas Connection including AGI locations and layouts.
4.8	Indicative Electrical Connection Plans.	Showing the route and connection point for the Electrical Connection including substation work locations and layouts.
4.9	Indicative Water Connection Plan.	Showing the routes for the water supply and discharge connection works.
4.10	Indicative HP Compressor Plans.	Showing the indicative layout, elevations and sections for the HP Compressor Station.
4.11	Indicative CO ₂ Gathering Network Plans. (Sheets 1-12 including Key Plan)	Showing the routes for the CO ₂ Gathering Network connections.
4.12	Indicative CO ₂ Export Pipeline Plan.	Showing the routes for the CO ₂ Export Pipeline.
4.13	Indicative Surface Water Drainage Plan.	Providing an indication of the proposed drainage works at the Site, including surface water drainage.
4.14	Deemed Marine Licence Coordinates Plans.	Showing the location of the works within the marine area.

4.15	Indicative Landscape and Biodiversity Plan.	Providing an indication of the landscaping and biodiversity strategy to be implemented.
5.5	Electricity Grid Connection Statement.	Providing information on the installation of the Electrical Connection and who will be responsible for designing and building it.
5.6	Gas Connection and Pipelines Statement.	Providing information on the installation of the Gas Connection and AGIs who will be responsible for designing and building these.
5.12	Indicative Lighting Strategy.	Detailing the indicative lighting strategy and details to be implemented.
5.13	Indicative Landscape and Biodiversity Strategy.	Detailing the indicative landscaping and biodiversity strategy and details to be implemented.
6.2.4	ES Chapter 4 'The Proposed Development'.	Providing a detailed description of the Proposed Development and setting out the maximum design parameters that have been assessed.

5.3.2 Due to the nature of the Proposed Development and the need to incorporate sufficient flexibility within its design, much of the design information that has been submitted as part of the Application is indicative, although based on the maximum design parameters. The Applicants will carry out a competitive FEED after which the EPC contractor will be selected. The mechanisms by which the detailed design of the Proposed Development will be secured are covered within Section 9 of the DAS.

6.0 DESIGN APPROACH AND DEVELOPMENT

6.1.1 This section sets out the approach that the Applicants have taken to the design of the Proposed Development and how the design has developed throughout the pre-application process.

6.2 Design Approach

6.2.1 The approach that the Applicants have taken to the design of the Proposed Development has been informed by the context within which it will sit, the opportunities and constraints that exist and the local planning policy framework.

6.2.2 As confirmed in Section 3, the PCC Site very much sits within an industrialised context, with the Redcar Blast Furnace and Coke Ovens still dominating the area's landscape. It is relatively remote from residential areas, although to the north are South Gare and Coatham Dunes/Sands, which are used for recreational purposes. The wider area is characterised by heavy industries, port uses and road and rail infrastructure.

6.2.3 The PCC Site is identified within the Local Plan and the South Tees SPD as a suitable location for energy generation and innovative new energy projects and new technologies connected to a low carbon and circular economy. The Teesworks Design Guide identifies a specific development zone for NZT that deliberately corresponds with the PCC Site. This zone is not identified as a Gateway Plot and is located away from the main Teesworks infrastructure corridor and is not situated on a primary route. Furthermore, while setting design principles for Teesworks, the Design Guide recognises that the design of 'Large-Scale Industrial Operations' (which cover 'Major energy generation') will primarily be driven by the functional requirements of the processes involved.

6.2.4 The various connection corridors for the Proposed Development are in the main routed through areas of existing and former industrial land and use existing service and infrastructure corridors.

6.2.5 In view of the above factors, the Applicants have adopted a functional approach to the design of the Proposed Development, notably the PCC Site, reflective of its function and purpose and the industrial character of the area. The approach to design has also been influenced by technical, engineering, environmental and safety considerations. However, functional design can represent 'good design' and in developing the design of the Proposed Development the Applicants have had regard to the design guidelines for Teesworks and sought to minimise impacts upon the surrounding area.

6.3 Design Development

6.3.1 The design of the Proposed Development has evolved since its inception and during the pre-application stage leading up to the submission of the Application. Chapter 6 'Alternatives and Design Evolution of the ES (Document Ref. 6.2) describes the alternatives that have been considered for the Proposed Development and also sets out the design options considered and how its design has evolved.

6.3.2 The alternatives that have been considered include:

- alternative technologies;
- alternative sites;
- alternative locations within Teesworks; and
- alternative connections routing and corridors.

6.3.3 Section 6.7 deals with the alternative design options that have been considered and how the design of the Proposed Development has evolved. The main design changes that have resulted and the reasons for these changes are set out in Table 6-1 in Chapter 6 of the ES. Key changes that have taken place during the pre-application stage include:

- A progressive reduction in the proposed Site area from approximately 1,500ha to approximately 462ha.
- A reduction in the number of CCGT Trains and HP Compressors and the size of the PCC Site.
- The narrowing, removal and refinement of the various options for connections corridors, including the use of a shorter River Tees crossing for the Gas Connection and CO₂ Gathering Network Connection Corridor.
- The use of existing pipe racking, overbridges and culverts where possible (rather than installation using 'open cut' techniques) for the CO₂ Gathering Network Connection Corridor.
- A reduction in the area of land required for the Electrical Connection due to the selection of a single connection route and also the use of underground installation.
- A reduction in the areas of land required for the Water Discharge Connection Corridor and the CO₂ Export Pipeline.
- Removal of the requirement to abstract water from the River Tees.
- Use of trenchless crossings of Coatham Dunes/Sands for the Water Discharge Connection Corridor and the CO₂ Export Pipeline.
- A reduction in the size of a number of Laydown Areas.

6.3.4 Table 6-1 of Chapter 6 of the ES also provides a comparison of the environmental effects of the changes with the original proposals

6.3.5 Early in the design process, a five CCGT Train (each train has integrated carbon capture plant) concept was developed for the Proposed Development. This proceeded any pre-application consultation. Following further discussions with BEIS, the decision was taken to proceed with a three CCGT Train concept with a greater emphasis on industrial decarbonisation through the inclusion of a CO₂ gathering network. The three CCGT Train concept (including proposals for a CO₂ gathering network) were the subject of both the Stage 1 (non-statutory) consultation (Autumn

2019) and the Stage 2 (statutory) consultation (Summer 2020). An indicative image of the three CCGT Train concept used at Stage 2 is reproduced in **Figure 6.1** below.

Figure 6.1 – Indicative 3D Concept Image of three CCGT Trains at Stage 2



- 6.3.6 Following the Stage 2 consultation the decision was taken to reduce the number of CCGT Trains further from three to one and also to reduce the number of HP compressors, while still providing the scope for future expansion. This decision was linked to cost optimisation to enable the deployment of a single CCGT Train (including carbon capture plant) and an industrial CO₂ gathering network to demonstrate the technology at scale prior to making a decision on future expansion. The decision to proceed with a single CCGT Train enabled a reduction in the size of the PCC Site from approximately 60ha to 42.5ha.
- 6.3.7 At Stage 2 local community and other stakeholders were also provided with the opportunity to comment on a variety of potential design options under consideration in terms of building form, materials and colour. A selection of the images that were presented during the consultation to illustrate the options under consideration at that time are reproduced in **Figure 6.2** below and are also provided at **Appendix 1**.

Figure 6.2 – Design Options presented at Stage 2

Building Form, materials and use of colour

Building Form

The main image above shows a standard design with a conventional appearance, determined by functional consideration. We want to develop the NZT Plant to provide a visually attractive scheme through the implementation of good design that is also sympathetic to the surrounding SSSI Nature Reserve.



Cladding might be arranged in an angular format to create texture and interest. North facing rooflights allow natural light to penetrate the plant and limit the requirement for artificial lighting.

Simple pitched roof forms reflect those of the neighbouring fishermen huts.

Materials and Colour

Materials will be chosen to reflect the industrial nature of the plant but also to enhance and respect the surrounding nature reserve area. Colour can be used to highlight certain areas, or ancillary structures on the buildings, to create focal points, add depth and visual interest.



Mesh cladding would allow views through to the plant inside, using Cor-Ten steel would reflect the previous steelworks on the site. Hues of green mesh or cladding could be added, influenced by the surrounding landscape and would provide contrast with the rusty rich brown of the Cor-Ten.

Images might be incorporated into the cladding, such as silhouettes of trees which are nature's own carbon capture machines.

Transparency & Lighting

Parts of the buildings may be clad in transparent material to allow the public to view the NZT process. These elements will be particularly visible at night creating interest.



If selected, mesh or polycarbonate materials will become transparent at night allowing views inside the buildings. Coloured lighting may highlight the stacks, or other prominent parts of the site.

- 6.3.8 Limited feedback was received at Stage 2 in respect of the design options presented within the consultation materials and no strong preference was expressed for any particular design approach. In view of this, the Applicants' approach to the final design of the Proposed Development (for the purposes of the Application) in terms of matters such as building form, material and colour has been to have regard to the South Tees Area SPD and the Teesworks Design Guide.
- 6.3.9 Further information on the pre-application consultation on the Proposed Development, including the feedback received, is set out in the Consultation Report (Document Ref. 5.1).
- 6.3.10 Since submission of the DCO Application in July 2021, and its acceptance for Examination on 16 August 2021, the Applicants have continued to engage with Interested Parties with a view to addressing matters raised in their Relevant Representations and agreeing common ground, while also continuing with detailed project development. This work has identified a number of changes to the Proposed Development. The changes are aimed at reducing optionality, land take and complexity.
- 6.3.11 The three main areas of change to the Proposed Development compared with what was presented in the DCO Application submitted in July 2021 are as follows:
- the Gas Connection Corridor (Work No. 2A) has been selected;
 - the Electrical Connection Corridor (Work No. 3A) has been selected;
 - the CO₂ Gathering Network Corridor (Work No. 6) from the north of the River Tees and across the Tees to the PCC Site has been reduced in land area and a decision has been made to install the pipeline within the existing Sembcorp No.2 Tunnel for the Tees crossing rather than by the HDD option; and

- updates have been made to land parcels across the Site due to further pre-front end engineering design ('FEED') construction assessments and landowner discussions.
- 6.3.12 The changes have further reduced the Site area from approximately 462ha to 267.4304ha.
- 6.3.13 The Environmental Statement Addendum (April 2022) (Document Refs. 7.7 to 7.8) and Second Environmental Statement Addendum (August 2022) (Document Refs. 7.10 to 7.11)~~xxx~~ –describes the changes made since the submission and acceptance of the DCO Application and considers how these changes affect the assessments presented as part of the original ES.
- 6.3.14 The changes have been reflected in this updated version of the Design and Access Statement.

7.0 DESIGN COMPONENTS

7.1.1 This section of the DAS describes the key design components of the Proposed Development. This includes in relation to use, layout, amount, the scale of the main buildings and structures, appearance and the approach taken to landscaping.

7.2 Use

7.2.1 The PCC Site is located within the eastern part of the former Redcar Steel Works complex. Until Q2 2020, it accommodated a number of large buildings and structures that formed part of the former Redcar Steel Works complex. These included the Raw Materials Handling Facility, the Sinter Plant and their extensive conveyor systems. These buildings and structures have recently been demolished although they have been a prominent part of the landscape for decades. There are large areas of land at the PCC Site that were previously used for the raw materials processing and open storage. In addition, there are some areas of grass and scrub vegetation.

7.2.2 The proposed use of the PCC Site is for power generation and the capture and compression of CO₂ emissions prior to transport offshore for secure storage. The proposed use is consistent with the allocation of the land within the RCBC Local Plan and also the uses identified as appropriate to the NIZ of the South Tees Area as set out in the South Tees Area SPD. A specific zone is also identified for NZT within the Teesworks Design Guide, which was designed to correspond with the PCC Site. In addition, the use is clearly in character with the industrialised context within which the PCC Site is located.

7.2.3 The various connection corridors (gas, water, electricity, CO₂ gathering and export) and associated works largely involve existing and former industrial land either side of the River Tees, while the pipelines and cables will be for the most part installed below ground or on existing pipe-racking, culverts and bridges within existing infrastructure and service corridors. The infrastructure required for the connections (including the limited buildings and structures associated with the Gas AGI and electrical substation works) will not therefore significantly alter the character or use of the land to which they relate.

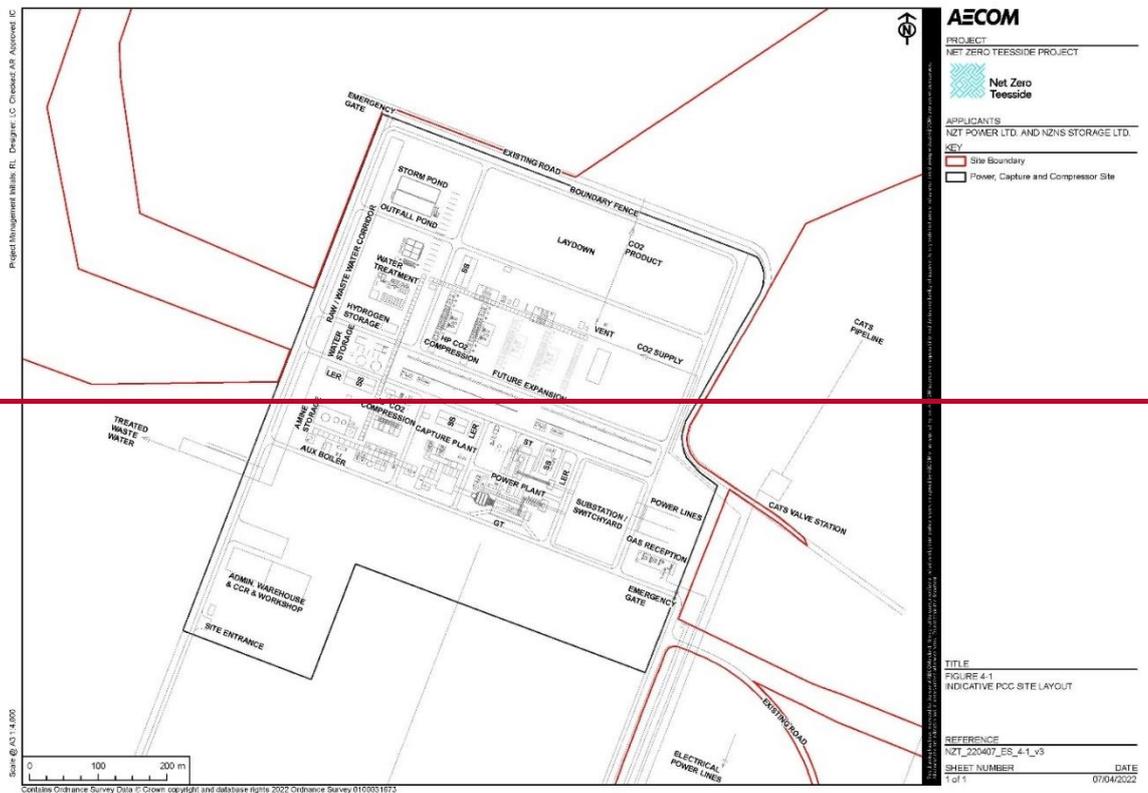
7.3 Layout

7.3.1 The power element of the PCC Site (the Low Carbon Electricity Generating Station including its Carbon Capture Plant) will be located in the south-east part of the Site. The main built elements of the Low Carbon Electricity Generating Station will comprise the Gas Turbine Hall, Steam Turbine Hall, HRSG Building and Stack, Absorber Tower and Stack and two banks of mechanical draught Cooling Towers. One bank of Cooling Towers will be located to north-east of the Gas Turbine and Steam Turbine Halls and HRSG Building.

7.3.2 The Carbon Capture Plant ('CCP') will be located adjacent to the HRSG Building and Stack in the south-west part of the PCC Site. The largest built elements of the CCP will be the Absorber Tower and Stack and the Amine Regenerator. The CCP will also

- include low pressure compression and CO₂ treatment, Amine storage tanks and pipes and pipe-racks. The second bank of Cooling Towers will be located to the north of the CCP.
- 7.3.3 The buildings and structures for the Low Carbon Electricity Generating Station will be nominally arranged on an east-west alignment across the PCC Site.
- 7.3.4 The Low Carbon Electricity Generating Station Electrical Substation (to facilitate the export of electricity from the PCC Site) and the Gas Reception Facility (for the reception of natural gas from the NTS via the Gas Connection) will be located in the south-east corner of the PCC Site.
- 7.3.5 The HP Compressor Station will be located to the north of the banks of Cooling Towers roughly within the centre of the plot. The HP Compressor Station will comprise a number of relatively low-level buildings and structures including pipes and pipe-racks.
- 7.3.6 Other site infrastructure and utilities, such as water treatment and storage, storm water and outfall ponds, will be located within the east and north-east parts of the plot.
- 7.3.7 The Administration Block, Control Room and Warehouse/Workshop will be located in the far south-west corner of the plot away from the main process areas of the PCC Site.
- 7.3.8 The north and north-west parts of the plot will be kept free of development for future use for storage and laydown associated with maintenance and outages.
- 7.3.9 The main buildings and structures at the PCC Site have been grouped together where feasible from a technical and safety perspective to consolidate their built form. Consistent with the Teesworks Design Guide and the Large-Scale Industrial Operations typology, the buildings and structures and main process areas are set well back from the Site boundaries.
- 7.3.10 Internal access roads will be routed around the perimeter of the plots and around the main built elements of the PCC Site. A service road will be included on the western side of the Site for access to the utilities area so that chemicals can be brought to the Site and waste removed without accessing the specific process areas.
- 7.3.11 The areas around and between the main buildings and structures will comprise in the main of hardstanding and crushed stone. The perimeter of the PCC Site will be landscaped and securely fenced.
- 7.3.12 The indicative layout of the PCC Site is reproduced below in **Figure 7.1** below and is also provided at **Appendix 2**.

Figure 7.1 – Indicative PCC Layout Plan



7.3.13 Layout is of limited relevance to the various connections (gas, water, electricity, CO₂ gathering and export), however, the routing of these is described in Section 3 at paragraphs 3.3.7 to 3.3.8 and within Chapter 4 ‘The Proposed Development’ of ES Volume I (Document Ref. 6.2). The routing and extent of the corridors is also shown upon the Works Plans (Document Ref. 4.4) and a number of other plans that form part of the Application. The locations and layouts of the Gas Connection AGIs and the electrical substation works at Tod Point are shown on the Indicative Gas Connection and AGI Plans and Electrical Connection Plans (Document Refs. 4.7 and 4.8).

7.3.14 As stated earlier, the connections will be installed within the limits of the corridors defined on the Works Plans. Where possible, existing infrastructure such as existing gas pipelines and pipe racking within existing infrastructure and service corridors will be used for the connections, subject to commercial agreements and asset integrity inspections. Where new connections are to be installed, these will be a combination of above and below ground installations. Typical construction working widths will for the pipelines and cables will vary from 5m to 35m dependent on the constraints present. The pipelines for natural gas, water and CO₂ will range from 550mm to 1100mm nominal bore diameter.

7.4 Amount

7.4.1 The entire Site is approximately 267.4304ha. The approximate areas of the main parts of the Site are as follows:

- PCC Site – 42.5ha.
- Gas Connection – 15.0ha.
- Electrical Connection – 247.30ha.
- Water Supply Connection Corridor – 4.6ha.
- Waste Discharge Connection Corridor:
 - use of the former Steel Works outfall – 21.5ha; and
 - a new (replacement) outfall – 74.3ha.
- CO₂ Gathering Network Corridor – 64.971.5ha.
- CO₂ Export Pipeline – 31.3ha.
- Laydown Areas – 366.90ha.
- Access and Highway Works – 459.18ha.

7.4.2 The above areas and their extent are shown upon the Work Plans (Document Ref. 4.4). A number of the areas overlap to provide for the flexibility as described in Section 5.

7.4.3 The main new permanent buildings and structures will be at the PCC Site. There will be some smaller-scale buildings and structures within the Gas AGIs, the New Tod Point Substation and the extension areas to the Existing Tod Point Substation. The

approximate maximum areas/footprints of the main buildings and structures at the PCC and their apron areas are set out in **Table 7.1** below:

Table 7.1 – Maximum Areas for Buildings/Structures PCC Site

Component	Maximum length (m)	Maximum width (m)	Maximum area (sqm)
Gas Turbine Hall	76	76	5,776
Heat Recovery Steam Generator ('HRSG') Building	63	28	1,764
Steam Turbine Hall	64	54	3,456
HRSG Stack	n/a	6.5 (inner diameter)	n/a
Cooling Tower Banks	400	40	16,000
Absorber Tower	35	25	875
Absorber Stack	n/a	6.5 (inner diameter)	n/a
Low Pressure Compression Facilities	80	60	4,800
HP Compression Facilities	250	120	30,000
Low Carbon Electricity Generating Station Electrical Substation	130	120	15,600

7.4.4 The maximum compound areas for the Gas AGIs (Work No. 2) will be 1,815sqm (55m length by 33m width).

7.4.5 The maximum compound area for the New Tod Point Substation will be 4,800sqm (80m length by 60m width).

7.4.6 As confirmed earlier, the Existing Tod Point Substation will be extended by the addition of two additional bays to the north and the south. The area for the northern extension will be 4,500sqm (maximum length of 75m and maximum width of 60m) and that for the southern extension will be 1,800sqm (maximum length of 60m and maximum width of 30m).

7.5 Scale

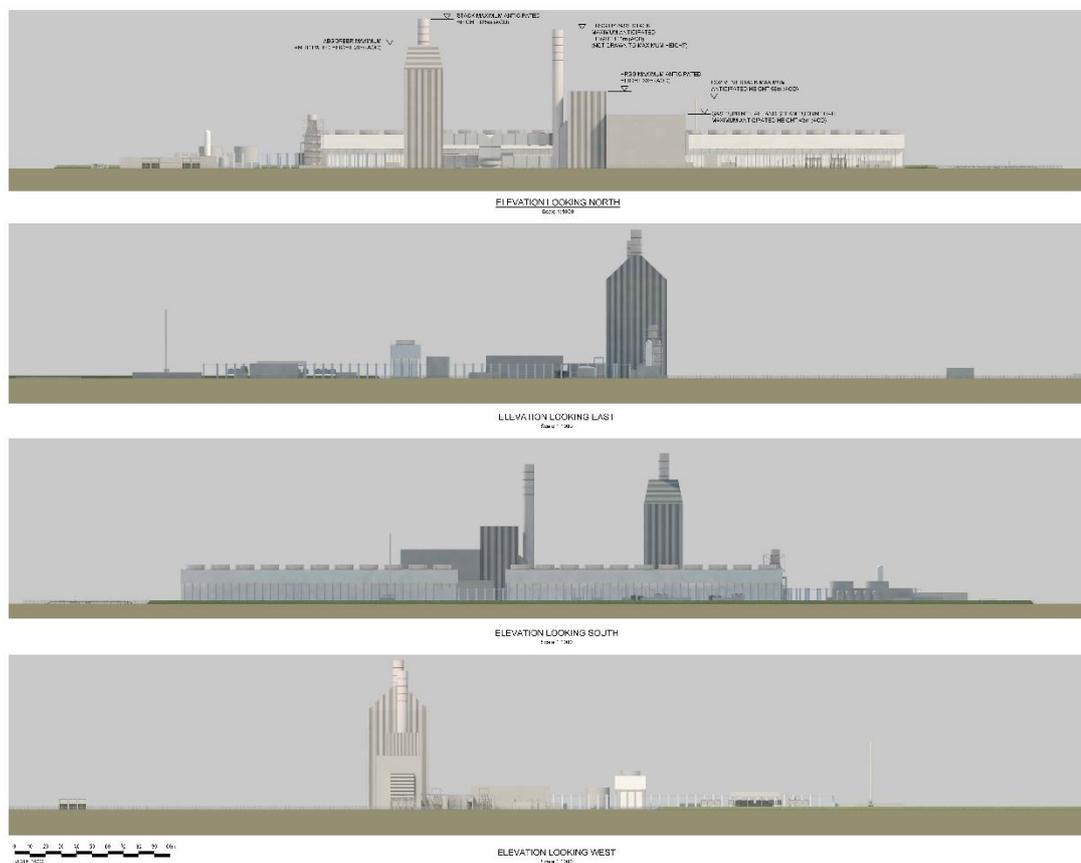
7.5.1 The scale of the Proposed Development relates to the dimensions (length, width and height) of the main buildings and structures that would be constructed. As confirmed above, all of the main buildings and structures will be located at the PCC

Site. The maximum dimensions of these are set out in Table 5.1 (Maximum Design Parameters) and paragraph 5.2.8 at Section 5.

7.5.2 The tallest buildings and structures will be the Absorber Stack (128m AOD), Absorber Tower (93m AOD), HRSG Stack (98m AOD) and HRSG Building (63m AOD). The Gas Turbine and Steam Turbine Halls will each be 43m AOD high and the banks of Cooling Towers 38m AOD.

7.5.3 The Indicative PCC Site Plans (Document Ref. 4.6) are provided at **Appendix 3**. The indicative elevations plan is reproduced as **Figure 7.2** below and provides an indication of the scale and massing of the buildings and structures at the PCC Site from the north, east, south and west.

Figure 7.2 – Indicative PCC Site Elevations/Sections



7.5.4 To place the scale of the buildings and structures at the PCC Site in some context, the Redcar Blast Furnace, which lies adjacent to the western boundary of the PCC Site is 111m in height. The bulk and scale of the proposed buildings are therefore in keeping with the industrialised landscape of the surrounding area.

7.5.5 The maximum height of the buildings and structures within the Gas AGIs will be 16m AOD.

7.5.6 The maximum height of the buildings and structures within the New Tod Point Substation and the extension areas to the Existing Tod Point Substation will be 22m AOD.

7.6 Appearance

- 7.6.1 The most visually prominent buildings and structures will be located at the PCC Site and will include the Absorber Stack and Tower, HRSG Building and Stack and Gas Turbine and Steam Turbine Halls. These buildings and structures will however be consolidated and grouped within the central part of the Site, set well back from its boundaries.
- 7.6.2 The appearance of the buildings and structures at the PCC Site will be in keeping with the industrialised context within which they will sit, with the area already being characterised by large industrial structures, including the former Redcar Steel Works complex and other industrial sites within the surrounding area. The appearance of the buildings and structures is representative of their function and purpose.
- 7.6.3 The buildings and structures at the PCC Site will be simple and functional in form and detailing, predominantly comprising steel framed enclosures that will be clad in appropriate materials. While the buildings and structures are functional, reflective of their industrial setting and the fact they do not sit on a Gateway Plot, the main infrastructure corridor or a primary route within the Teesworks area, the decision has been taken to enclose the main items of plant and equipment in line with Design Guide recommendations having regard to the fact these will be visible from South Gare and Coatham Dunes/Sands.
- 7.6.4 It is envisaged that the external finishes for the buildings and structures at the PCC Site will comprise predominantly of metal cladding and concrete. Again, in line with Design Guide, it is proposed that a simple and consistent approach is taken to the materials and colour palette to be employed. There are a number of possible solutions for external finishes, including flat and profiled metal cladding and concrete. Lighter colours such as light greys may be used to soften the appearance of the buildings and structures against the sky and sea. A decision on external finishes will be made at the detailed design stage with the final details being subject to approval by the LPA.
- 7.6.5 A 3D visualisation of how the PCC Site may appear is reproduced as **Figure 7.3** below.

Figure 7.3 – 3D Visualisation of the PCC Site



- 7.6.6 The gas, electricity, water and CO₂ connections will largely involve below ground or low-level works, in many cases within existing infrastructure and service corridors and will not therefore be prominent within the area.
- 7.6.7 The buildings and structures within the Gas AGIs, the New Tod Point Substation and the extension areas to the Existing Tod Point Substation will be of significantly smaller scale than those at the PCC Site. Those at the Gas AGIs will have a maximum height of 16m AOD with those associated within the New Tod Point Substation and the extensions to the Existing NGET Tod Point Substation not exceeding a height of 22m AOD. Given the industrialised context these buildings and structures will not be highly prominent within the area. Furthermore, those associated with the electrical substation works will sit next to the Existing Tod Point Substation. The approach to the external finishes for the Gas AGI and substation buildings and structures will mirror that for the PCC Site generally.
- 7.6.8 The detailed design of the Proposed Development, including the design and appearance of buildings and the type and colour of materials to be employed will be secured by Requirement 3 ‘Detailed design’ of the draft DCO (Document Ref. 2.1) – See Section 9 for more information on securing detailed design.

7.7 Landscaping

- 7.7.1 The approach taken to landscaping at the PCC Site has been influenced by functional and safety requirements. The areas around and between the main buildings and structures will comprise in the main of hardstanding and crushed stone, with some grassed areas. These areas need to be kept free of planting for safety and security reasons.
- 7.7.2 The internal access roads and other hardstanding areas (e.g. for parking) will be of concrete or tarmac.

- 7.7.3 However, the perimeter areas of the PCC Site will be landscaped and there will be opportunities for planting and biodiversity enhancement, including wildflower grassland and native scrub creation. Further details are provided within the Indicative Landscape and Biodiversity Plan (Document Ref. 4.15) and outlined within the Indicative Landscape and Biodiversity Strategy (Document Ref. 5.12).
- 7.7.4 The perimeter of the PCC Site will be securely fenced with appropriate chain link or mesh fencing.
- 7.7.5 The indicative landscaping proposals are shown in **Figure 7.4** below and are also provided at **Appendix 4**.

Figure 7.4 – Indicative Landscaping and Biodiversity Plan





7.7.6 The areas around and between the main buildings and structures within the Gas AGIs, the New Tod Point Substation and the extension areas to the Existing Tod Point Substation are likely to comprise hardstanding and crushed stone. The AGIs and substation compounds will be securely fenced. No soft landscaping is proposed around the AGIs and substations.

7.8 Lighting

7.8.1 The Application includes an Indicative Lighting Strategy (Document Ref. 5.11). Before any lighting is installed at the PCC Site or other locations (e.g. AGIs, electrical substations) a detailed lighting scheme will be submitted to the relevant LPA for approval. The lighting scheme will be designed in accordance with relevant standards, such as the Guidance Notes for the Reduction of Obtrusive Light (2020) published by the Institute of Lighting Engineers and/or Chartered Institution of Building Services Engineers requirements, as appropriate.

7.8.2 The lighting scheme will be designed to provide safe working conditions in all areas of the PCC Site and other locations whilst reducing light pollution and the visual impact on the local environment.

8.0 ACCESS ARRANGEMENTS

- 8.1.1 This section describes the operational access arrangements for the Site.
- 8.1.2 The main vehicular route to the Site is via existing access roads from the A1085 Trunk Road to the east near Redcar and the A1053 Tees Dock Road to the north of Grangetown. There is access from these roads to the A19 and the wider strategic road network from either the A66, passing north of Middlesbrough, or the A174, which passes to the south of the town.
- 8.1.3 There will be two main points of vehicular access to the PCC Site via existing private access roads within the Teesworks area. This will include an access point in the south-west corner, located close to the Administration Block/Control Room and Warehouse/Workshop and a second access point in the south-east corner located close to the Low Carbon Electricity Generating Station Electrical Substation and Gas Reception Facility. There will also be an access point in the north-west corner of the PCC Site for emergency use.
- 8.1.4 HGVs and other large vehicles will access the PCC Site from the A1085 via the former Redcar Steelworks entrance. The arrangements for operational traffic movements are set out in more detail within the Transport Assessment (Appendix 16A, ES Volume III, Document Ref. 6.4).
- 8.1.5 The nearest bus stops are located on West Coatham Lane to the south of the PCC Site, with the nearest railway station being Redcar British Steel 800m to the south of the Site. The next closest railway station is Redcar situated approximately 2.5km to the east.
- 8.1.6 Internal access roads will be routed around the perimeter of the PCC Site and around the main process areas. Internal access roads will be designed to provide safe access and movement for all vehicle types and users. There will be clear segregation and demarcation of routes for pedestrians.
- 8.1.7 Car parking facilities will be provided within the PCC Site. This will include a car park for operational staff and visitors located close to the Administration Block/Control Room and Warehouse/Workshop, locations of which are identified on the Indicative PCC Facility Plans (Document Ref. 4.6)
- 8.1.8 Secure cycle parking facilities will be provided within the PCC Site close to the Administration Block/Control Room and there will be shower and changing facilities for those cycling to work.
- 8.1.9 Where possible, pedestrian and cycle routes, parking areas and buildings within the PCC Site will be designed to provide for inclusive access. This will need to take account of operational and safety considerations given the nature of the PCC Site.
- 8.1.10 Buildings will comply with the access requirements set out in the Buildings Regulations except where exemptions apply. Building Regulations approval would only be sought once an EPC contractor has been appointed and detailed design has been completed.

- 8.1.11 The access arrangements for the PCC Site are shown at **Appendix 5**.
- 8.1.12 The Gas AGIs and the New Tod Point Substation will be accessed from the local highway network via existing access roads. Vehicle parking facilities will be provided within the compounds for maintenance and inspection purposes. The Existing Tod Point Substation benefits from existing access and parking facilities and no changes are proposed.

9.0 SECURING DETAILED DESIGN

- 9.1.1 Where flexibility is required in the design of a development (as explained in Section 5 of this DAS) it is important to ensure that appropriate mechanisms are in place to provide certainty to the SoS, the relevant LPA and any other relevant bodies, that its detailed design will be in accordance with the design parameters upon which the EIA has been based.
- 9.1.2 The draft DCO (Document Ref 2.1) contains a number of controls in the form of articles, schedules and requirements to secure the detailed design of the Proposed Development in accordance with the information contained within the Application and the assessments set out in the ES (Document Refs. 6.1 to 6.4). Those controls are set out in **Table 9.1**.

Table 9.1 – Controls over Detailed Design within the draft DCO

Article or Requirement	Title	Description
Article 4	Development consent etc. granted by this Order	Requires the Proposed Development to be constructed within the limits defined on the Works Plans and makes the Proposed Development subject to the Requirements (in Schedule 2).
Article 45	'Certification of plans etc.'	Requires the undertaker to obtain the certification of certain plans and documents (e.g. the Works Plans and ES) by the SoS, in order to ensure that definitive copies of the key documents are available and to assist in ensuring that the Proposed Development is carried out in accordance with them, in line with Requirement 34.
Schedule 2 - Requirement 3	Detailed design	Requires details of Work Nos. 1 to 9 to be submitted to the relevant planning authority for approval, and that where relevant they comply with the maximum design parameters noted above <u>and are also in accordance with the design principles set out in Sections 7 and 8 of the Design and Access Statement.</u>
Requirement 4	Landscaping and biodiversity protection,	Requires a landscaping and biodiversity management and enhancement plan to be submitted to the relevant planning authority for approval in respect of soft landscaping, including shrub and tree

	management and enhancement	planting and biodiversity and habitat enhancement at the Site. Also requires the plan to set out maintenance and management details.
Requirement 6	External lighting	Requirement 6(2) requires details of all permanent external lighting (with the exception of aviation warning lighting covered by Requirement 27).
Requirement 7	Highway accesses	Requirement 7(3) requires details of any new or modified permanent means of access to a public highway.
Requirement 8	Means of enclosure	Requirement 9(3) requires details of any permanent means of enclosure.
Requirement 9	Site security	Requires a written scheme detailing security measures to minimise the risk of crime.
Requirement 11	Surface and foul water drainage	Requirement 11(3) requires details of all permanent surface and foul water drainage systems.
Requirement 12	Flood risk mitigation	Requirement 12(3) requires a scheme for the mitigation of flood risk during operation.
Requirement 26	Combined heat and power	Requirement 26(1) requires the undertaker to demonstrate to the satisfaction of the relevant planning authority that it has allowed space within the design of the Proposed Development for the later provision of heat for off-site users of process or space heating and its later connection to such systems, should they be identified and commercially viable.
Requirement 27	Aviation warning lighting	Requires the submission of details of aviation warning lighting in respect of Work No. 1.
Requirement 34	Approved details and amendments to them	34(1) requires all details submitted for approval of the relevant planning authority under the requirements to reflect the principles set out in the documents certified under Article 45.

Schedule 15	Design parameters	Defines the maximum design parameters for the main buildings and structures (Work Nos. 1 and 7).
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9.1.3 The above will ensure that the detailed design of the Proposed Development is controlled and secured.

10.0 CONCLUSIONS

- 10.1.1 This DAS sets out how the Applicants have had regard to design and access considerations in designing the Proposed Development.
- 10.1.2 The Applicants have taken account of the Site's context, planning policy and local design guidelines in the design of the Proposed Development.
- 10.1.3 While flexibility has been sought in the design of the Proposed Development, the Applicants have defined design parameters upon which to base the EIA to ensure that the likely significant effects of the Proposed Development have been robustly assessed. The Applicants have also included appropriate articles and requirements within the draft DCO to ensure that the detailed design of the Proposed Development is controlled and secured.
- 10.1.4 The design of the Proposed Development, notably the PCC Site, is functional, reflecting its purpose and the context within which it will sit. In terms of siting and layout, the main buildings and structures are set well within the PCC Site and have been grouped together where feasible to consolidate the built form. While the buildings and structures are functional, reflective of their industrial setting and the fact they do not sit on a Gateway Plot or primary route within the Teesworks area, the decision has been taken to enclose the main items of plant and equipment in line with Design Guide recommendations having regard to the fact they will be visible from South Gare and Coatham Dunes/Sands. The buildings/structures will be clad in materials appropriate to the area.
- 10.1.5 The approach taken to landscaping at the PCC Site has been influenced by functional and safety requirements. While there are limited opportunities for soft landscaping, the perimeter areas of the PCC Site will be landscaped and there will be opportunities for planting and biodiversity enhancement in line with the landscape and biodiversity plans and strategy that have been developed.
- 10.1.6 The PCC Site will incorporate appropriate access arrangements. The internal access roads will be designed to provide safe access and movement for all vehicle types and users. There will be clear segregation of and demarcation of routes for all users. Where possible, pedestrian routes, parking areas and buildings will be designed to provide for inclusive access.
- 10.1.7 The buildings and structures within the Gas AGIs, the New NZT Tod Point Substation and the extension areas to the Existing NGET Tod Point Substation will be of significantly smaller scale than those at the PCC Site. Given the industrialised context these buildings and structures will not be highly prominent within the area. Furthermore, those associated with the electrical substation works will sit next to the Existing Tod Point Substation. The approach to the external finishes for the Gas AGIs and electrical substation buildings and structures will mirror that for the PCC Site generally.
- 10.1.8 The Gas AGIs and the New Tod Point Substation will be accessed from the local highway network via existing access roads. Vehicle parking facilities will be provided

within the compounds for maintenance and inspection purposes. The Existing Tod Substation benefits from existing access and parking facilities and no changes are proposed.

- 10.1.9 In conclusion, it is considered that the Proposed Development represents 'good design' for the purposes of energy infrastructure and policy set out in the relevant National Policy Statements, other planning policy documents and also local design guidelines.

APPENDIX 1: DESIGN OPTIONS PRESENTED AT STAGE 2

The Project Site

The current extent of the Project Site is shown below edged in red. It is located either side of the River Tees, from Redcar in the east to Billingham in the west. The land around Redcar, to the south of the Tees, lies within the administrative boundary of Redcar and Cleveland Borough Council, with the land north of the River within the boundary of Stockton-on-Tees Borough Council.



The gas-fired power station and CO₂ compressor station will be located on part of the former SSI steel works site in Redcar, land that is controlled by the South Tees Development Corporation. The CO₂ transport/export pipeline will also start in this location (minimising the distance it has to travel over land) before heading offshore. The power station connections and the CO₂ gathering network will involve land within both Redcar and Stockton-on-Tees, including crossings beneath the River Tees.

Power Station and CO₂ compressor station

An indicative layout and 3D visualisation of the gas-fired power station and CO₂ compressor station are provided below. The design has been developed since the early ideas shared during Stage 1 consultation.



3D visualisation of possible building forms, materials and colours.

Building Form, materials and use of colour

Building Form

The main image above shows a standard design with a conventional appearance, determined by functional consideration. We want to develop the NZT Plant to provide a visually attractive scheme through the implementation of good design that is also sympathetic to the surrounding SSSI Nature Reserve.



Cladding might be arranged in an angular format to create texture and interest. North facing rooflights allow natural light to penetrate the plant and limit the requirement for artificial lighting.

Simple pitched roof forms reflect those of the neighbouring fishermen's huts.

Materials and Colour

Materials will be chosen to reflect the industrial nature of the plant but also to enhance and respect the surrounding nature reserve area. Colour can be used to highlight certain areas, or ancillary structures on the buildings, to create focal points, add depth and visual interest.



Mesh cladding would allow views through to the plant inside, using Cor-Ten steel would reflect the previous steelworks on the site. Hues of green mesh or cladding could be added, influenced by the surrounding landscape and would provide contrast with the rusty rich brown of the Cor-Ten.

Images might be incorporated into the cladding, such as silhouettes of trees which are nature's own carbon capture machines.

Transparency & Lighting

Parts of the buildings may be clad in transparent material to allow the public to view the NZT process. These elements will be particularly visible at night creating interest.

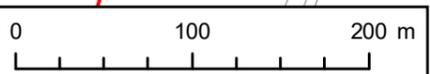
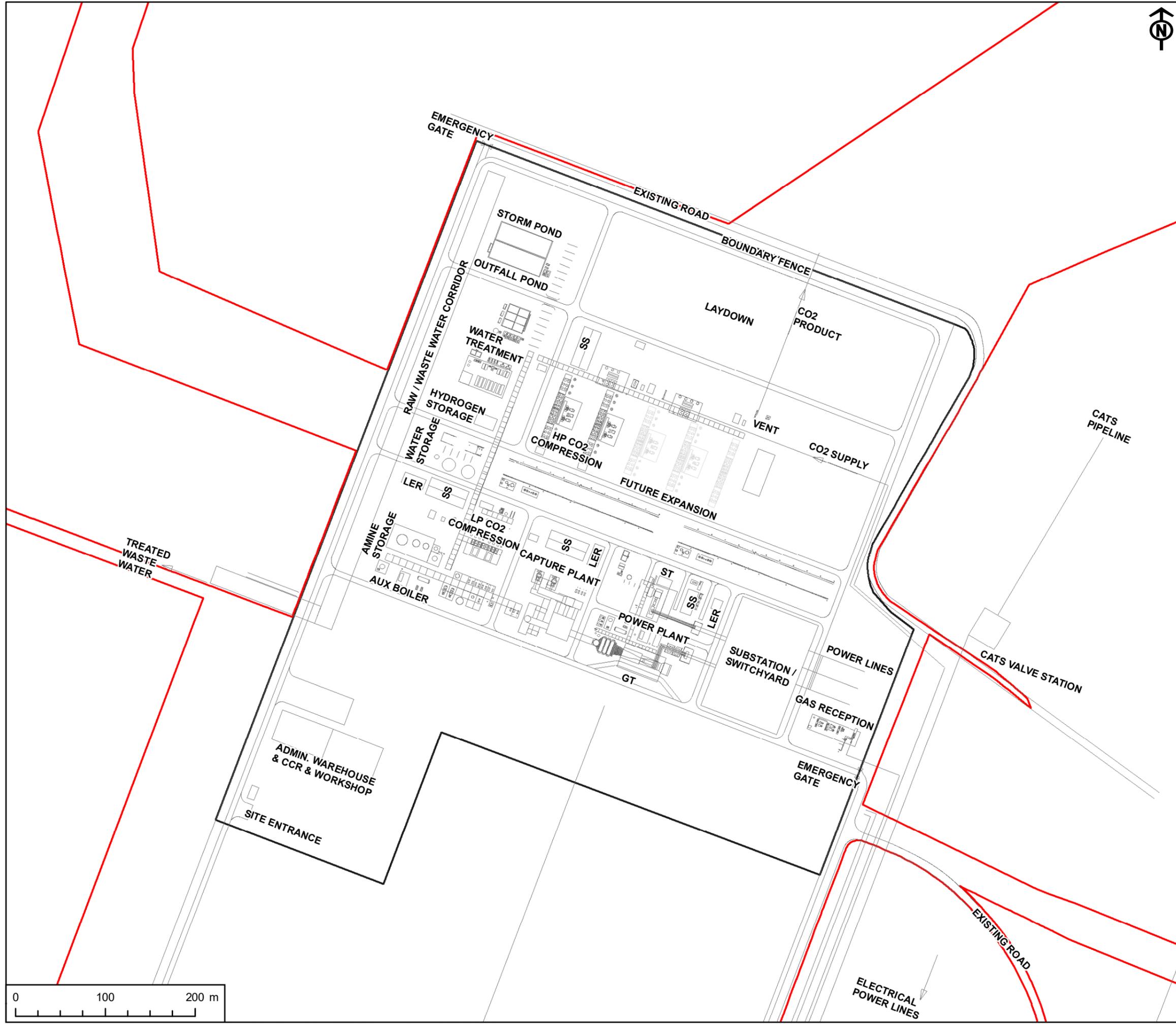


If selected, mesh or polycarbonate materials will become transparent at night allowing views inside the buildings. Coloured lighting may highlight the stacks, or other prominent parts of the site.

APPENDIX 2: INDICATIVE PCC SITE LAYOUT

Project Management Initials: RL Designer: LC Checked: AR Approved: IC

Scale @ A3 1:4,000



APPLICANTS
 NZT POWER LTD. AND NZNS STORAGE LTD.

KEY
 Site Boundary
 Power, Capture and Compressor Site

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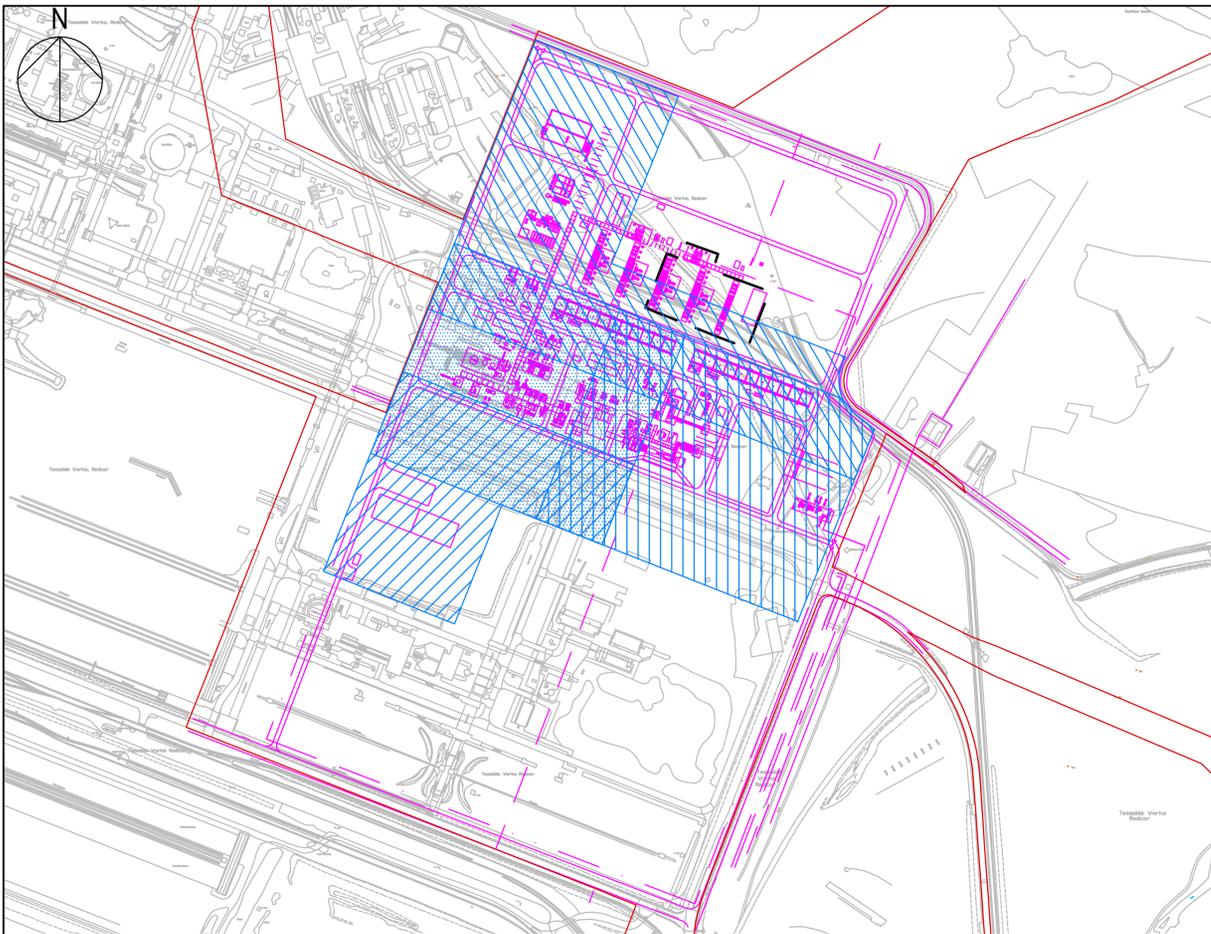
TITLE
 FIGURE 4-1
 INDICATIVE PCC SITE LAYOUT

REFERENCE
 NZT_220817_ES_4-1_v4

SHEET NUMBER
 1 of 1

DATE
 17/08/2022

APPENDIX 3: INDICATIVE PCC SITE ELEVATIONS/SECTIONS

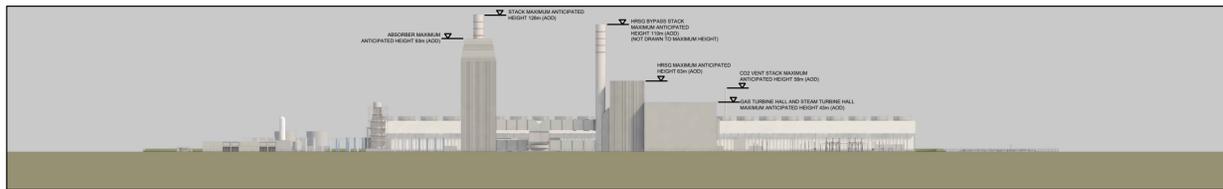


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- KEY**
- SITE BOUNDARY
 - WORK No. 1A - LOW CARBON ELECTRICITY GENERATING STATION - CCGT PLANT
 - WORK No. 1B - LOW CARBON ELECTRICITY GENERATING STATION - CCGT PLANT - COOLING AND UTILITIES
 - WORK No. 1C - LOW CARBON ELECTRICITY GENERATING STATION - CARBON CAPTURE PLANT
 - WORK No. 1D - ELECTRICITY GENERATING STATION - ADMIN CONTROL ROOM & STORES
 - AREA FOR FUTURE EXPANSION OF PROPOSED HP CO2 COMPRESSION AND INDICATIVE FUTURE EXPANSION HP CO2 COMPRESSION EQUIPMENT



Revision Details	By	Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Applicant
NZT POWER LTD AND NZNS STORAGE LTD



Drawing Title
DCO Reference Number - 4.6

INDICATIVE POWER CAPTURE AND COMPRESSION (PCC) FACILITY PLANS

Sheet 1 of 4 - Key Plan

Designed	Drawn	Checked	Approved	Date
	SF			

AECOM Internal Project No.	Subsidiary	Project Manager
60559231	N/A	

Scale @ A1
AS SHOWN

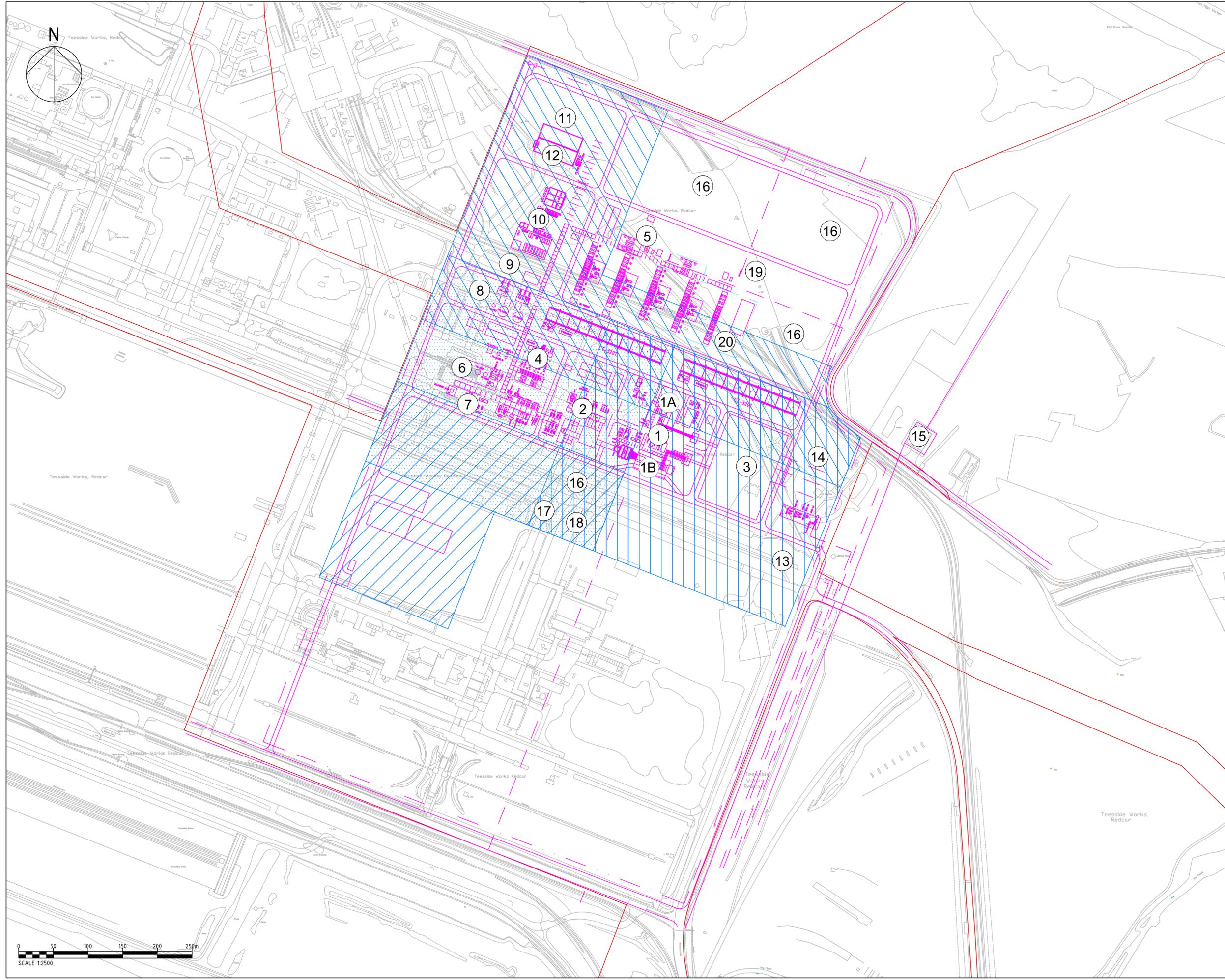
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NOTES

PLANT DESCRIPTION

1. POWER PLANT
- 1A. STEAM TURBINE
- 1B. GAS TURBINE
2. CO2 CAPTURE PLANT
3. SS/SWITCHYARD
4. CO2 COMPR. & DEHYDR
5. HP CO2 COMPRESSION
6. AMINE STORAGE
7. AUX BOILER
8. WATER STORAGE
9. HYDROGEN STORAGE
10. WATER TREATMENT
11. STORM POND
12. OUTFALL POND
13. GAS RECEPTION
14. POWER LINES
15. CATS VALVESTATION
16. LAYDOWN
17. WAREHOUSE & WORKSHOP
18. ADMIN & CCR
19. VENT
20. FUTURE EXPANSION HP CO2 COMPRESSION EQUIPMENT

KEY

- SITE BOUNDARY
- ▨ WORK No. 1A - LOW CARBON ELECTRICITY GENERATING STATION - CCGT PLANT
- ▨ WORK No. 1B - LOW CARBON ELECTRICITY GENERATING STATION - CCGT PLANT - COOLING AND UTILITIES
- ▨ WORK No. 1C - LOW CARBON ELECTRICITY GENERATING STATION - CARBON CAPTURE PLANT
- ▨ WORK No. 1D - ELECTRICITY GENERATING STATION - ADMIN CONTROL ROOM & STORES
- AREA FOR FUTURE EXPANSION OF PROPOSED HP CO2 COMPRESSION AND INDICATIVE FUTURE EXPANSION HP CO2 COMPRESSION EQUIPMENT

Revision Details	By	Check	Date	Suffix

Purpose of issue: **FOR INFORMATION**

Applicant: **NZT POWER LTD AND NZNS STORAGE LTD**

Project Title: **Net Zero Teesside**

Drawing Title: **DCO Reference Number - 4.6**

INDICATIVE POWER CAPTURE AND COMPRESSION (PCC) FACILITY PLANS

Sheet 2 of 4 - Layout View

Designed	Drawn	Checked	Approved	Date
	SF			

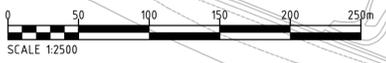
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Drawing Number 60559231-PE-DRG-002	Rev 1
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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THIS DRAWING TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

Revision Details	By	Check	Date	Suffix
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Purpose of issue
FOR INFORMATION

Applicant
**NZT POWER LTD AND
NZNS STORAGE LTD**



Drawing Title
DCO Reference Number - 4.6

**INDICATIVE POWER CAPTURE AND
COMPRESSION (PCC) FACILITY PLANS**

Sheet 3 of 4 - 3D Aerial View

Designed	Drawn	Checked	Approved	Date
	SF			
AECOM Internal Project No.	Suitability	Project Manager		
60559231	N/A			
Scale @ A1	Zone / Mileage			
AS SHOWN	N/A			

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60559231-PE-DRG-003	0



ELEVATION LOOKING NORTH
Scale 1:1000



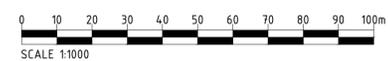
ELEVATION LOOKING EAST
Scale 1:1000



ELEVATION LOOKING SOUTH
Scale 1:1000



ELEVATION LOOKING WEST
Scale 1:1000

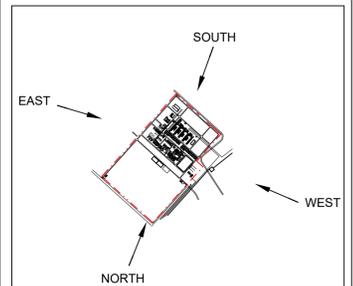


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NOTES

1. ASSUMED FINISHED GROUND LEVEL IS 13m (AOD).



ELEVATION VIEW PLAN

Revision Details	By	Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Applicant
NZT POWER LTD AND NZNS STORAGE LTD



Drawing Title
DCO Reference Number - 4.6
INDICATIVE POWER CAPTURE AND COMPRESSION (PCC) FACILITY PLANS

Sheet 4 of 4 - Elevations

Designed	Drawn	Checked	Approved	Date
	SF			

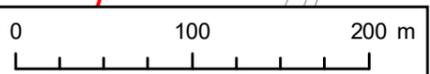
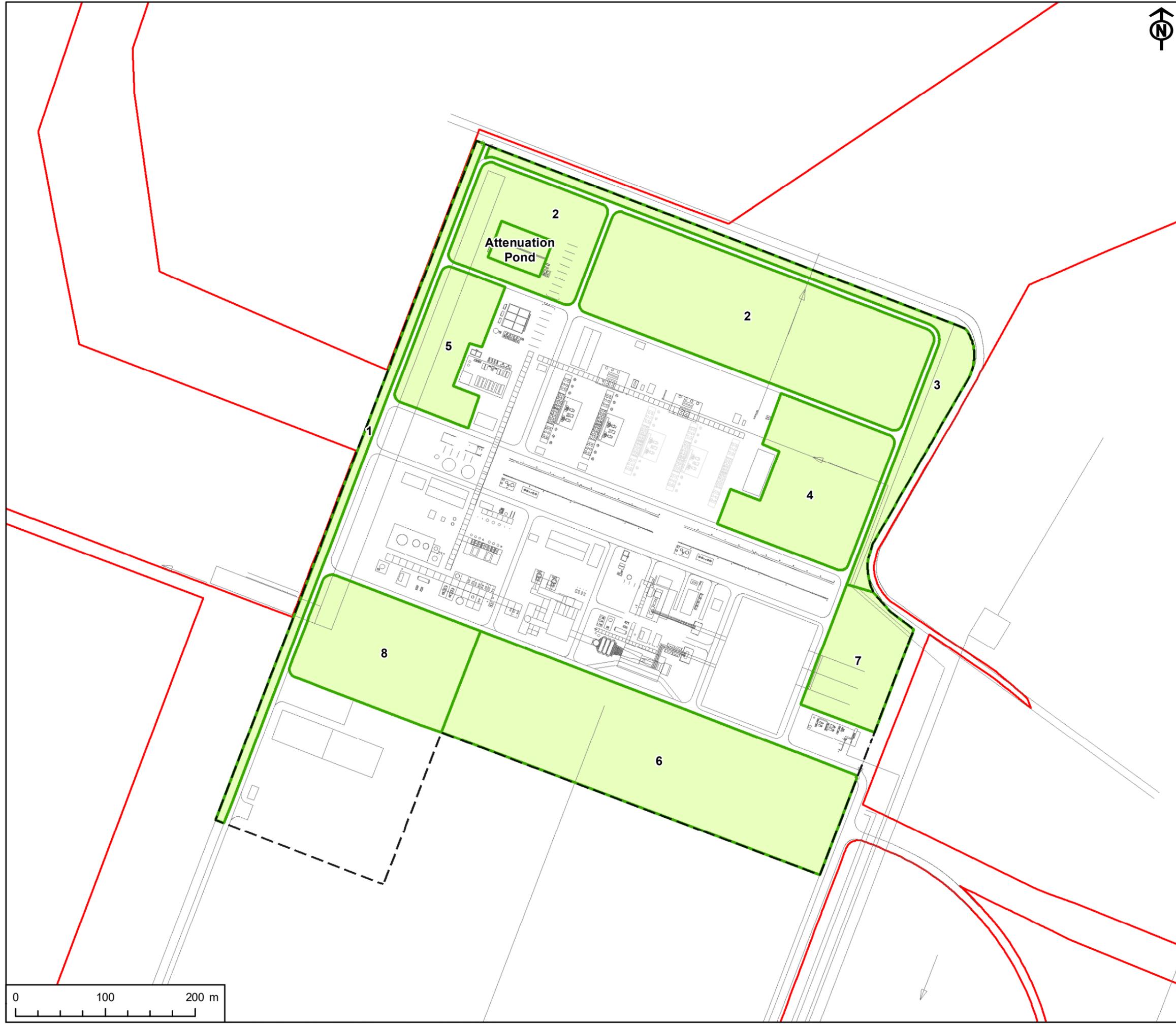
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Scale @ A1 AS SHOWN	Zone / Mileage N/A	

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Drawing Number 60559231-PE-DRG-004	Rev 0
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APPENDIX 4: INDICATIVE LANDSCAPE PROPOSALS



KEY

	Site Boundary
	Power, Capture and Compressor Site
	Potential Biodiversity Enhancement Area

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NOTE:
 PCC layout shown is indicative

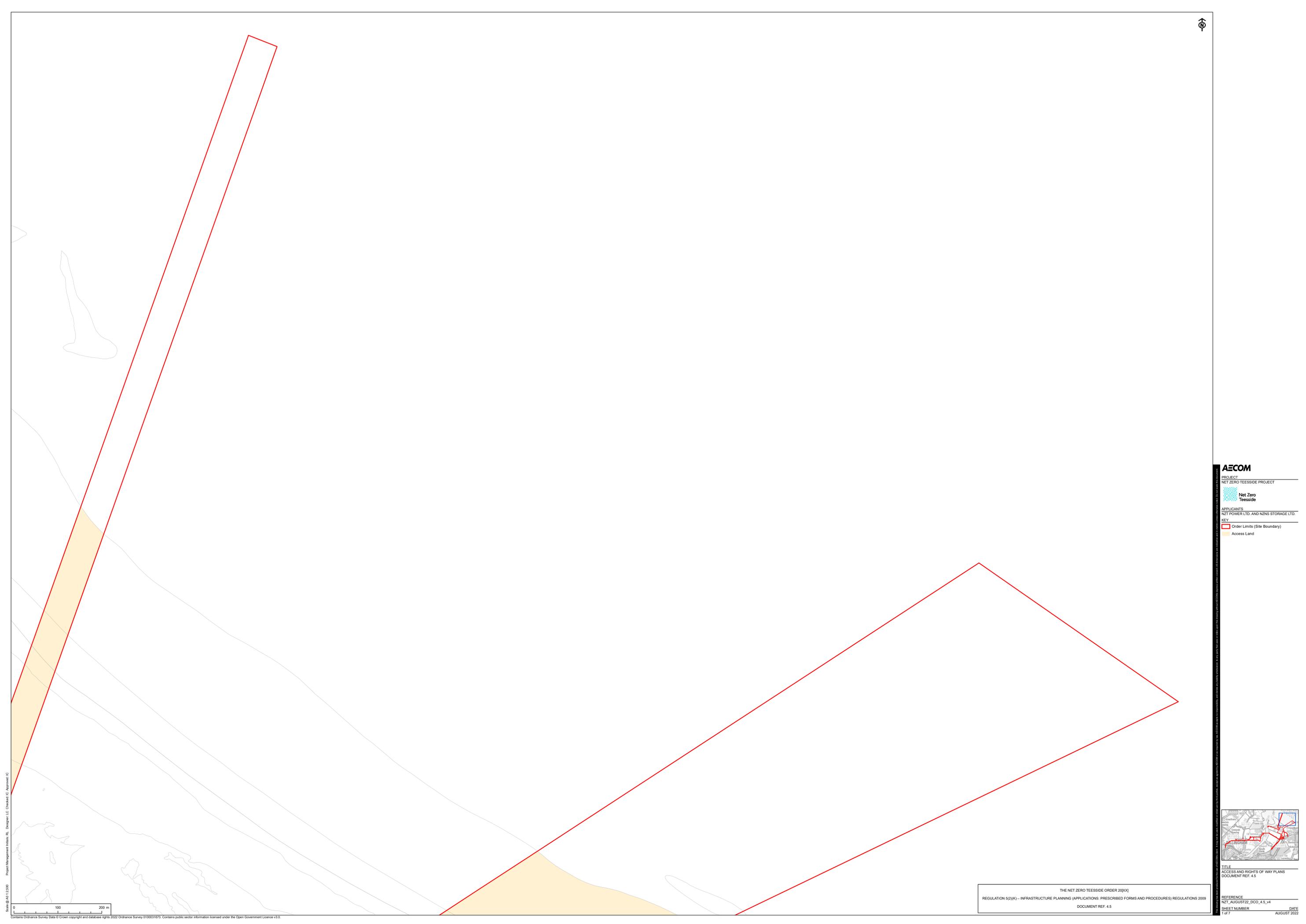
TITLE
 FIGURE 4-2
 LANDSCAPE AND BIODIVERSITY

REFERENCE
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SHEET NUMBER
 1 of 1

DATE
 17/08/2022

APPENDIX 5: PCC SITE ACCESS PLAN



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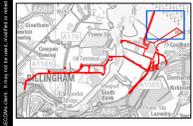
PROJECT
NET ZERO TEESIDE PROJECT



APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site Boundary)
- Access Land



TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

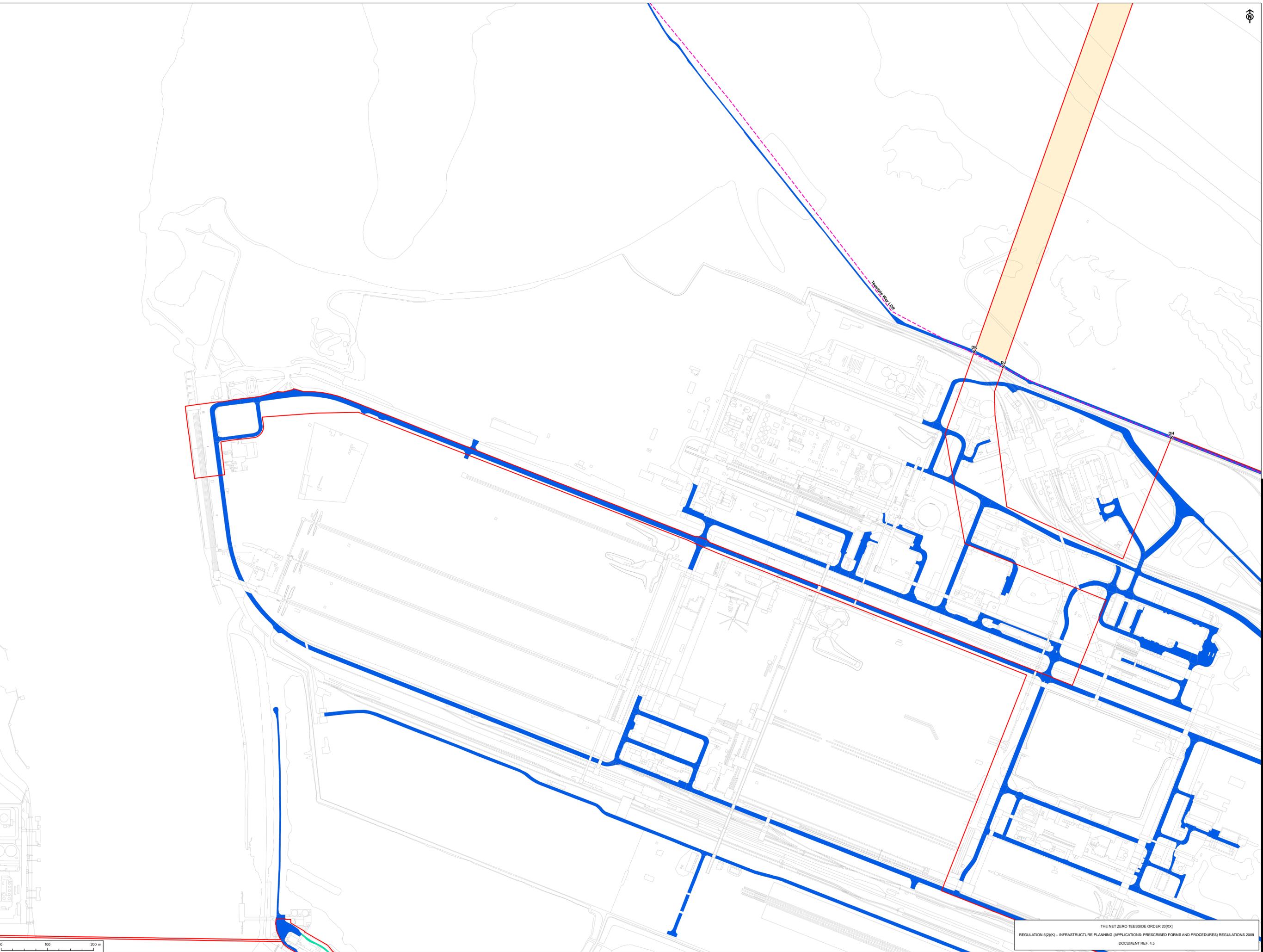
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 REGULATION 5(2)(K) – INFRASTRUCTURE PLANNING (APPLICATIONS: PRESCRIBED FORMS AND PROCEDURES) REGULATIONS 2009
 DOCUMENT REF. 4.5

REFERENCE
NZT_AUGUST22_DCO_4.5_v4
 SHEET NUMBER
1 of 7
 DATE
AUGUST 2022

Project Management: Inshore, R. O'Connell, C. Chubb, C. Johnson, J.C.

Scale: 1:12,500

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PROJECT
NET ZERO TEESIDE PROJECT

Net Zero
Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site)
- Access Routes Details -
- PRoW - Teesdale Way
- Private Road
- Private Track
- Access Land



THE NET ZERO TEESIDE ORDER 20(XX)

REGULATION 5(2)(K) – INFRASTRUCTURE PLANNING (APPLICATIONS: PRESCRIBED FORMS AND PROCEDURES) REGULATIONS 2009

DOCUMENT REF. 4.5

TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

REFERENCE
NET_AUGUST22_DCO_4.5_v4

SHEET NUMBER
2 of 7

DATE
AUGUST 2022

Scale: 0 100 200 m

Project Management: Julia, R., Designer: C. Chubb, C. Approved: C.

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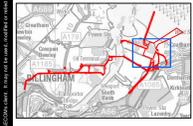
PROJECT
NET ZERO TEESDALE PROJECT

NET ZERO
Teesdale

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site Boundary)
- Access Routes Details - ID
- PRoW - Footpath
- PRoW - England Coast Path / Teesdale Way LDR
- PRoW - Teesdale Way LDR
- A Road
- Private Road
- Private Track
- Railway Line
- Private Maintenance
- Access Land



Scale 1:5000
0 100 200 m

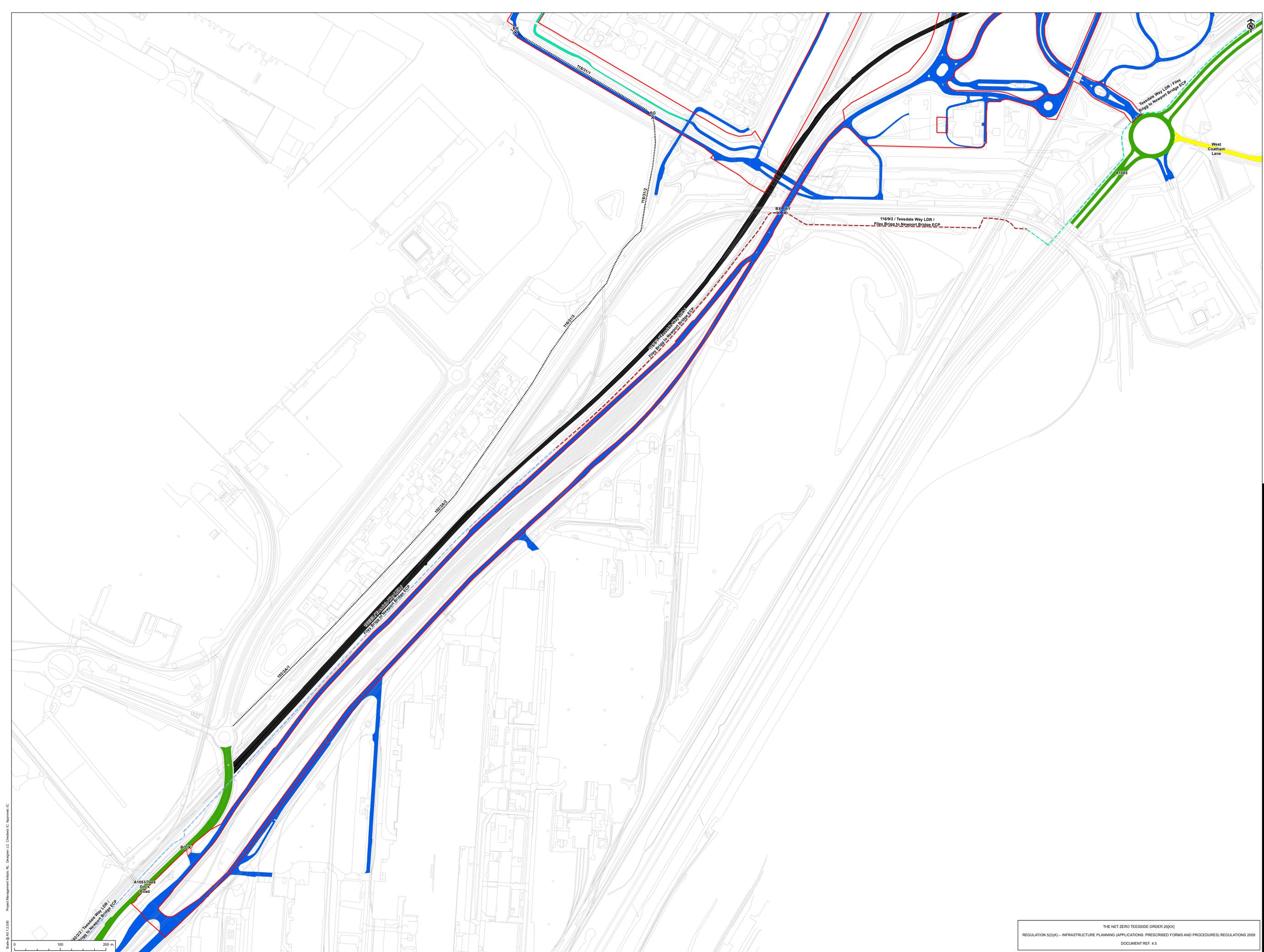
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REGULATION 5(2)(K) - INFRASTRUCTURE PLANNING (APPLICATIONS: PRESCRIBED FORMS AND PROCEDURES) REGULATIONS 2009
DOCUMENT REF. 4.5

TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

REFERENCE
NET_AUGUST22_DCO_4.5_v4

SHEET NUMBER
3 of 7

DATE
AUGUST 2022



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PROJECT
NET ZERO TEESIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

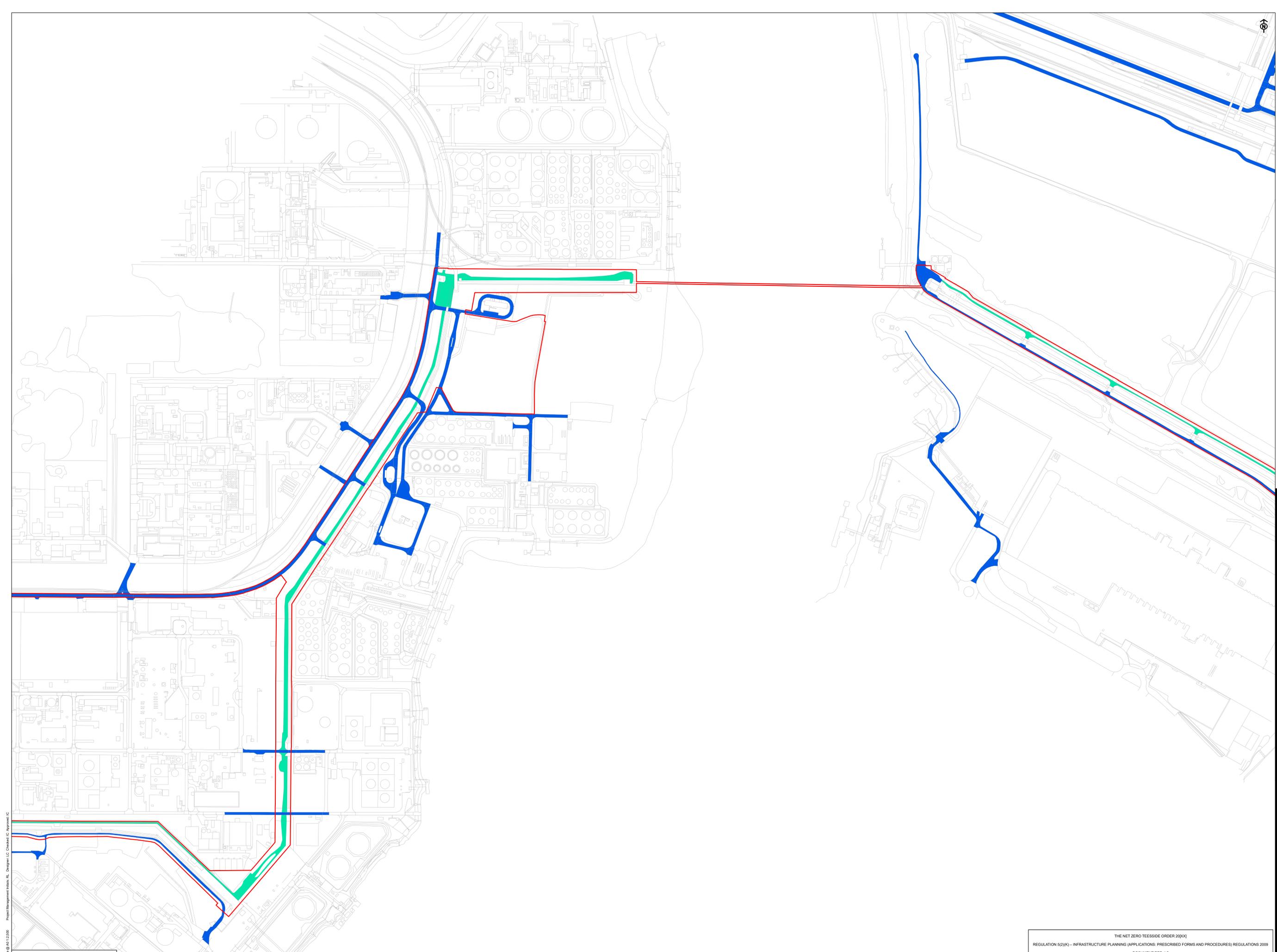
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- Access Routes Details - ID
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- PRoW - Footpath / England Coast Path / Teesdale Way LDR
- PRoW - Bridleway / England Coast Path / Teesdale Way LDR
- PRoW - England Coast Path / Teesdale Way LDR
- A Road
- Minor Road
- Private Road
- Private Track
- Railway Line
- Private Maintenance

TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

REFERENCE
NET_AUGUST22_DCO_4.5_v4

SHEET NUMBER
4 of 7

DATE
AUGUST 2022



Project Management: Ian Hill, RL, Designer: GC, Checker: JC, Approver: JC
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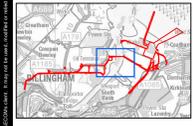
PROJECT
NET ZERO TEESIDE PROJECT

Net Zero
Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site Boundary)
- Private Road
- Private Track



THE NET ZERO TEESIDE ORDER 20(X)

REGULATION 5(2)(K) – INFRASTRUCTURE PLANNING (APPLICATIONS: PRESCRIBED FORMS AND PROCEDURES) REGULATIONS 2009

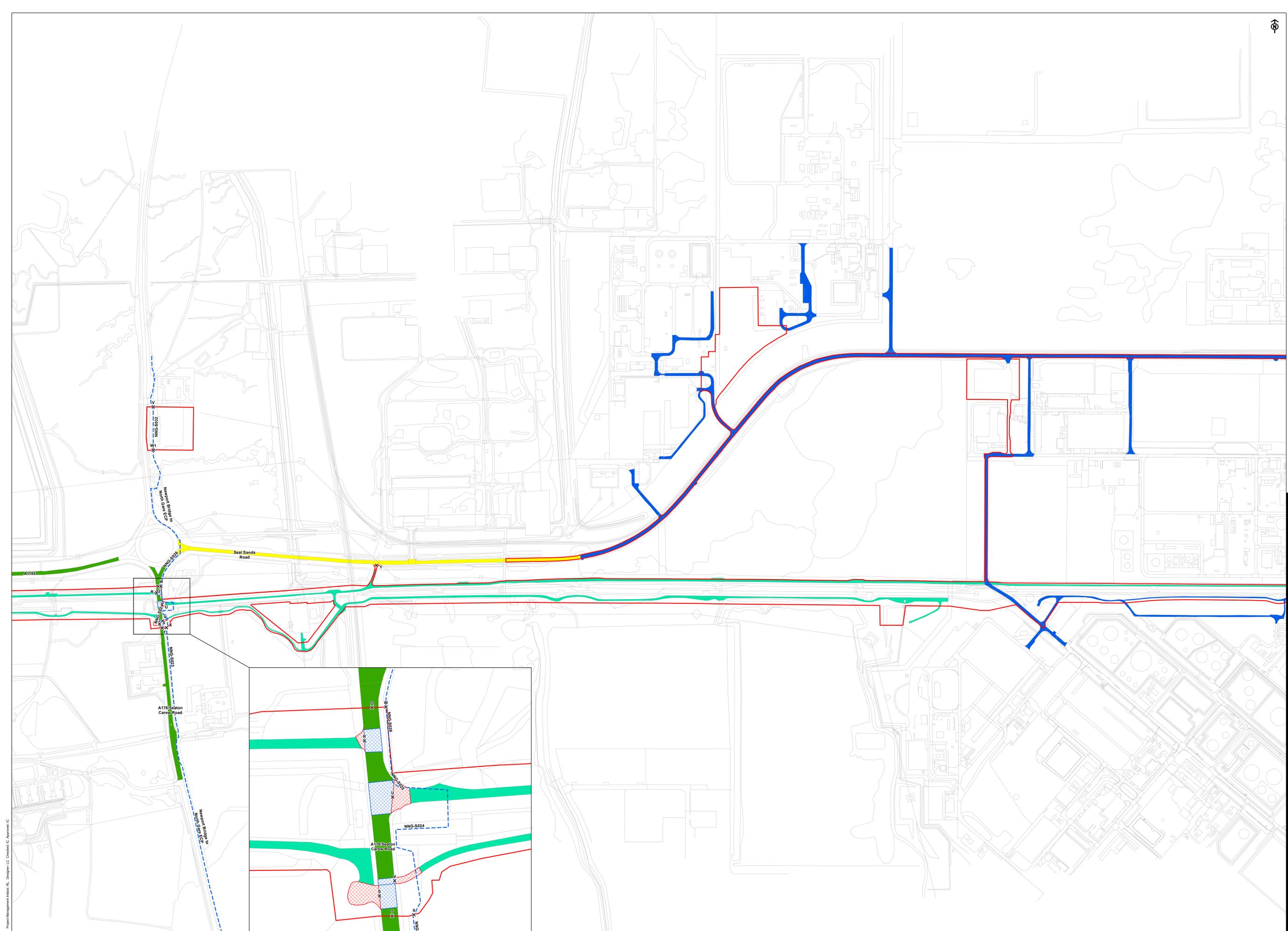
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TITLE
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DATE
AUGUST 2022



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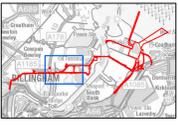
PROJECT
NET ZERO TEESIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site Boundary)
- X Access Routes Details - ID
- PRoW - England Coast Path
- A Road
- Minor Road
- Private Road
- Private Track
- Private Maintenance
- Public Maintenance



TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

REFERENCE
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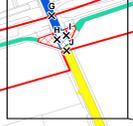
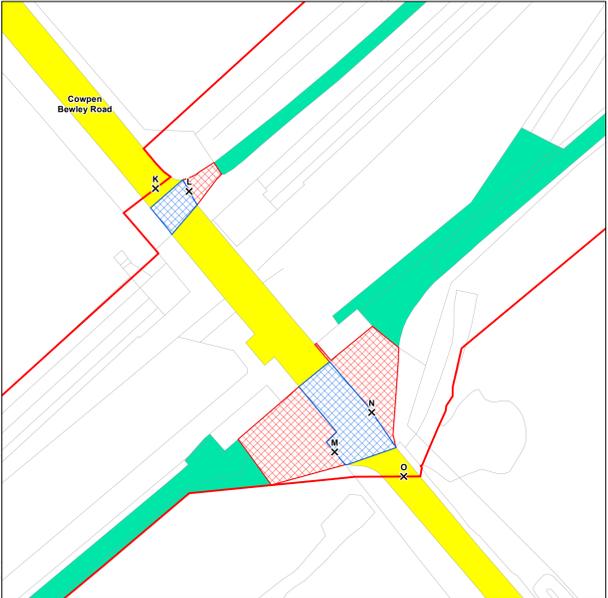
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DATE
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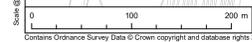
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THE NET ZERO TEESIDE ORDER 20(X)
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DOCUMENT REF. 4.5

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PROJECT
NET ZERO TEESIDE PROJECT

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Order Limits (Site Boundary)
- X Access Routes Details - ID
- A Road
- B Road
- Minor Road
- Private Road
- Private Track
- Railway Line
- Private Maintenance
- Public Maintenance



TITLE
ACCESS AND RIGHTS OF WAY PLANS
DOCUMENT REF. 4.5

REFERENCE
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7 of 7

DATE
AUGUST 2022