MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Outline Design Principles [tracked]

Deadline: 5
Application Reference: EN020028

Document Numbers:
MRCNS-J3303-LDA-10001
MOR001_FLO-CON-ENV-RPT-0126

Document Reference: J3/F02

22 September 2025
F02

Document status					
Version	**Purpose of document**	**Approved by**	**Date**	**Approved by**	**Date**
F01	For issue	AS	September 2024	IM	September 2024
F02	Submission at Deadline 5	GL	September 2025	IM	September 2025

Prepared by:

LDA Design

Prepared for:

Morgan Offshore Wind Limited, Morecambe Offshore Windfarm Ltd

Contents

Tables

Figures

~~Contents~~

Tables

No table of figures entries found.

Figures

Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
Biodiversity benefit	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected. For the Transmission Assets, biodiversity benefit will be delivered within identified biodiversity benefit areas within the Onshore Order Limits. Further qualitative benefits to biodiversity are proposed via potential collaboration with stakeholders and local groups, contributing to existing plans and programmes, both within and outside the Order Limits.
Code of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the ES.
Construction Traffic Management Plan	A document detailing the construction traffic routes for heavy goods vehicles and personnel travel, protocols for delivery of Abnormal Indivisible Loads to site, measures for road cleaning and sustainable site travel measures.
Design envelope	A description of the range of possible elements and parameters that make up the Transmission Assets options under consideration, as set out in detail in Volume 1, Chapter 3: Project Description. This envelope is used to define the Transmission Assets for EIA purposes when the exact engineering parameters are not yet known. This is also referred to as the Maximum Design Scenario or Rochdale Envelope approach.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Direct pipe	A cable installation technique which involves the use of a mini (or micro) tunnel boring machine and a hydraulic (or other) thruster rig to directly install a steel pipe between two points.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.

Term	Meaning
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to, and information to support, the EIA and Habitats Regulations Assessment processes for certain topics.
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Intertidal Infrastructure Area	The temporary and permanent areas between MLWS and MHWS.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Local Highway Authority	A body responsible for the public highways in a particular area of England and Wales, as defined in the Highways Act 1980.
Main rivers	The term used to describe a watercourse designated as a Main River under the Water Resources Act 1991 and shown on the Main River Map. These are usually larger rivers or streams and are managed by the Environment Agency.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for to apply for 'deemed marine licences' in English waters as part of the development consent process
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Micro-tunnel / micro-tunnelling	A tunnelling technique involving the use of a hydraulic (or other) jacking rig and a mini (or micro) tunnel boring machine to install a concrete tunnel between two points.
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe Offshore Windfarm: Generation Assets	The offshore generation assets and associated activities for the Morecambe Offshore Windfarm.

Term	Meaning
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.
Morecambe OWL	Morecambe Offshore Windfarm Limited is owned by Copenhagen Infrastructure Partners' (CIP) fifth flagship fund, Copenhagen Infrastructure V (CI V).
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore generation assets and associated activities for the Morgan Offshore Wind Project.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between JERA Nex bp (JNbp) and Energie Baden-Württemberg AG (EnBW).
National Grid Penwortham substation	The existing National Grid substation at Penwortham, Lancashire.
National Policy Statement(s)	The current national policy statements published by the Department for Energy and Net Zero in 2023 and adopted in 2024.
Offshore booster station	A fixed structure located along the offshore export cable route, containing electrical equipment to ensure bulk wind farm capacity can be fully transmitted to the onshore substations.
Offshore substation platform(s)	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the Generation Assets to the landfall.
Offshore export cable corridor	The corridor within which the offshore export cables will be located.
Offshore Permanent Infrastructure Area	The area within the Transmission Assets Offshore Order Limits (up to MLWS) where the permanent offshore electrical infrastructure (i.e. offshore export cables) will be located.
Offshore Order Limits	See Transmission Assets Order Limits: Offshore (below).
Offshore substation platform(s)	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substations.
Onshore export cable corridor	The corridor within which the onshore export cables will be located.
Onshore Infrastructure Area	The area within the Transmission Assets Order Limits landward of MHWS. Comprising the offshore export cable corridor from MHWS to

Term	Meaning
	the transition joint bay, onshore export cable corridor, onshore substations and 400 kV grid connection cable corridor, and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation and/or biodiversity benefit are excluded from this area.
Onshore Order Limits	See Transmission Assets Order Limits: Onshore (below).
Onshore substations	The onshore substations will include a substation for the Morgan Offshore Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project, and which helps to inform consultation responses.
Renewable energy	Energy from a source that is not depleted when used, such as wind or solar power.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations due to the flow of water.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
The Secretary of State for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Transmission Assets.
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).
Transmission Assets Order Limits: Offshore	The area within which all components of the Transmission Assets seaward of Mean Low Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning. Also referred to in this report as the Offshore Order Limits, for ease of reading.
Transmission Assets Order Limits: Onshore	The area within which all components of the Transmission Assets landward of Mean High Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds). Also referred to in this report as the Onshore Order Limits, for ease of reading.

Acronyms

Acronym	Meaning
AIS	Air Insulated Switchgear
AOD	Above Ordnance Datum
BCA	Bilateral Grid Connection Agreement
CoCP	Code of Construction Practice
CoT	Project Commitment
CBRA	Cable Burial Risk Assessment
CfD	Contracts for Difference
CMS	Construction Method Statement
CSIP	Cable Specification and Installation Plan
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security & Net Zero
dML	Deemed Marine Licence
EnBW	Energie Baden-Württemberg AG
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPP	Evidence Plan Process
ES	Environmental Statement
EWG	Expert Working Group
GIS	Gas Insulated Switchgear
HDD	Horizontal Directional Drilling
HGV	Heavy goods vehicle
HNDR	Holistic Network Design Review
HVAC	High Voltage Alternating Current
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IAQM	Institute of Air Quality Management
LAT	Lowest Astronomical Tide
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MDS	Maximum Design Scenario

Acronym	Meaning
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPS	Marine Policy Statement
MTBM	Mini (or micro) tunnel boring machine
NGESO	National Grid Electricity System Operator
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
O&M	Operation and Maintenance
OSP	Offshore Substation Platform
OTNR	Offshore Transmission Network Review
PDE	Project Design Envelope
PEIR	Preliminary Environmental Information Report
PPP	Pollution Prevention Plan
PRoW	Public rights of way
SAC	Special Areas of Conservation
SAR	Search and Rescue
SPA	Special Protection Area
SNCBs	Statutory Nature Conservation Bodies
SSSI	Sit of Special Scientific Interest
SWMP	Site Waste Management Plan
TEP	Technical Engagement Plan
TJB	Transition Joint Bay
UK	United Kingdom
UXO	Unexploded Ordnance
WSI	Written scheme of investigation

Units

Unit	Description
%	Percentage
dB	Decibels
Kg	Kilogram
kHz	Kilohertz
KJ	Kilojoules
km	Kilometres
km^2	Kilometres squared
kV	Kilovolt
m	Metres
m^2	Metres squared
m^3	Metres cubed
nm	Nautical mile
µPa	micropascal

1 Introduction

1.1 Background

1.1.1.1 This document forms the oOutline Design Principles (~~Outline DP~~oDP) prepared for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (referred to hereafter as 'the Transmission Assets').

1.1.1.2 The document addresses the delivery of good design for the Transmission Assets project including a record of design process and design delivery. It covers the construction and operational phase delivery of the two onshore substations; the design of the habitat mitigation proposals; and the cable route reinstatement. The document also sets out the Applicants' approach to the post consent design development of the ~~is focussed on~~ design elements associated with the two onshore substations.

1.1.1.3 This document, submitted for Deadline 5 as an interim update, reflects ongoing discussions with Fylde Borough Council, Lancashire County Council, Preston City Council and South Ribble Borough Council since Deadline 4, together with matters arising from ISH2 and subsequent written exchanges during the Examination. In this regard, the Applicants and the Councils continue to work towards a finalised version of the oDP for submission at Deadline 6. Square brackets are used in this document to identify matters that are being discussed between the Applicants and the Councils.

1.2 Project overview

1.2.1.1 Morgan Offshore Wind Limited (Morgan OWL), a joint venture between JERA Nex bp (JNbp) and Energie Baden-Württemberg AG (EnBW), is developing the Morgan Offshore Wind Project. The Morgan Offshore Wind Project is a proposed wind farm in the east Irish Sea

1.2.1.2 Morecambe Offshore Windfarm Ltd (Morecambe OWL), owned by Copenhagen Infrastructure Partners' (CIP) fifth flagship fund, Copenhagen Infrastructure V (CI V), is developing the Morecambe Offshore Windfarm, also located in the east Irish Sea.

~~1.2.1.1 Morgan Offshore Wind Limited (Morgan OWL), a joint venture between bp Alternative Energy Investments Ltd. (bp) and Energie Baden-Württemberg AG (EnBW), is developing the Morgan Offshore Wind Project. The Morgan Offshore Wind Project is a proposed wind farm in the east Irish Sea.~~

~~1.2.1.2~~1.2.1.3~~Morecambe Offshore Windfarm Ltd (Morecambe OWL), a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) (Cobra) and Flotation Energy Ltd., is developing the Morecambe Offshore Windfarm, also located in the east Irish Sea.~~ Morgan OWL and Morecambe OWL (the Applicants), being in agreement with the output from the Holistic Network Design Review, are jointly seeking a single consent for their electrically separate

Transmission Assets comprising aligned offshore export cable corridors to landfall and aligned onshore export cable corridors to separate substation(s), and onward connections to the National Grid at Penwortham, Lancashire.

~~1.2.1.3~~1.2.1.4 The purpose of the Transmission Assets is to connect the Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets (referred to collectively as the 'Generation Assets') to the National Grid. The key components of the Transmission Assets include offshore element, landfall and onshore elements.

~~1.2.1.4~~1.2.1.5 Details of the activities and infrastructure associated with the Transmission Assets are set out in Volume 1, Chapter 3: Project description of the Environmental Statement (ES) (document reference F1.3).

1.3 Purpose and status

1.3.1.1 The oDP has been prepared to demonstrate how the Applicants have complied with best practice guidance on Good Design. The oDP provides a structured, evidence-based framework showing how design process and outcomes has been integrated into the Transmission Assets project across all relevant aspects; from initial site search to the indicative design of the substations through to post-consent detailed design governance, ensuring alignment with relevant planning policy, embedded mitigation, and recognised principles of good design.

1.3.1.2 The oDP has been prepared pursuant to Regulation 5(2) (q) of The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 and forms part of the suite of supporting documents submitted with the DCO application. Its purpose is to outline the Applicants' design approach for the Transmission Assets and then provide a central, clear, and enforceable framework to guide the evolution of detailed design post-consent, in support of the discharging local authority and the consented DCO and its requirements. This document is therefore a document certified a by the Secretary of State under article 42 for the purposes of this Order.

1.3.1.3 The Applicants' design approach has been informed by a structured site identification process, the National Infrastructure Commission's (NIC) Design Principles for National Infrastructure (2020), and lessons learned from recently consented DCO precedent projects. Where appropriate, the oDP has also been updated during the Examination of the Transmission Assets to reflect the NIC's Project-Level Design Principles (May 2024). Further detail on policy and guidance is provided in Section 3; alongside clarification on the pre consent design presented at the Examination in Section 5, and the post consent design governance and process in Section 6.

1.3.1.4 The Applicants' design strategy is implemented through a structured framework that establishes a clear and transparent line of sight between the overarching vision for the Transmission Assets, project objectives, design principles, and the post-consent Design Code. This process is described in Section 4 Good Design. The proposed onshore substation

design, including its embedded mitigation, has been shaped through an iterative process that has taken account of consultation outcomes, ongoing technical development, and environmental constraints and interactions.

1.3.1.5 The design framework and the oDP also demonstrates how the Applicants, in relation to the two substations that will independently serve the Generation Assets, have:

- Fulfilled the requirement for 'good design' as prescribed in NPS EN-1, EN-3 and EN-5;
- Established a set of design principles to guide the design process from the outset of the Project which were aligned with the thematic priorities promoted by the NIC, namely: *Climate, People, Places* and *Value*.
- Considered site-specific constraints and consultation responses.
- Embedded good design within the iterative process of site selection and refinement for each substation.
- Promoted good design across multiple disciplines; and
- Committed to maintaining the principles of good design post-consent and throughout detailed design.

1.3.1.6 The Applicants' consenting strategy establishes the parameters, commitments and design principles by which the Transmission Assets have been designed and assessed through EIA process. The relevant submitted documents include:

- The spatial extent defined by the Work Plans (document reference B7)
- The parameters set out in Volume 1, Chapter 3: Project description (document reference F1.3)
- Volume 1, Annex 5.3: Commitments Register (document reference F1.5.3)
- Outline Landscape Management Plan (oLMP) (document reference J2)
- Outline Ecological Management Plan (oEMP) (document reference J6)
- Outline Design Principles (oDP) (document reference J3)

1.3.1.7 The parameters, commitments, and design principles underpinning the Transmission Assets will be secured through Requirements in the draft DCO (REP4-007).

1.3.1.8 The relevant Requirements prescribe the guiding principles, parameters, and commitments that will inform detailed design following consent, ensuring that key matters are captured as enforceable elements and remain controllable at the detailed design stage. Final detailed designs will be submitted to and approved by the relevant

planning authority prior to the commencement of construction at each onshore substation site.

1.3.1.9 The design proposals set out in Section 5 are indicative but based on the Transmission Assets' Maximum Design Scenarios (MDS), which define the maximum limits of the Transmission Assets' construction, operational and decommissioning parameters.

1.3.1.10 The MDS provides sufficient certainty to support the Environmental Statement (ES) assessments while allowing for necessary flexibility in detailed design.

1.3.1.11 The degree of design flexibility incorporated within the MDS is proportionate to the current stage of technological development in electrical transmission infrastructure and accommodates the anticipated input of a technology provider during detailed design. This flexibility covers aspects such as infrastructure siting, foundation types, and construction methods.

1.3.1.12 At the same time, the MDS, in combination with the enforceable design principles set out in this document and secured through the relevant Requirements of the draft DCO, ensures that key design parameters and commitments remain controlled post-consent.

~~1.3.1.1~~1.3.1.13 This approach demonstrates how the Applicants have embedded good design into the iterative development process while maintaining compliance with guidance and policy on Good Design.

~~The Outline DP has been prepared pursuant to Regulation 5(2)(q) of *The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009* and forms part of a suite of supporting documents for the DCO application.The design proposals outlined in this document are *indicative* but are based on the Transmission Assets' maximum design scenarios (MDS), which describes a range of potential construction parameters for the Transmission Assets. The realistic worst case design and construction, operation, and decommissioning activities are considered.~~

~~This approach and use of the MDS allows flexibility in aspects such as infrastructure siting, foundation types, and construction methods, which will require further detailed consideration after the DCO submission. At the same time, the MDS offers enough certainty, in combination with design principles set out in this document, to support the ES assessments and provide clarity on the final design.~~

~~1.3.1.2 Its purpose is to demonstrate how the Applicants – in relation only to the two substations that will separately service the Generation Assets – have:~~

- ~~Fulfilled the requirement for 'good design', as prescribed in the National Policy Statements EN-1, EN-3 and EN-5~~
- ~~Established a set of design principles to guide design from the outset of the Project~~
- ~~Has considered site constraints and consultation responses.~~

- ~~Has embedded good design during the iterative process of selecting site and refining the sites of each substation~~
- ~~Has championed good design across multiple disciplines~~
- ~~Will ensure the principles of good design are maintained post-consent and throughout the detailed design process~~

~~1.3.1.3 The design proposals outlined in this document are indicative but are based on the Transmission Assets' maximum design scenarios (MDS), which describes a range of potential construction parameters for the Transmission Assets. The realistic worst case design and construction, operation, and decommissioning activities are considered.~~

~~1.3.1.4 This approach and use of the MDS allows flexibility in aspects such as infrastructure siting, foundation types, and construction methods, which will require further detailed consideration after the DCO submission. At the same time, the MDS offers enough certainty, in combination with design principles set out in this document, to support the ES assessments and provide clarity on the final design.~~

~~1.3.1.5 This document is to be read in conjunctions with the following ES chapters: Volume 1, Chapter 3: Project description (document reference F1.3) and Volume 1, Chapter 4: Site Selection and Alternatives (document reference F1.4).~~

1.4 Structure

1.4.1.1 This document is set out as follows:

- **Section 2.0 Site Context** presents an overview of the environmental context of the two substation sites and how an understanding of the local context has help shape the design proposals.
- **Section 3.0 Good Design Policy Context** sets out the relevant policies, criteria for good design and guidance when planning for ~~an~~a substation.
- **Section 4.0 Design Framework** establishes how the Applicants have fulfilled the criteria of 'good design' through a clearly defined design framework, setting out the vision, objectives and design principles.
- **Section 5.0 Design Approach, Evolution and Response** demonstrates how the design of the substations has approached, evolved and responded to the environment and consultation responses.
- **Section 6.0 Post Consent Design Process and Governance~~Securing Good Design Post Context~~** outlines how the Applicants will secure and govern the implementation of the detailed design on the Transmission Assets' substation, following a successful consenting process.

2 Site Context

2.1 Introduction

2.1.1 Overview

2.1.1.1 Decisions about the design proposals including the alignment of the cable routes and the sitting of the two substations have been guided by an understanding of the natural and cultural influences shaping the landscape where they will be constructed, operated, and decommissioned.

2.1.1.2 To reflect the local landscape character ~~Lancashire's unique landscape~~, a tailored design response and process has been developed, identifying potential impacts on existing environmental features and the visual environment and design principles and design codes to inform the design response. The Applicants have actively sought opportunities to avoid or mitigate potentially harmful environmental effects from the new infrastructure associated with the siting of each substation and the associated cable route connections. These efforts aim to protect the character and qualities of the landscape and minimise impacts on the natural environment~~. while enhancing them, wherever possible~~.

~~2.1.1.3~~ The section provides a brief overview of key environmental and policy considerations that have informed the Applicants' cable route alignment and the design of each substation, ~~It summarises~~summarising relevant environmental resources and assets that have been considered and how this understanding has shaped design proposals.~~.~~

2.1.1.3 ~~Mitigation measures proposed by each relevant topic are~~ The Design for the substations is documented in *Section 5.0 Design Approach, Evolution and Response*.

2.1.1.4 Figure 1 shows the location of the two substations in the context of the Order Limits of the Transmission Assets.

Figure 1: Location of the Morgan substation site and the Morecambe substation site in the context of the Order Limits

2.2 Construction Phase

2.2.1.1 *[This section will sign post to the CEMP and highlight rationale for siting of compounds. It will signpost to outline design control outlined in Section 6, including reference to controls secured through CEMP and an undertaking to consult the Councils in relation to the layout of the proposed compounds, addressing local micro layout matters, approach to appearance of compounds with reference to fencing/ hoarding etc and to monitoring to ensure the compounds maintain good appearance standards during the period of their operation and that decommissioning is agreed.]*

2.3 Overview of the cable route alignment

2.3.1.1 *[This section will refer to the cable route and substation site selection process reflecting good design process signposting to the OLMP (updated to address species mix matters etc for cable route areas) Green Belt TN and related documents submitted as part of the dDCO]*

~~2.2~~2.4 Overview of the substation sites

~~2.2.1~~2.4.1 Morgan substation site

~~2.2.1.1~~2.4.1.1 The Morgan substation site is situated between Kirkham and Freckleton, 560m to the south of the A583 Kirkham Bypass and east of Hall Cross, to the north of the Morecambe substation site. Lower Lane, Greenbank Farm and Freshfield Farm are located to the west. HM Prison Kirkham is located to the north west and Newton-with-Scales is to the site's east.

~~2.2.1.2~~2.4.1.2 The site is gently sloping, falling in an easterly direction from its highest point, at approximately 16 m AOD, towards Dow Brook, which is at approximately 6.5m AOD. The site is irregular in shape, delineated by field boundaries and Dow Brook, and the five medium size grass fields the site comprises ~~is~~ are currently used for cattle grazing.

~~2.2.1.3~~2.4.1.3 A public bridleway (BW0505016) runs to the west of the site from Hall Cross (Higher Hall) to connect to other public rights of way towards Freckleton. It passes to the west of the substation site Dow Brook lies to the east of the site.

~~2.2.2~~2.4.2 Morecambe substation site

~~2.2.2.1~~2.4.2.1 The Morecambe substation site is situated to the south of the Morgan substation site, east of Lower Lane and to the north of Freckleton. A public bridleway and Dow Brook run to the east of the site, which is relatively flat at between 9 to 12 m AOD.

Figure 2: Location of the Morgan substation and the Morecambe substation in their immediate contexts

~~2.2.3~~2.4.3 Geology, hydrogeology and ground conditions

~~2.2.3.1~~2.4.3.1 Volume 3, ES Chapter 1 considers the likely impacts and effects of the Transmission Assets on geology, hydrogeology and ground conditions during the construction, operation and maintenance and decommissioning phases. An overview of the existing environment outlined below.

~~2.2.3.2~~2.4.3.2 The Transmission Assets traverse a low-lying coastal region underlain by a thick sequence of superficial deposits. Near-surface sand and gravel layers are present around the substations. The substations are situated on drained marshland, characterised by numerous land drains and small watercourses, with limited evidence of springs or groundwater-fed wetlands.

~~2.2.3.3~~2.4.3.3 For significant groundwater discharge to occur, these land drains and watercourses would need to connect with important aquifers. However, in most cases, they are underlain by clay-rich deposits such as Glacial Till and Tidal Flats, which have low permeability and do not contribute meaningfully to surface water flows. This is evidenced by the prevalence of small, isolated ponds and the scarcity of shallow groundwater abstractions.

~~2.2.3.4~~2.4.3.4 As a result, groundwater-dependent features are not considered sensitive receptors across within and around either of the substations.

~~2.2.4~~2.4.4 Hydrology and flood risk

~~2.2.4.1~~2.4.4.1 Volume 3, ES Chapter 2 considers the likely impacts and effects of the Transmission Assets on hydrology and flood risk during the construction, operation and maintenance, and decommissioning phases. An overview of the existing environment outlined below.

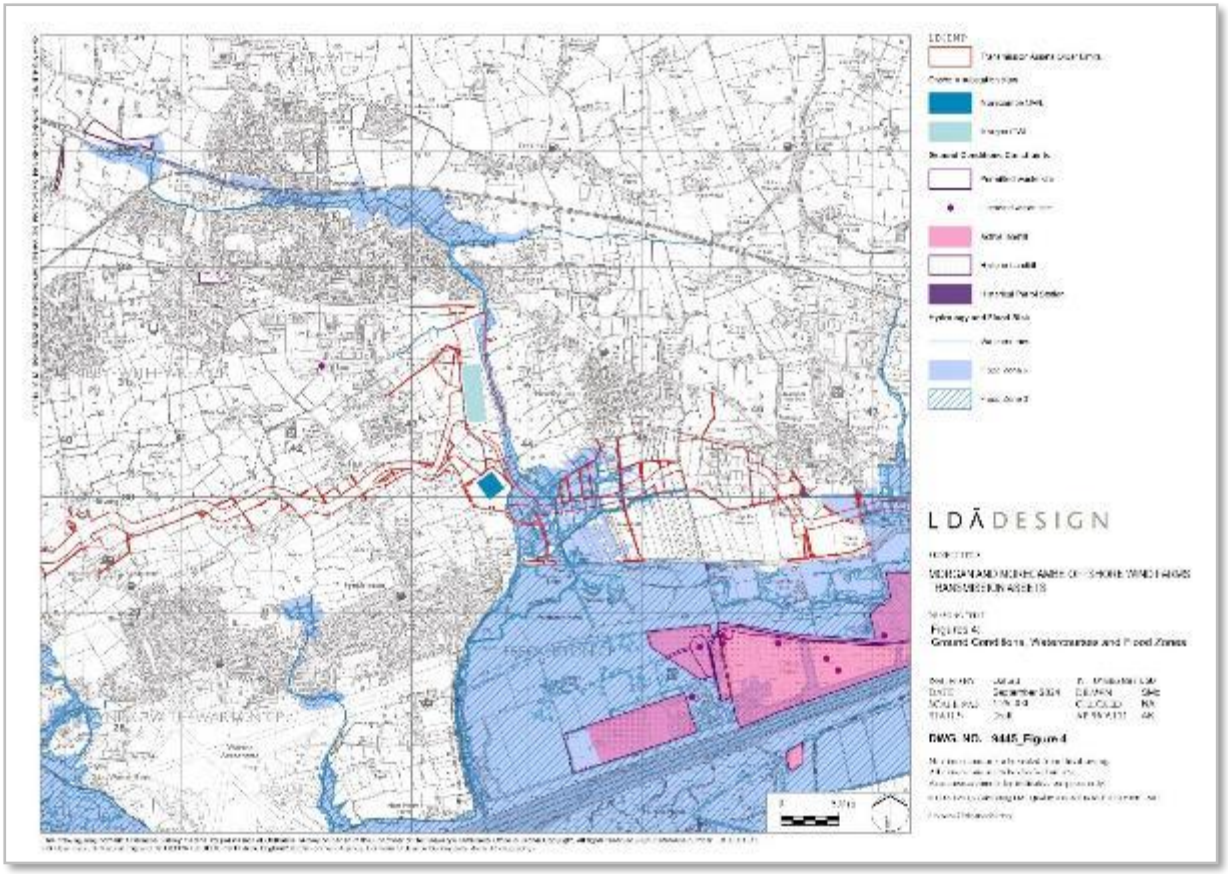
~~2.2.4.2~~ The Transmission Assets are situated within the North West River Basin District, which is divided into fifteen Management Catchments. The substations fall within the Ribble Management Catchment.

~~2.2.4.3~~ The permanent Morgan substation, along with its permanent access tracks and surface water attenuation, is located within Flood Zone 1. Similarly, the permanent Morecambe substation and its surface water attenuation are also situated within Flood Zone 1, while the associated permanent access tracks extend across Flood Zones 1, 2, and 3.

~~2.2.4.4~~2.4.4.2 In addition, construction compounds related to both substations, including temporary construction compounds and access tracks (haul roads), are spread across Flood Zones 1, 2, and 3.

2.4.4.3 This distribution across multiple flood zones reflects the planning and design considerations needed to manage flood risk in these areas while ensuring the operational integrity of the assets throughout their lifecycle.

Figure 3: Ground conditions constraints, hydrology and flood risk



Design implications (geology, hydrology and flood risk)

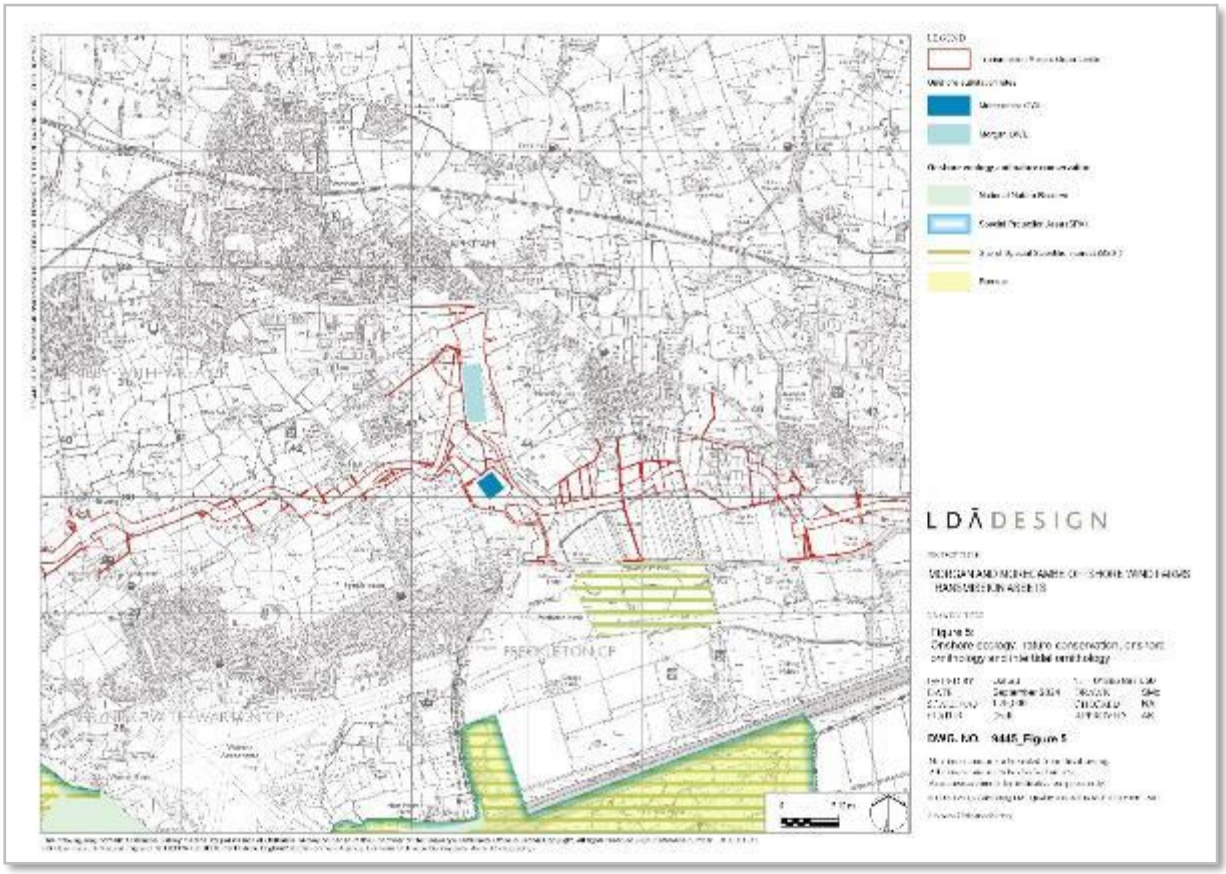
2.4.4.4 The Outline Operational Drainage Management Plan has been shaped by the Applicants' commitment to embedded measures to reinstate and maintain land drainage, manage surface water to runoff rates, and provide attenuation to control flows from the substations. These measures are designed to prevent localised flooding, ensure runoff is appropriately treated, and integrate drainage management into the overall site design. *[characteristics of field ponds be inserted]*

~~2.2.5~~2.4.5 Onshore ecology and nature conservation

~~2.2.5.1~~2.4.5.1 Volume 3, ES Chapter 3 considers the likely impacts and effects of the Transmission Assets on onshore ecology and nature conservation during the construction, operation and maintenance and decommissioning phases.

~~2.2.5.2~~2.4.5.2 The baseline surveys for the Transmission Assets identified a variety of habitats of varying quality, including important types such as ancient and deciduous woodlands, coastal and floodplain grazing marshes, coastal saltmarshes, sand dunes, semi-improved grasslands, lowland fens and meadows, mudflats, mature broadleaved trees, scrub, waterbodies, watercourses, and species-rich hedgerows forming field boundaries. Additionally, the Transmission Assets are situated near a range of international, national, and locally designated ecological sites, including two locally designated sites within the footprint of the Morgan onshore substation.

Figure 4: Onshore ecology and nature conservation



Design implications (ecology and nature conservation)

2.4.5.3 The Outline Ecological Management Plan has been devised through the Applicants' commitment to establishing an appropriate framework for ecological protection and enhancement across all phases of the Transmission Assets, covering habitats, protected and notable species, species-specific mitigation licences, and the role of the Ecological Clerk of Works (ECoW).

2.4.5.4 These ecological measures are embedded within the design approach, influencing the retention and enhancement of vegetation, the choice and arrangement of planting, and the siting of mitigation areas within the substation setting. Detailed Ecological Management Plans (EMPs) will be prepared post-consent in line with the oEMP and in consultation with statutory advisors and regulators. These will secure the long-term delivery of ecological mitigation and management, ensuring that ecological protection and enhancement continue to underpin the evolving design.

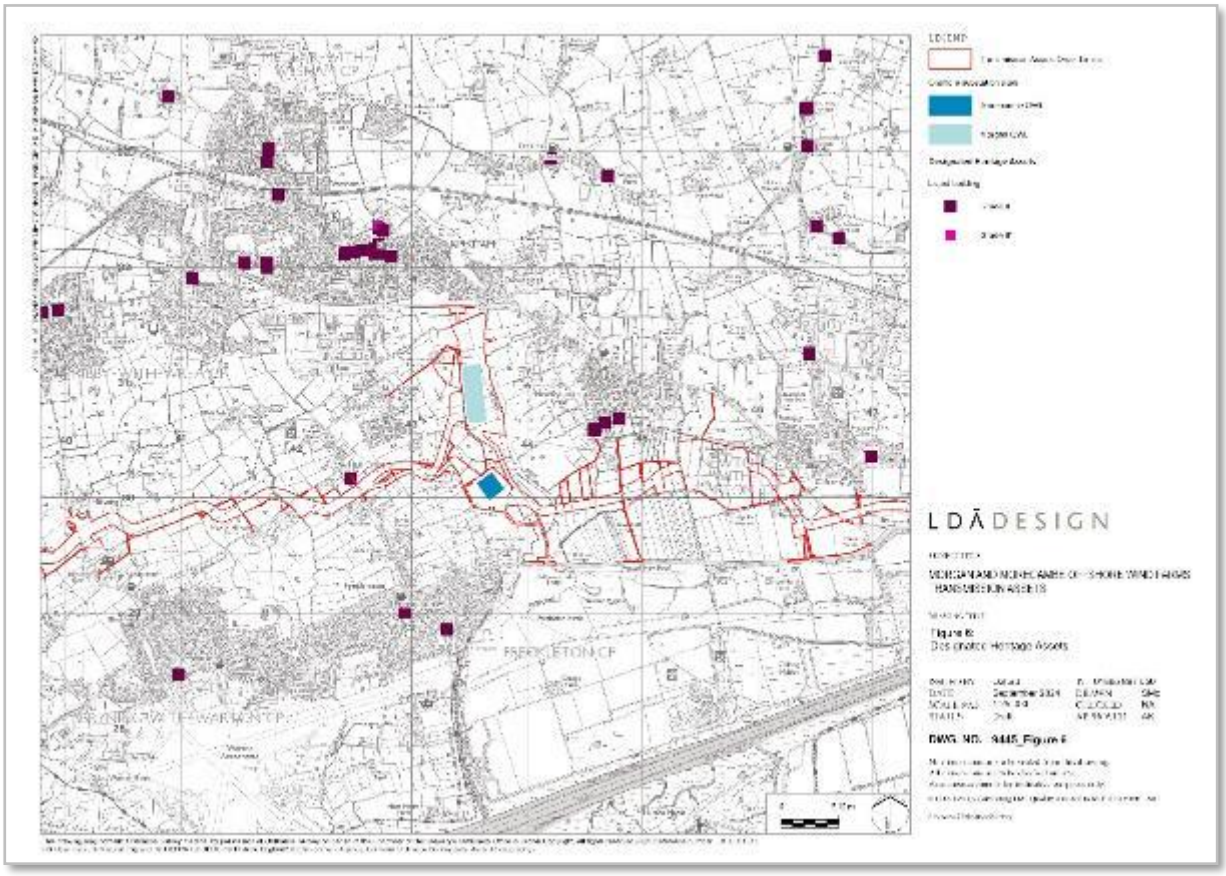
~~2.2.6~~2.4.6 Historic environment

~~2.2.6.1~~2.4.6.1 Volume 3, ES Chapter 5 considers the likely impacts and effects of the Transmission Assets on the historic environment during the construction, operation and maintenance, and decommissioning phases.

~~2.2.6.2~~2.4.6.2 The construction, operation, and maintenance of the Transmission Assets would not result in any direct physical impacts on nearby designated heritage assets. Any impact on assets would be indirect and non-physical, arising from a change within the setting of the asset.

2.4.6.3 Within the 5 km radius of the substations, there are no Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, or Conservation Areas that would be affected by the construction, operation, or decommissioning activities.

Figure 5: Historic environment



Design consideration (historic environment)

2.4.6.4 The siting of the substation sites has been positively shaped by a deliberate strategy of avoidance in relation to sensitive heritage assets. During the site selection process, statutory and non-statutory designations were mapped and excluded from potential sites. wherever practicable. This proactive approach has ensured that important assets such as Listed Buildings, Scheduled Monuments, Registered Parks and

Gardens, Conservation Areas, veteran trees and protected woodland have not been directly affected.

2.4.6.5 By prioritising avoidance, the design has both minimised potential adverse effects and reinforced the project's commitment to safeguarding cultural heritage wherever it can. This is demonstrated through the avoidance of features such as veteran trees near Penwortham substation.

~~2.2.7~~2.4.7 Landscape Character and Designations

~~2.2.7.1~~2.4.7.1 Volume 3, ES Chapter 6 considers the likely impacts and effects of the Transmission Assets on landscape and visual resources during the construction, operation and maintenance, and decommissioning phases.

~~2.2.7.2~~2.4.7.2 The Transmission Assets are located within a diverse landscape characterised by a mix of urban areas with historic industrial buildings that juxtapose with surrounding agricultural areas. The landscape includes marginal upland pastures, extensive grasslands, and wooded river corridors of the Ribble Valley, as well as the arable fields of the Fylde and the drained horticultural landscapes of the mosslands.

~~2.2.7.3~~2.4.7.3 Lancashire's landscape is distinguished by long views and inter-visibility between various landscape types, although the intimate and undulating countryside around the substation contrasts wider characteristics. Settlement patterns feature clusters of 18th and 19th-century red brick farm buildings and rural villages, heavily influenced by 20th-century development. Enclosed coastal marshes and intertidal flats, notably around the Ribble, Lune, and Wyre estuaries, which are valued for their beauty and prolific birdlife.

~~2.2.7.4~~2.4.7.4 National Character Areas provide a broad overview of the landscape character across the county. Local character assessments are published by the local planning authority and provide a more detailed description of landscape character.

2.4.7.5 No designated landscape areas of international, national or local importance are located within, or near to, the substations.

2.4.7.6 The onshore substations are located within the *Coastal Plain – The Fylde (15d) Landscape Character Area*. Key landscape features relevant to the substations include hedgerows, trees and field ponds, which are characteristic of the area and provide important habitat.

2.4.7.7 The substation sites are located within a predominantly flat, agricultural landscape of pasture and grassland fields enclosed by hedgerows and trees. Dow Brook, a tributary of the River Ribble, runs immediately east of the sites, with scattered field ponds and shelterbelts present across the wider setting. The landscape is already influenced by energy infrastructure, including transmission lines, pylons and communication masts, which are visually prominent in the open setting.

2.4.7.8 The **Morgan substation site** comprises five grass fields divided by hedgerows, with land gently sloping east towards Dow Brook. Several field ponds occur both within and around the site. Most hedgerows to be removed are of low quality (Category C), with limited sections of moderate quality (Category B). Tree removal includes several Category A oak, ash and alder, with further B and C category trees, hedgerow groups and clumps across the site.

2.4.7.9 The **Morecambe Onshore Substation** comprises a single grass field. Associated tree and hedgerow removal is limited, with most features of low quality (Category C). Losses include a small number of Category A

oak and ash trees, with further B and C category specimens along Lower Lane.

Figure 6: Landscape Character, amenity and recreation

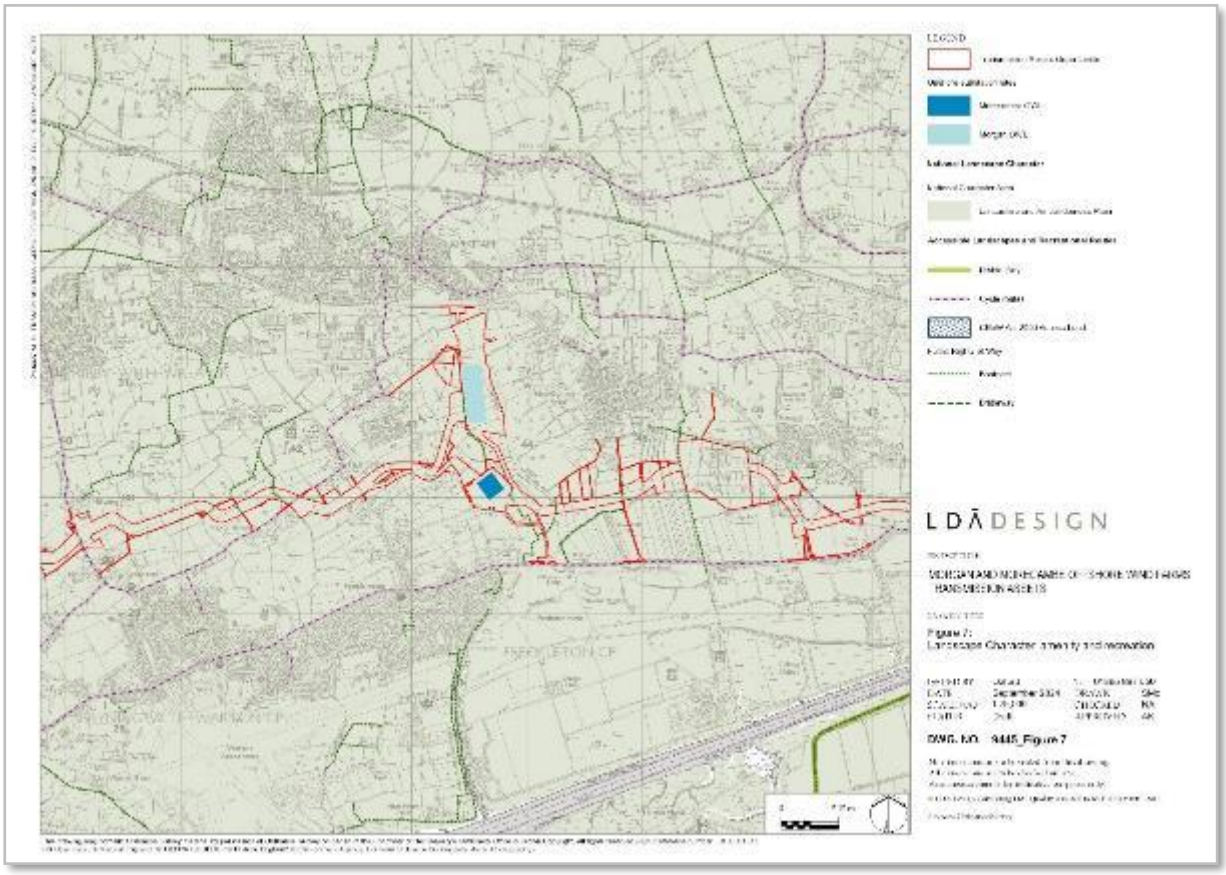
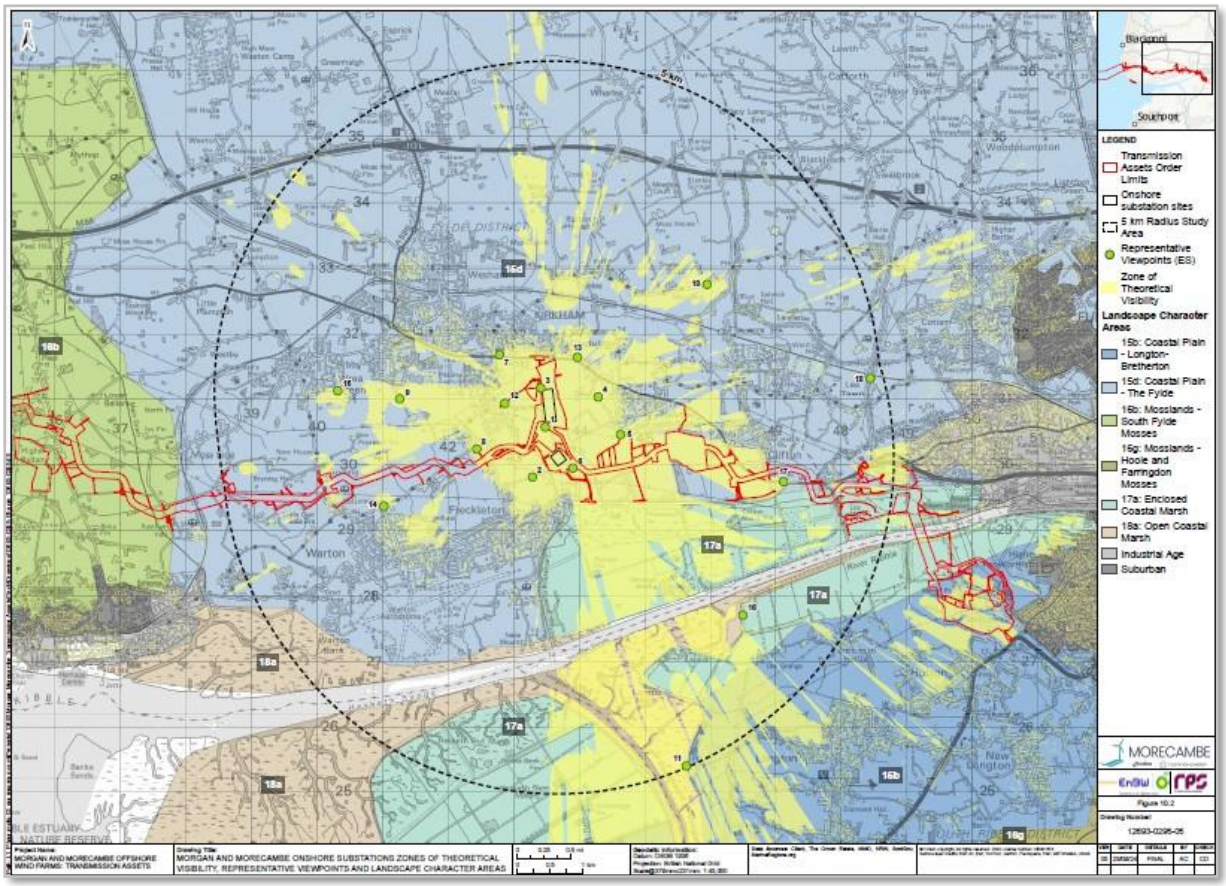


Figure 7: Landscape character and ZTV study



Design implications (landscape and visual)

2.4.7.10 The approach to the design of the onshore substations and their landscape strategies reflects the Applicants objectives to provide a setting that manages the effects of the onshore elements – particularly the substations – by responding to adjacent land uses and the wider landscape character. It is acknowledged that, by their nature, the substations represent a form of development that cannot be entirely mitigated within the receiving landscape, however, the Applicants consider that the proposals can be integrated to an appropriate level.

2.4.7.11 Although substations inevitably represent a scale of development that cannot be entirely concealed within the receiving landscape, the Applicants have focused on achieving an appropriate degree of integration. The landscape strategy has therefore been developed not simply as mitigation, but as a design tool, informed by the objectives of the outline Landscape Management Plan (oLMP) (document reference J2). These objectives cascade through the Project-Level Design Principles and Design Codes in Sections 5.0 and 6.0, ensuring that landscape considerations are embedded throughout the design process.

2.4.7.12 Reflecting existing landscape character has been central to this approach. The substations' design and associated mitigation have been shaped to ensure that scale, form and materiality are responsive to their context, while planting palettes and layouts are characteristic of the

local setting and consistent with recognised guidance. In this way, mitigation becomes part of the design language of the substations rather than an applied layer.

2.4.7.13 The Applicants have also drawn directly on the Landscape Strategy for Lancashire (Lancashire County Council, 2000), ensuring that local character and guidance inform the response.

2.4.7.14 For the Coastal Plain character area – within which the sites fall as part of the Fylde Coastal Plain Landscape Character Area 15d – the updated Design Principles and Codes embed the following design-led responses:

- **Conserving distinctive field patterns and landscape features**, through the retention and enhancement of hedgerows and hedgerow trees, and targeted tree planting to soften settlement edges and screen new infrastructure.
- **Conserving remnants of agricultural habitat mosaics**, including the protection of wet and semi-natural grasslands.
- **Enhancing the landscape setting of rural settlements**, by using existing field boundaries as a framework for new development.
- **Enhancing landscapes associated with infrastructure**, with carefully located tree planting to integrate new development without undermining the open character of the Coastal Plain or obscuring key views.

2.4.7.15 Through this design-led approach, the substations are not only mitigated but also shaped by their landscape context. The strategy ensures that integration with local character, enhancement of valued features, and sensitive treatment of scale and form are embedded within the proposals, establishing a robust framework that will continue to guide detailed design in the post-consent process

~~2.2.8~~2.4.8 Amenity and recreation

~~2.2.8.1~~2.4.8.1 Recreational resources within or near the Transmission Assets Order Limits include coastal areas, beaches, open greenspaces (e.g., playing fields, parks, golf courses), National Cycle Routes 62 and 622, Long Distance Footpaths (Ribble Way, Lancashire Coastal Way), public rights of way (PRoW), and other facilities such as waterways, Blackpool Airport, holiday parks, and stables.

Design implications (amenity and recreation)

2.4.8.2 An Outline Public Rights of Way (PRoW) Management Plan has been prepared as part of the Outline Code of Construction Practice (CoCP) (document reference J1). This provides the framework for managing access during construction, with detailed PRoW Management Plans to follow in accordance with the Outline PRoW Management Plan (document reference J1.5) and outline CoCP.

2.4.8.3 These detailed plans will set out specific measures to mitigate temporary disruption to the Lancashire Coastal Way, the Ribble Way, and all other affected PRoWs. Measures may include temporary diversions, clear signage and phased works to minimise inconvenience to users.

2.4.8.4 By embedding PRoW management within the design and construction process, the proposals safeguard accessibility and ensure the continued recreational and amenity value of these routes.

~~2.2.9~~2.4.9 Traffic

~~2.2.9.1~~2.4.9.1 Volume 3, ES Chapter 7 considers the likely impacts and effects of the Transmission Assets on traffic and transport during the construction, operation and maintenance, and decommissioning phases.

~~2.2.9.2~~2.4.9.2 A study area was established in consultation with local highway authorities, covering relevant sections of the strategic and local road networks likely to be used by construction vehicles. Baseline conditions were assessed using publicly available traffic flow data, new traffic surveys, road safety evaluations, and analyses of public transport, pedestrian, and cyclist facilities.

Design implications (traffic)

2.4.9.3 The design of construction access, crossings, and traffic management has been structured to integrate safely and responsibly with existing infrastructure while minimising environmental and community impacts. Trenchless techniques will be used to cross key roads, Environment Agency Main Rivers, and Network Rail lines, reducing disruption to transport routes and sensitive receptors. Core working hours are established to limit disturbance, with mobilisation periods and exceptional works managed under advance notification. Temporary access points and internal haul routes are designed to minimise impacts on the local road network, and vehicle movements for operation

and maintenance are generally restricted to daytime and evening periods. Detailed Construction Traffic Management Plans will manage HGV and worker movements, safe passage on local highways, and any localised improvements required. These measures are embedded within the outline CoCP, alongside wider safeguards for other environmental considerations, ensuring that the onshore works are delivered in a context-sensitive, safe, and design-led manner.

~~2.2.10~~2.4.10 Noise

~~2.2.10.1~~2.4.10.1 Volume 3, ES Chapter 8 considers the likely impacts and effects of the Transmission Assets of noise and vibration during the construction, operation and maintenance, and decommissioning phases on human receptors.

2.4.10.2 The long-term sound survey highlighted that much of the area affected by the Transmission Assets has a fairly low existing noise climate due to the rural nature of certain areas. The dominant source of noise was noted to be traffic on local highway networks.

Design implications (noise)

2.4.10.3 The design approach to noise and vibration control is based on programming construction within defined core working hours, supported by the selective use of quieter plant and equipment, the careful arrangement of site layouts to direct noise away from sensitive receptors, and the application of screening where appropriate, as prescribed in the outline Construction Noise and Vibration Management Plan. Traffic-related noise will be managed through designated routes, reduced speed limits and measures set out in the Construction Traffic Management Plan. Operational practices, such as shutting down idle plant, prohibiting unnecessary idling and amplified music, and ensuring considerate site behaviour, will further reduce noise emissions. These measures are reinforced by monitoring and engagement processes, including the provision of a site contact and targeted noise and vibration monitoring, ensuring that thresholds are not exceeded and that the works remain integrated with the project's wider design-led commitment to protecting amenity and respecting the surrounding environment.

~~2.2.11~~2.4.11 Air Quality

~~2.2.11.1~~2.4.11.1 Volume 3, ES Chapter 9 considers the likely impacts and effects of the Transmission Assets on air quality during the construction, operation and maintenance and decommissioning phases.

2.4.11.2 The nearest Air Quality Management Area (AQMA) is located approximately 3km east of the Transmission Assets Order Limits in Penwortham, designated due to elevated nitrogen dioxide levels

Design implications (air quality)

2.4.11.3 Provisions regarding air quality and dust control are integral to the design and implementation of the construction process. Air quality

provisions will focus on minimising dust generation, managing construction traffic, and applying best practice suppression techniques to maintain local air quality. The outline CoCP has been prepared and provides the framework for environmental and amenity safeguards during construction. The outline Dust Management Plan (oDMP) sets out the key dust control measures that will be implemented during the preparation works and construction activities of the Transmission Assets. Traffic-related dust generation will be managed through designated routes, reduced speed limits and measures set out in the Construction Traffic Management Plan. These measures are reinforced by monitoring and engagement processes, including the provision of a site contact and targeted monitoring, ensuring that thresholds are not exceeded and that the works remain integrated with the project's wider design-led commitment to protecting amenity and respecting the surrounding environment.

3 Good Design Policy Context

3.1 Introduction

3.1.1 Background

3.1.1.1 *[This section will define all items that policy directs to, where good design has a bearing and which PINS will report against in terms of 'compliance'. This document will now extend beyond the substations to include other key aspects of the entire project, such as cable route alignment, substation site location, construction phase controls, and operational substation design]*

~~3.1.1.1~~3.1.1.2 Government policy to secure good design for national infrastructure is embedded in National Planning Statement (NPS) and in the National Infrastructure Commission's (NIC) *Design Principles for National Infrastructure*.

~~3.1.1.2~~3.1.1.3 The key design policies from these documents are summarised in this section.

- NPS EN-1 sets out policies for considering and assessing good design in a DCO application; supported by EN-3 and EN-5.
- The *Design Principles for National Infrastructure* focus on setting a framework for design, the process of design and considering design in all stages of a project.

~~3.1.1.3~~3.1.1.4 Design policies in all these documents are complementary in promoting good design and are covered below.

3.2 National Policy Statements[1]

3.2.1.1 This section summarises relevant aspects of National Policy Statements ('NPS') concerned with the concept of 'good design' that are relevant to the design of the substation.

3.2.2 National Policy Statement for Energy (EN-1) (January 2024)

3.2.2.1 NPS EN-1 sets out the Government's policy for the delivery of major energy infrastructure. It seeks to help deliver the Government's climate change objectives by clearly setting out the need for new low carbon energy infrastructure to contribute to climate change mitigation.

3.2.2.2 NPS EN-1 sets out criteria for good design for energy infrastructure, stating in paragraphs 4.7.1 to 4.7.2:

3.2.2.3 *4.7.1 The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is*

[1] Each NPS was first published in November 2023, before coming into force on 17 January 2024, noting that the publication on each document state 'November 2023'.

sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important.

4.7.2 Applying good design to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, 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 energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.

3.2.2.4 NPS EN-1 continues by setting out guidance for an Applicants' Assessment, stating at paragraph 4.7.5:

3.2.2.5 *4.7.5 To ensure good design is embedded within the project development, a project board level design champion could be appointed, and a representative design panel used to maximise the value provided by the infrastructure. Design principles [footnote 122] should be established from the outset of the project to guide the development from conception to operation. Applicants should consider how their design principles can be applied post-consent.*

3.2.2.6 Footnote 122 adds:

3.2.2.7 *Design principles should take into account any national guidance on infrastructure design, this could include for example the design principles for National Infrastructure published by the National Infrastructure Commission, the National Design Guide and National Model Design Code, as well as any local design policies and standards.*

3.2.2.8 Paragraph 4.7.6. states that whilst applicants 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, land form and vegetation.

3.2.2.9 In acknowledgement of this position and given the importance the Planning Act 2008, paragraph 4.7.10 states that:

3.2.2.10 *4.7.10 ... places on good design and sustainability, the Secretary of State needs 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.*

3.2.2.11 Furthermore, paragraph 4.7.11 makes clear that:

3.2.2.12 *4.7.11 In doing so, the Secretary of State should be satisfied that the applicant has considered 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, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible.*

3.2.3 National Policy Statement for Renewable Energy Infrastructure (EN-3) (January 2024)

3.2.3.1 NPS EN-3 sets out how the Government expects offshore wind to play a significant role in decarbonising the energy system. It confirms that the Government has set a target for 50 GW of offshore wind capacity by 2030, with an expectation that there will be a need for substantially more installed offshore capacity beyond this to achieve net zero by 2050.

3.2.3.2 NPS EN-3 also sets expectations on 'good design', firstly outlining at paragraph 2.5.1 that *"Section 4.7 of EN-1 sets out the criteria for good design that should be applied to all energy infrastructure"*, before stating that:

3.2.3.3 *2.5.2 Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage.*

3.2.4 National Policy Statements for Electricity Networks (EN-5) (January 2024)

3.2.4.1 NPS EN-5 sets out important considerations for electricity networks infrastructure, including consenting, siting and design considerations. It sets out the general assessment principles for transmission infrastructure in circumstances where they may be separate from generating, referring back to NPS EN-1 where relevant.

3.2.4.2 NPS EN-5 outlines why co-ordination is expected by the Government to reduce overall environmental and community impacts associated with bringing offshore transmission onshore compared to an uncoordinated approach.

~~3.3 National Infrastructure Commission Design Group Guidance~~

3.3 Design Principles Design Principles for National Infrastructure

3.3.1 Overview

3.3.1.1 These principles, developed by the National Infrastructure Commission's Design Group in consultation with all infrastructure sectors, were created to guide the future projects which will upgrade and renew the UK's infrastructure system. They should be applied to all economic infrastructure: digital communications, energy, transport, flood management, water and waste. The design principles for National Infrastructure are as follows:

Climate: Mitigate greenhouse gas emissions and adapt to climate change.

3.3.1.2 *The design of our infrastructure must help set the trajectory for the UK to achieve net zero greenhouse gas emissions by 2050 or sooner. This means opportunities must be sought during design and construction to enable the decarbonisation of our society and mitigate and offset residual emissions. Our infrastructure has to support an environmentally sustainable society. It should enable the people and businesses using it to reduce their wider climate impacts too. The search for these opportunities should not be restricted to the area within the site boundary. And good design incorporates flexibility, allowing the project to adapt over time and build our resilience against climate change.*

People: Reflect what society wants and share benefits widely.

3.3.1.3 *Infrastructure should be designed for people, not for architects or engineers. It should be human scale, easy to navigate and instinctive to use, helping to improve the quality of life of everyone who comes into contact with it. This means reliable and inclusive services. It means accessible, enjoyable and safe spaces with clean air that improve health and wellbeing.*

3.3.1.4 *The range of views of communities affected by the infrastructure must be taken into account and reflected in the design. While it won't always be possible to please everyone, engagement should be diverse, open and sincere, addressing inevitable tensions in good faith and finding the right balance. And it should not just be designed for people today. Good design will plan for future changes in demographics and population.*

Places: Provide a sense of identity and improve our environment.

3.3.1.5 *Well-designed infrastructure supports the natural and built environment. It gives places a strong sense of identity, and through that forms part of our national cultural heritage. It makes a positive contribution to local landscapes within and beyond the project boundary. Projects should be inspiring in form and detail, respecting and enhancing local culture and character without being bound by the past.*

3.3.1.6 *Good design supports local ecology, which is essential to protect and enhance biodiversity. Projects should make active interventions to enrich our ecosystems. They should seek to deliver a net biodiversity gain, contributing to the restoration of wildlife on a large scale while protecting irreplaceable natural assets and habitats.*

Value: Achieve multiple benefits and solve problems well.

3.3.1.7 *A good design process adds value by defining clearly issues from the outset and providing overall direction for everyone working on a project. It explores every option for increasing value alongside the creative process. This approach means the brief is interrogated rigorously so that opportunities to secure economic, environmental and social*

benefits are identified, pursued and articulated for local and national audiences.

3.3.1.8 *Good design also finds opportunities to add value beyond the main purpose of the infrastructure. It looks beyond the site boundary to consider the wider benefits the project can bring. It seeks to solve multiple problems well with a single solution. It provides more for less with savings on cost, the environment, materials and space.*

3.4 National Infrastructure Commission's Project Level Design Principles (May 2024)

3.4.1 Overview

~~3.3.1.9~~3.4.1.1 This guidance explains why project level design principles should be made central to the delivery of major infrastructure projects and how principles can be most impactful in the very earliest stages, alongside the development of an overall design vision. It provides an overview of the suggested scope of any set of design principles; illustrating how principles should be used throughout the project lifecycle to support design governance and underpin delivery of the outcomes set out in the business case.

~~3.3.1.10~~3.4.1.2 This document defines those *Project Level Design Principles* in **Section 4.5**, outlining how they have been reached as part of a structured design process

3.5 Local Planning Policy

~~3.3.2~~3.5.1 Overview

~~3.3.2.1~~3.5.1.1 The onshore elements of the Transmission Assets are located within the local authority areas of Fylde Borough Council, Blackpool Council, South Ribble Borough Council, Preston City Council and Lancashire County Council.

~~3.3.2.2~~3.5.1.2 *Volume 1, Chapter 2: Policy and legislation context* (document reference F1.2) provides a summary of the policy and legislative context for the Transmission Assets'), with reference to the following:

- climate change and renewable energy legislation and policy;
- UK transmission infrastructure strategy and policy; and
- the consenting process, including details of the Planning Act 2008, as amended (referred to here as 'the Planning Act 2008') and associated planning policy.

~~3.3.2.3~~3.5.1.3 Policy and legislation specific to individual environmental topics and the EIA are set out within each topic chapter of the ES (see Volumes 2, 3 and 4) and an assessment is carried out against each relevant policy within the Planning Statement that accompanies the application for development consent (document reference J7). Adopted and emerging

local plan documents have been taken into account throughout the consenting process.

4 Design Framework

4.1 What is Good Design?

4.1.1.1 Good design matters. It has a direct impact on the quality of people's lives; being as much about processes and behaviours as it is about design outcomes.

4.1.1.2 In light of the overarching NPS, outlined in Section 3, the concept of 'good design' has been a fundamental consideration from the outset of the development of the substations' design.

4.2 Design Framework

4.2.1.1 Good design is reflected in both design process as well as design outcome, with the approaches for achieving good design best considered from the outset of a project.

4.2.1.2 A framework for good design was prepared as part of the Transmission Assets' design process, the purpose of which was to drive good design outcomes, while clearly setting out the expectations of the substations so that consultants, stakeholders and communities had clarity about the substations' designs and the extent of the Applicants' commitments.

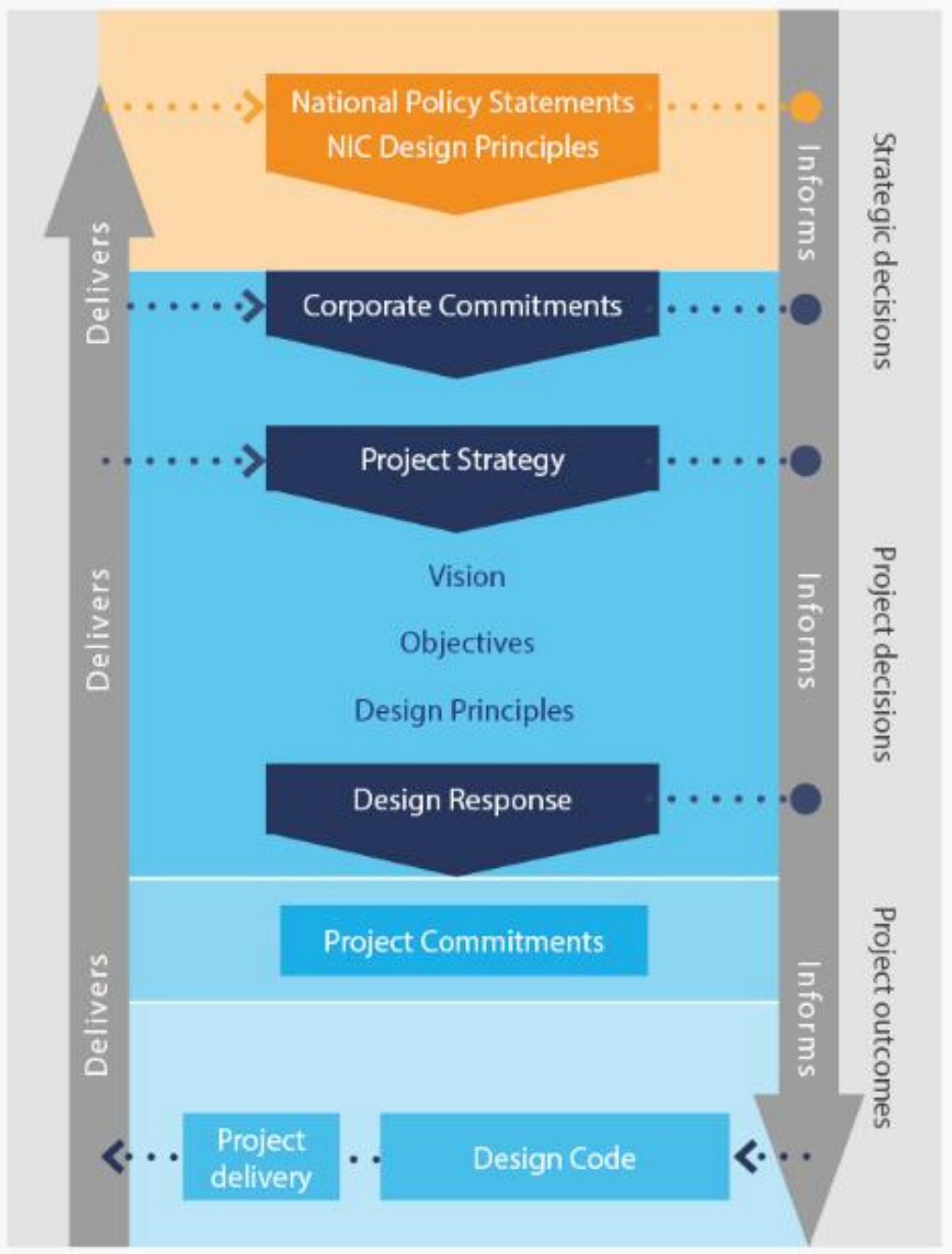
4.2.1.3 The framework's development provides a transparent line of sight between the Transmission Assets' visions, objectives, strategic design principles, project level design principles and the post-consent Design Codes; framing how the Applicants will fulfil the criteria of 'good design', as set out in NPS EN-1, EN-3 and EN-5. The use of design principles also aligns with the NIC's guidance. Section 6.0 of this document is structured to provide clear and enforceable post consent governance in support of the local authority in securing good design and the proper discharge of Requirement 4 of Schedules 2A and 2B of the draft DCO .

4.2.1.4 The framework for this design process, and the subsequent guidance that instils 'good design' into the Transmission Assets, is set out in **Figure 8: Design Framework**.

~~4.2.1.3~~4.2.1.5This framework is supported by a commitment to prepare a compliance report that will form a record of how the design has progressed during pre-discharge design development and how the Project Level Design Principles and Design Codes have been addressed and in support of the Requirement submission. ~~The framework's development provides a transparent line of sight between the Transmission Assets' visions, objectives, design principles and post-consent Design Code; framing how the Applicants will fulfil the criteria of 'good design', as set out in NPS EN-1, NPS EN-3 and NPS EN-5. The use of design principles also aligns with the NIC's guidance.~~

Figure 8: Design Framework [under review]

~~4.2.1.4~~4.2.1.6*[This diagram to be updated to reflect tuned process, including reference to Project Level Design Principles and signpost to the post consent* design process set out in Section 6]



4.3 Vision

4.3.1.1 A vision sets the overall tone of a project and informs the approach to design – an intentional process that is not merely seeking to deliver an operationally efficient project that minimises impacts, but which also reflects wider ambitions reflected in a Transmission Assets' objectives and design principles.

4.3.1.2 The vision~~s~~ for each Applicant ~~have~~has been developed; combining each Applicant's corporate mission and values with their aspirations for the Transmission Assets, whilst reflecting the urgent need for the UK to transition to low carbon energy generation. Good design was central to this.

Morgan OWL vision	*Morecambe OWL vision*
Climate change is one of the biggest challenges the world faces. It is affecting every country and we must all play a role in helping to combat it. *This project can play a role in the energy transition by delivering a significant volume of offshore wind in support of the UK Governments' targets by:* — *Generating low carbon electricity from offshore wind farms in support of the decarbonisation of the UK electricity supply* — *Optimising generation capacity within the constraints of available sites and grid infrastructure* — *Contributing to achieving the aims of the UK's Energy Security Strategy.*	***Renewable energy is central to supporting the UK's ambitions to lead the world in combatting climate change, reducing our reliance on fossil fuels and embracing a future where renewable energy power our homes and businesses.*** *Morecambe Offshore Windfarm has a nominal capacity of 480MW – enough to power over half a million households. It will also contribute to the UK Government's commitment to:* — *Generate 50GW of power from offshore wind by 2030* — *Reach net zero by 2050.*

4.4 Objectives

4.4.1.1 To deliver these~~is~~ visions and inform the Transmission Assets'~~;~~ development, the Applicants identified the following objectives:

- **Decarbonisation:** Generate low carbon electricity from an offshore windfarm, in support of the Net-Zero by 2050 target and UK Government ambition to deliver 50GW of offshore wind by 2030
- **Security of supply:** Provide significant electricity generation capacity within the UK to support commitments for offshore wind generation and security of supply.
- **Affordability:** Maximise generation capacity at low cost to the consumer from viable, developable seabed within the constraints of available sites and grid infrastructure
- **Coordination:** Coordinate and coexist with other activities, developers and operators to deliver the project and its skills, employment and investment benefits in the Local Economic Area.

- **Design Champions:** During the examination process the Applicants have committed to the appointment of Design Champions to ensure the delivery of good design post consent and in accordance with best practice.

~~4.4.1.2~~ To achieve the objectives, the Transmission Assets adopted the four thematic NIC design principles as a framework to guide and frame the Transmission Assets ongoing design process and support the achievement of good design outcomes.

~~4.4.1.3~~4.4.1.2 The design principles, at a project-level, were subsequently structured to align with NIC guidance under the four thematic headings: *Climate, People, Places and Value.*

4.5 Strategic d~~D~~esign principles

4.5.1.1 The following Strategic Design Principles ~~*design principles* have been~~ were adopted during the design process in accordance with the overarching objectives for the substation sites of the Transmission Assets; framed within the four thematic headings – *Climate, People, Places and Value* – of NIC guidance.

4.5.1.2 The development of the strategic design principles guided the design process up to the DCO submission, directing outcomes that ensure the substation sites:

- Integrate sensitively with the surrounding local context;
- Mitigate, as far as reasonably practicable, any adverse environmental effects;
- Respect the interests and amenity of local communities; and
- Deliver enhancements where feasible, while supporting the provision of low-carbon energy infrastructure.

Table 4-1: Strategic Design Principles~~Design Principles~~

Climate
Maximum generation capacity
Ensure that the Transmission Assets works within its constraints to maximise the Generation Assets' capacity and positively contribute to the UK energy transition and net-zero target by 2050.
Prioritise sustainability
Priority will be given to sustainable resource management and techniques and minimise carbon emissions throughout the project lifecycle.
Resilient design
Design for resilience and adaptation to future climate change
Climate Background
The Applicants have looked within the Order Limits when seeking opportunities to mitigate climate change; design the infrastructure with the flexibility and resilience to adapt to changes in its environment and take advantage of new technology.
People

Coordinated approach

Recognise the advancing nature of technology, coordinate the application of the two electrically separate projects, with the aim of serving multiple needs to maximise efficiency.

Be a considerate neighbour

Behave as a considerate neighbour through both construction and operation. Engage openly, transparently and meaningfully with stakeholders taking their feedback into account and making use of local knowledge to improve the project.

People Background

The Applicants have sought opportunities to minimise disruption to the quality of life for people who live and work nearby and taken steps to mitigate potentially adverse effects and disruption. The Applicants have also sought the views of local communities throughout the project to ensure the design complements the local character and culture and provides meaningful benefits to local communities.

Places

Landscape restoration

Retain and protect all existing trees, hedgerows and other vegetation wherever possible. Where landscape features have been removed, they will be restored wherever possible.

Ecological enhancement

Design proposals will seek to deliver a biodiversity benefit in relation to the above ground permanent infrastructure, using the current Defra Metric.

Place Background

The Applicants have looked for opportunities to use infrastructure to benefit the natural and built environment, to see how interventions can deliver improvements to see how interventions can deliver improvements to sustain local ecosystems and support local plans for growth and investment.

Value

Respect the landscape and avoid sensitive features

The location of the final substation sites has been selected to avoid sensitive features including settlements, landscape and habitat features (including designated nature conservation sites), and designated landscapes, as far as possible. Where this is not possible, the Applicants will ensure the mitigation of impacts are possible.

Value Background

The Applicants have sought to take a 'people and landscape led' approach putting these at the centre of design and decision making and utilised a collaborative team problem-solving approach to resolve concerns and design issues.

~~4.5.1.3 The *indicative* design proposals for the two substations' designs are outlined in **Section 5. 0.** They describe how the design has evolved to date, and will continue to evolve, in response to the site context and the objectives and the design principles of the Transmission Assets.~~

~~4.5.1.4 The development of the design principles for the substation sites has informed and guided the design process outcomes towards design outcomes that ensure that the substation sites would fit sensitively into the local context; mitigate (as far as possible) adverse environmental effects; respects local communities; and provides enhancements where possible, whilst delivering low carbon energy.~~

~~4.5.1.5 The design principles in this document are intended to complement the core design documents listed below. These documents outline the design of the Proposed Development that would be secured by the DCO:~~

- ~~Spatial extent set by the Work Plans;~~
- ~~Parameters fixed by ES Volume 1, Chapter 3: Project description (document reference F1.3).~~
- ~~Outline Landscape Management Plan (oLMP) (document reference J2).~~
- ~~Outline Ecological Management Plan (oEMP) (document reference J6)~~

4.6 Project Level Design Principles

4.6.1.1 During the Examination phase, the **Strategic Design Principles** (and *Design Codes*) for each onshore substation site were reviewed and discussed with the relevant local planning authorities.

4.6.1.2 This engagement has progressed the refinement of these Design Principles and Design Codes, addressing local character, landscape sensitivities, and other site-specific considerations.

4.6.1.3 The indicative design proposals for the two substations' designs are outlined in **Section 5.0.** These proposals demonstrate how the design has evolved to date and provide a clear picture the level of design, before the ExA, to inform the consent, and as the foundation of the post consent design development.

4.6.1.4 **Project Level Design Principles** (detailed in **Section 5.7)** have been prepared that will guide the post-consent detailed design development – in support of the Requirement(s) discharge along with the **Project Level Design Codes** (see **Section 6.0) –** to respond to the technical and environmental considerations during the post-consent process.

4.6.1.5 The extent of flexibility of any element of the substation that can be explored as part of the detailed design process will be discussed with the discharging Council and will be subject to the appointment of the Applicant's delivery partner(s) who will design and deliver the final substations. As noted above, the Applicants are committed to the preparation of a Compliance Report in support of each Requirement

discharge submission, which would be overseen by the Applicants' Design Champions.

5 Design Approach, Evolution and Response

5.1 Design Approach: Substations

5.1.1 Overview

5.1.1.1 The design proposals for the substation sites have been developed through a series of clearly defined stages which were closely aligned to the pre-application consultation process. These are defined as follows:

- Collation of environmental data to identify key constraints;
- Initial Site Selection;
- Consultation;
- Refinement and development of site selection; and
- Development of the Commitments Register.

5.1.1.2 Pre-application consultation is a legal requirement for DCO applications and an important part of the design process. The Applicants have consulted the local community, statutory bodies and other relevant stakeholders on their development proposals in accordance with the requirements of the Planning Act 2008.

5.1.1.3 The comments received at each stage of the consultation were recorded, analysed and used to inform the evolution of the proposals. Full details can be found in the submitted Consultation Report (document reference E1).

5.1.2 Consultation

5.1.2.1 The Applicants have undertaken an extensive programme of community and stakeholder consultation to inform the EIA process and the design of the Project.

5.1.2.2 The Applicants committed to early engagement with communities; delivering two stages of non-statutory consultation ahead of the statutory consultation.

5.1.2.3 The first non-statutory consultation took place between November and December 2022 and provided local people and stakeholders with the opportunity to give their feedback on the proposed development.

5.1.2.4 The second non-statutory consultation took place between April and June 2023 and provided local people and stakeholders with another opportunity to give their feedback on the latest proposals. During this period, the Applicants presented the following information:

- The four indicative onshore substation search areas – within which two new onshore substations will need to be constructed;
- An indicative onshore export cable corridor/grid connection area
- The National Grid connection point at Penwortham substation

- The indicative landfall and indicative onshore export cable corridor, and related temporary compound areas.

5.1.2.5 The statutory consultation process took place between October and November 2023. The Applicant asked for feedback on the detailed information about, and the assessment undertaken for, the Transmission Assets and submitted for the PEIR.

5.1.2.6 Simultaneously, in October 2022 the Applicants published a Scoping Report, which set out what they understood, at the time, to be the Transmission Assets' likely effects on the environment and how they would assess them. The Secretary of State's Scoping Opinion, which was subsequently provided in December 2022.

5.1.2.7 Following scoping, engagement continued in order to facilitate proportionate EIA and the iterative design process. A key part of this engagement includes the Evidence Plan process.

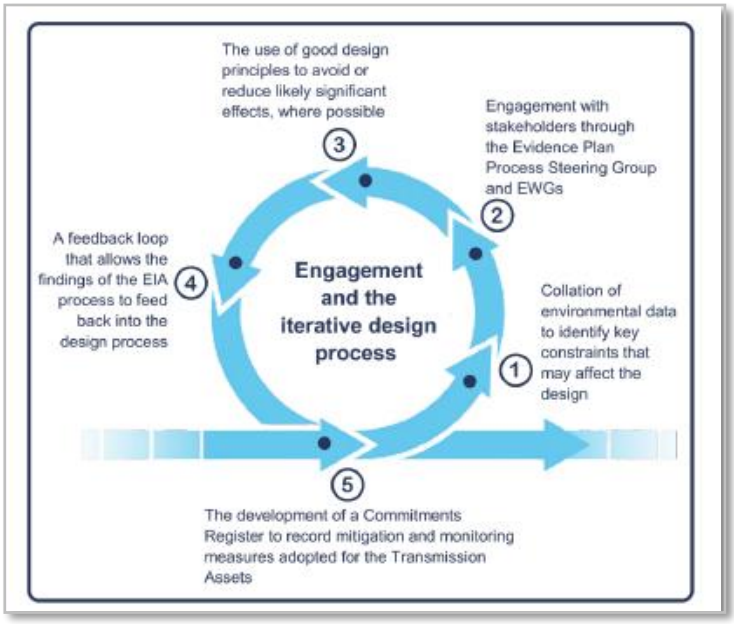
5.1.2.8 In developing the Evidence Plan for the Transmission Assets, stakeholder engagement and input is of fundamental importance. An Evidence Plan Process ('EPP') Steering Group was set up to include the following:

- the Applicants and their EIA consultants;
- the Planning Inspectorate;
- Natural England;
- the Marine Management Organisation (MMO);
- the Centre for Environment, Fisheries and Aquaculture (Cefas);
- Historic England;
- Blackpool Council;
- Fylde Council;
- Preston City Council;
- South Ribble Borough Council; and
- Lancashire County Council.

5.1.2.9 The EPP Steering Group has met at key milestones throughout the Project consenting process. In addition, Expert Working Groups (EWGs) have been set up to discuss topic specific areas with the relevant stakeholders.

5.1.2.10 During the EIA process, environmental issues have been considered as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design. This design process is shown in Figure 9, making allowance for the use of good design principles alongside the identification of key constraints to inform the design process.

Figure 9: Engagement and the iterative design process



5.1.2.11 The Consultation Report (document reference E1) provides full details of the consultation process and includes a description of key design decisions that have been made by the Applicants as a result of feedback received to date. Details of how the Applicants have taken account of the comments received are also provided in each assessment topic chapter of the ES, where relevant.

5.1.2.12 A summary of the most salient design decisions that have been made by the Applicants, as a result of the consultation process, are outlined below.

Morgan substation

- Refinement of the siting and orientation of the Morgan substation, to take into account consultation responses received from landowners. This has resulted in the following changes to the project design and Order Limit from PEIR to DCO:
  - The total permanent area for the onshore substation has increased from 125 000 m2 to approximately 164 000 m2. An area has also been included in the total permanent area for the substation, to the east (adjacent to Dow Brook), to provide space for landscaping, environmental mitigation and biodiversity benefit. The additional area included since the PEIR was published are predominantly for the provision of landscaping and mitigation, including areas for drainage and attenuation.
- Inclusion of area to underground a low voltage (LV) line – within the temporary compound area, to provide more efficient use of this space, which will be used to facilitate construction of the permanent infrastructure.

- The temporary and permanent access of the substation is being taken from Kirkham Bypass (A583), in part, to separate the construction and operational traffic for each of the substations.
- The temporary access track width increased from 15 m to 20 m.
- Commitment made by Morgan OWL to proceed with gas insulated switchgear (GIS) technology only. Air insulated switchgear (AIS) will no longer be used.
- Onshore substation maximum height of main buildings was reduced from 20m to 15m.

Morecambe substation

- Selection of Option 2 (South) was selected by Morecambe OWL as being the preferred location; following analysis of consultation feedback; consideration of key environmental and engineering constraints; and the emerging Morgan substation. This has resulted in the following changes to the project design and Order Limit from PEIR to DCO:
  - The total permanent footprint has reduced from 60,000m2 to 59,500m2.
  - Refinement of the siting, orientation and optimisation of the temporary compounds' location to align to the selected temporary access
- Temporary and permanent access were selected and is being taken from Lower Lane to the west of the selected substation. The temporary access for construction will be from the A584, which is to the south of the preferred substation location. Permanent rights will be retained over this access to facilitate HGV and AIL deliveries. The location of the temporary compounds presented at PEIR for Option 2 (south) were reorientated and optimised to align to the temporary access from the A584.
- The temporary access track width increased from 15m to 20m.
- Onshore substation maximum height of main buildings was reduced from 20m to 13m.
- Commitment made by Morecambe OWL to retain the option for both GIS and AIS substation technologies in the application.

5.2 Design Evolution

~~5.1.4~~5.2.1 Site selection rationale: Substations

~~5.1.4.1~~5.2.1.1 The project process ~~Transmission Assets~~ is underpinned by the project ~~its~~ **Oo~~o~~bjectives** (see section 4.4), which have formed the foundation for the ~~driven the iterative~~ site selection process and design process. ~~from the outset to its final submission, as set out in the preceding sections.~~

~~5.1.4.2 A fundamental part of this process has been the Applicant's site selection process, which aimed to identify sites for the substations that will respect and enhance features in the landscape, address the biodiversity crisis and deliver the lowest energy costs to consumers in the long term; all while being environmentally acceptable, deliverable and consentable.~~

5.2.1.2 Prior to commencing site selection, principles for the permanent substation areas were established to provide a framework for making decisions at each stage of the process.

~~5.1.4.3~~5.2.1.3 ~~A two-tier approach was applied, considering both "mandatory" and "preferred" areas. The list of Onshore Substations Design Principles for Site Selection is set out in Annex 4.3 Site Selection and Refinement of Onshore Infrastructure, in full.~~ The Applicant undertook a structured ~~systematic~~ process to determine suitable sites for the onshore substation sites. ~~, which was framed at a macro level by principles of good design.~~ This included consideration of a range of technical, environmental and economic factors based on the site selection process set out below. This process is illustrated in Figure 10: Site Selection Process.

5.2.1.4 Firstly, **Site Selection Principles**, informed by technical expertise, included minimising environmental and social impacts, optimising route length and alignment (to reduce costs and energy losses), and ensuring sufficient space for infrastructure.

5.2.1.5 In parallel, **Guiding Principles for Onshore Infrastructure** were developed and applied, prioritising direct cable routing, co-location of substations, avoidance of designated sites, woodlands, residential properties, and complex or constrained ground conditions.

5.2.1.6 Engineering feasibility, environmental sensitivity, and stakeholder and public consultation responses were all integrated through internal workshops to collate and review the data / feedback to reach cross-discipline decisions about refining the site and design options at each stage.

5.2.1.7 The **Horlock Rules** were also applied to substation siting alongside the site selection principles, consistent with best practice in National Grid planning and endorsed in NPS EN-5. These provide established guidelines for mitigating the impacts of substation development.

5.2.1.8 The site selection process followed involved an iterative four-stage process:

- **Stage 1** – Identification of Point of Interconnection

- **Stage 2** – Identification of areas of search
- **Stage 3** – Refinement of the siting and design of the Transmission Assets for PEIR
- **Stage 4** – Refinement of the siting and design of the Transmission Assets for DCO application

5.2.1.9 Each stage incorporated consultation feedback and technical assessments. Alternatives were assessed at both strategic and site-specific levels, leading to the refinement of the landfall, onshore cable corridors, and substation locations.

5.2.1.10 The site selection process forms an important element of the ~~design having regard to~~ design process. Based on the guidance documents published by both the NIC and PINs (listed in Section 3.0), design is recognised as being as much about 'process' as 'outcome', and that each stage of a project – including demonstrating a clear site selection process – forms a key part of demonstrating good design has been delivered.

~~5.1.4.4 The Applicants followed an iterative process in initial site selection, identifying areas for the substations within their environmental, physical, technical, commercial, and social contexts. The Applicants sought and explored opportunities where they are available, as well as ensuring that the engineering requirements can be achieved.~~

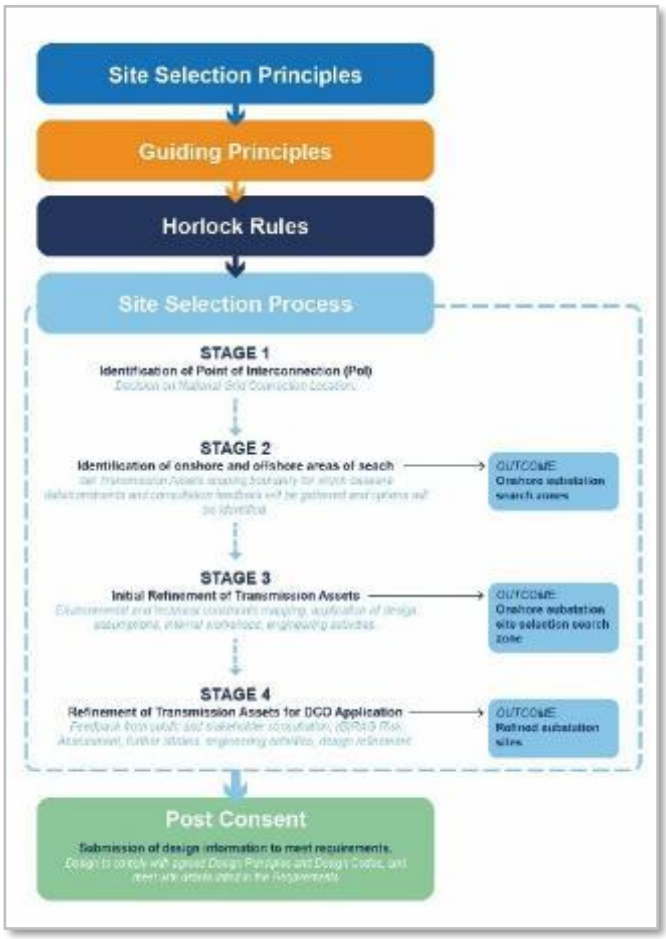
~~5.1.4.5 A Black/Red/Amber/Green (BRAG) methodology has been used to inform the different aspects of site selection. This was considered appropriate to compare different locations for the siting of the onshore Transmission Assets, given the ability to capture and classify the main differentiating issues in four fundamental categories, based on a qualitative assessment either using defined parameters, professional judgement, or assessing the issue relative to the other potential options. A BRAG assessment of this type enabled the Applicants to clearly and directly compare between areas.~~

~~5.1.4.6 At each stage of the process, information was collated, reviewed and appraised to reach a balanced cross-discipline decision, and had consideration of National Grid's ***Guidelines on Substation Siting and Design*** ('The Horlock Rules').~~

~~5.1.4.7 Volume 1, Chapter 4: Site Selection and Alternatives (document reference F1.4) sets out, in detail, the Applicants' comparison of the environmental effects between that different site options that were considered.~~

5.2.1.11 The final substation site was identified for the reasons set out below.

Figure 10: Site Selection Process



Morgan substation

~~5.1.4.8~~5.2.1.12The formal consultation period for PEIR provided the opportunity for statutory stakeholders, landowners, nearby residents and members of the public to comment on the site selected for the Morgan substation.

~~5.1.4.9~~5.2.1.13The key refinement made to address the comments received was to relocate the substation site further to the east. This move was requested by the landowner of the substation site to lessen the impact on agricultural activities. On further consideration, the new location also addressed concerns from nearby residents who felt the substation was too close to the residential areas of Kirkham South and Hall Cross. The increased distance allows more opportunity to utilise existing screening to reduce views of the substation from these areas.

~~5.1.4.10~~5.2.1.14Further refinement saw the construction compound being located to the north of the substation site. This meant that both construction and operational access could be taken directly from the A583 via a new junction, eliminating the requirement for any construction traffic to traverse Lower Lane. It also meant that the Public Right of Way (PRoW) was no longer located between the construction compound and the substation platform, thus greatly reducing the direct impact to the PRoW during construction.

Morecambe substation

~~5.1.4.11~~5.2.1.15Following the consultation at PEIR on two potential Morecambe substation locations, an assessment was undertaken to identify the preferred location for the substation within Zone 1. This considered consultation feedback from statutory stakeholders, landowners, nearby residents and members of the public, potential environmental constraints and engineering considerations.

~~5.1.4.12~~5.2.1.16The feedback indicated that a greater number of consultees stated a preference for the Option 2 (South), although this was not a significant number. The two potential Morecambe substation options were subjected to a BRAG assessment (detailed in Volume 1, Annex 4.3) including consideration of the location of the refinements of the Morgan substation to determine the preferred site. From this assessment, Option 2 (South) was identified as the preferred option for the Morecambe substation.

~~5.1.4.13~~5.2.1.17Once Option 2 (South) had been identified as the most suitable area for the substation location, potential construction and operational access routes were identified, which were subsequently appraised based on consideration of landowner feedback, environmental and engineering constraints.

~~5.1.4.14~~5.2.1.18The construction Access Track 2 was identified as the most appropriate route for the substation on balance given the land use and engineering constraints noted in Volume 1, Annex 4.3. The main operational access for light goods vehicles was identified off Lower Lane.

~~5.2~~5.3 Design Response: Substations

5.3.1 Overview

5.3.1.1 The following sections outline the key design parameters for each substation, as specified in the MDS (Volume 1, Chapter 3: Project Description, document reference F1.3).

5.3.1.2 The response to each substation's site context and necessary mitigation measures are highlighted (where appropriate), ensuring alignment with the overarching objectives and design principles that will guide the final substation design post-consent.

5.3.2 Good Design Responses to Onshore Substations

~~5.2.1.1~~ At Deadline 3, the document *S_D3_7 Environmental Statement: Technical Note: Landscape and Design Matters - Rev F01* (REP3-064) was submitted, presenting a series of ~~precedent~~ images to illustrate examples of the character of GIS and AIS technology. Relevant examples are appended to this document in **Appendix A**.

~~5.2.1.2~~5.3.2.1

~~5.2.2~~5.3.3 Function

~~5.2.2.1~~5.3.3.1 Each substation will contain the electrical components for transforming the power supplied from the offshore wind farms to ~~an~~a 400 kV outgoing circuit to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.

~~5.2.2.2~~5.3.3.2 The import and export cables to the substations will be contained in underground ducts. The main purpose of the substations is to step-up the electrical voltage (via transformers) to 400kV, suitable for connecting to the National Grid substation at Penwortham. Both substations will also include equipment to facilitate protection, control and switching.

~~5.2.2.3~~5.3.3.3 During normal operation, both substations would be unmanned, but remotely monitored continuously. Operation and maintenance staff are expected to visit the onshore substations approximately every 6 months to undertake preventative and corrective works. Vehicle movements associated with planned operation and maintenance of the onshore substations are expected to operate only during the daytime and evening periods (i.e., 07:00 – 23:00).

~~5.2.2.4~~5.3.3.4 The substations would not typically be requiring lighting during normal operation. However, operational lighting requirements may include:

- security lighting around perimeter fence of the platform, to allow CCTV coverage;
- car park lighting – standard car park lighting, which may be motion sensitive; and
- repair/maintenance – task related flood lighting may be necessary.

~~5.2.2.5~~5.3.3.5 Operational lighting will be low level and directional to ensure that the levels of light spill onto bat roosting, foraging and commuting habitats are not significant.

~~5.2.2.6~~5.3.3.6 The operational lifetime of the substations is expected to be 35 years. At the end of its operational phase, each substation will be decommissioned, removed and the site will be reinstated.

~~5.2.3~~5.3.4 Equipment and Buildings

~~5.2.3.1~~5.3.4.1 Each substation will house the auxiliary equipment and facilities for operating, maintaining and controlling the substations. Both substation sites are likely to contain the following electrical equipment and buildings (but is not limited to):

- power transformers
- switchgear
- reactive compensation equipment
- harmonic filters
- cables

- lightning protection masts
- control buildings
- communication masts
- backup generators
- access
- fencing and
- other associated equipment, structures or buildings.

~~5.2.3.2~~5.3.4.2 For Morecambe OWL, two substation design options are included in the design envelope to maintain ~~flexibility :~~flexibility:

- Air Insulated Switchgear (AIS) design, with all equipment housed in an 'open yard' style; or
- Gas Insulated Switchgear (GIS) design with some equipment housed in single or multiple buildings, and other equipment located exteriorly.

~~5.2.3.3~~5.3.4.3 It is also possible to have a combination of the above. There may also be some smaller buildings required to house components such as smaller equipment and control rooms.

~~5.2.3.4~~5.3.4.4 The Morgan OWL will employ a GIS design.

~~5.2.3.5~~5.3.4.5 The tallest features either of the substation sites will be the lightning protection masts at a height of 30m above ground level. These are included as part of the MDS and are subject to detailed lightning protection study. The maximum height of other buildings associated with each substation with be 15m for the Morgan substation; and 13m for the Morecambe substation.

5.3.4.6 If required, acoustic enclosures would be installed around the transformers to mitigate potential noise impacts to residential properties.

5.3.4.7 During the Examination, indicative 3D illustrations of each onshore substation site's layout were prepared and submitted for Deadline 3. These illustrations annotate the typical structures, equipment and buildings that would be required at each site, aligning with the EIA project description and the authorised development identified within the draft DCO. These layouts also mirror the designs used to prepare the submitted visualisations.

5.3.4.8 Figure 11 and Figure 12 illustrates, indicatively, how these typical structures, equipment and buildings might be laid out within the MDS footprint of each substation site.

Figure 11: Indicative substation layout, Morgan

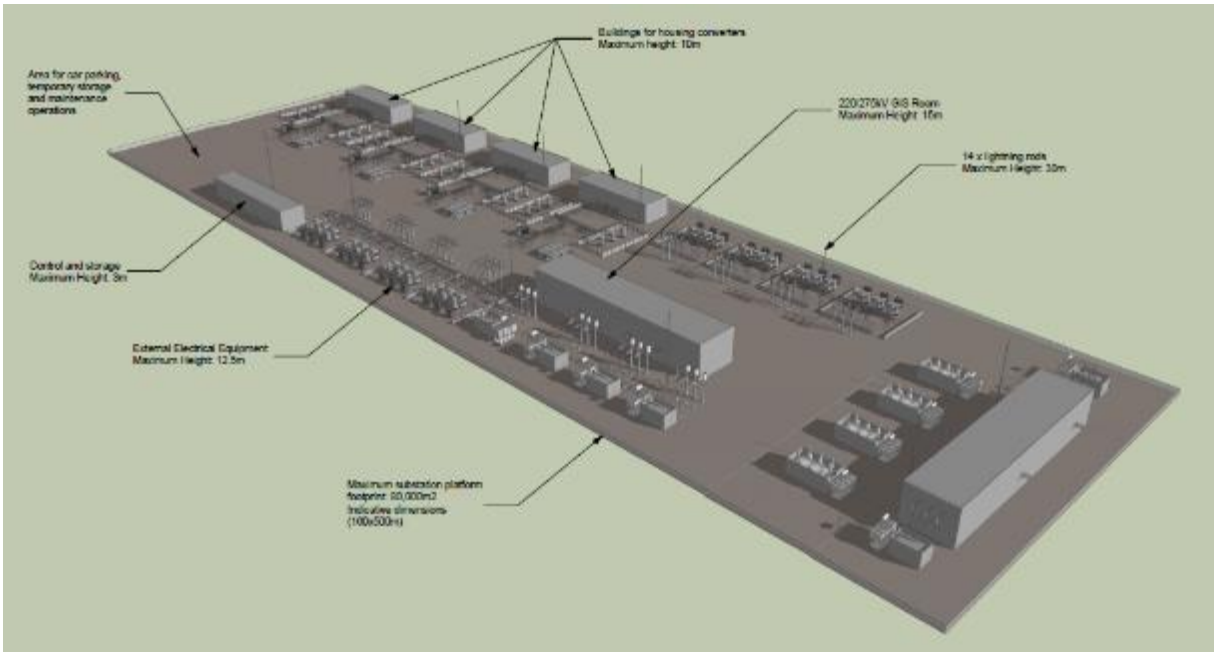
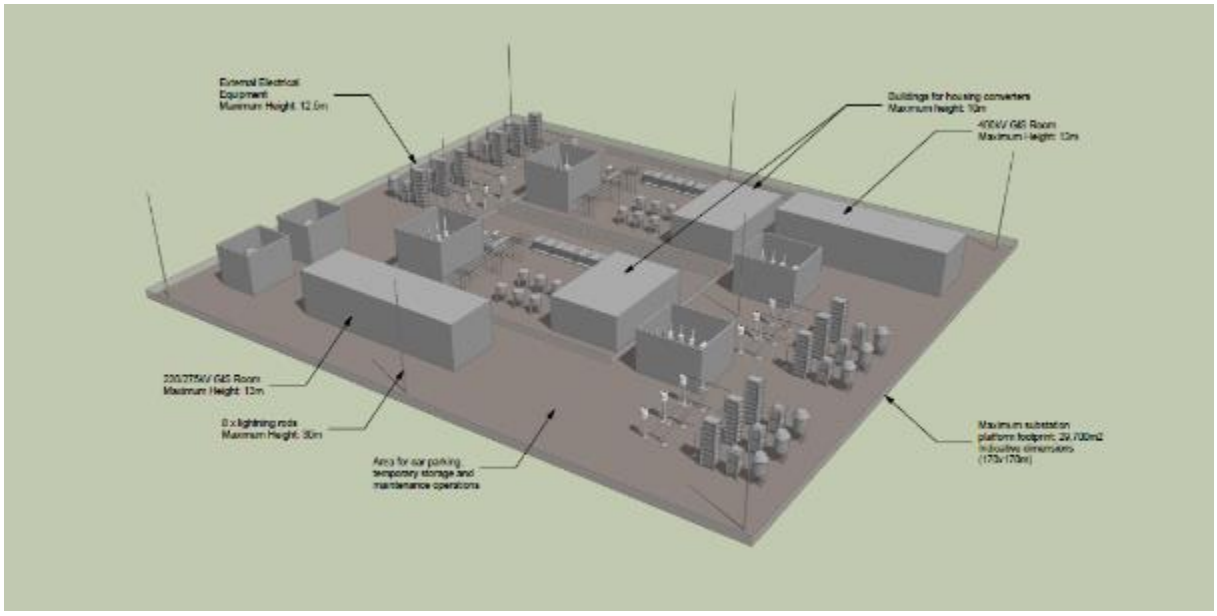


Figure 12: indicative substation layout - Morecambe



~~5.2.4~~5.3.5 Layout

~~5.2.4.1~~5.3.5.1 The platform for each substation is of sufficient size to accommodate the maximum footprints required for each project development scenario.

~~5.2.4.2~~5.3.5.2 The maximum design parameter for the substation platform footprint (and other associated components of each substation are as follows:

Parameter	Maximum design parameter		
	Morgan Offshore Wind Project	Morecambe Offshore Windfarm	Maximum design parameter
Maximum substation platform footprint (m2)	80,000	29,700	109,700
Maximum permanent footprint including substation platform, landscaping, access, drainage and attenuation (m2)	164,000	59,500	223 500
Maximum impermeable footprint (m2)	48,000	17,820	
Maximum number of main buildings	4	4	8
Maximum main building height (m)	15	13	N/A
Main building - maximum lightning protection height (m)	30	30	N/A
Maximum length of main building (m)	140	30	N/A
Maximum width of main building (m)	80	15	N/A

~~5.2.4.3~~5.3.5.3 The layout of electrical infrastructure is driven by the technical and functional requirements of each substation and must be set out in sequential order in accordance with all electrical transmission systems. However, subject to the appointment of a technical partner who will design and deliver the final substation, there may be a degree of flexibility that can be explored as part of the detailed design process, post consent.

Figure 13 and Figure 13: Indicative layout of the substation, Morgan

5.3.5.4 shows the indicative layouts from above to illustrate a potential layout that each substation might employ.

Figure 13: Indicative layout of the substation, Morgan

Figure 14: Indicative layout of the substation, Morecambe

~~Figure 12 and Figure 13 and show indicative layouts for each substation from nearby PRoWs. Figure 12: View from BW0505016 towards Morgan substation, showing an indicative layout Figure 13: View from footpath north of A584 towards Morecambe substation, showing an indicative layout~~

~~5.2.5~~5.3.6 Grading and Earthworks

5.3.6.1 To install each substation site's working platforms, some 'cut and fill' will be required (i.e., excavated material may be used to create a level site for substation construction after foundation installation).

~~5.2.5.1~~5.3.6.2 An indicative cut and fill exercise has been undertaken for both substation platforms for the DCO submission. Cut and fill will be necessary to create level platforms, particularly at the sloping Morgan OWL site, and will be designed to minimise spoil movement, as described in the Project Description (document reference F1.3) and oLMP (document reference J2).

~~5.2.5.2~~5.3.6.3 In line with all offshore wind projects and their associated onshore transmission infrastructure, the final cut and fill levels will be developed as part of the post consent design development and will be subject to approval by the relevant planning authority under Requirement 4 of the draft DCO (document reference C1).

5.3.6.4 The following figures illustrates topographic information to support understanding the relationship between the proposed onshore substation site levels and the local existing landform.

- **Figure 15: Topographic** Context
- presents a topographic context plan showing existing contours between Kirkham and Newton-with-Scales, including indicative proposed spot heights for both substation platforms. These heights were used to inform the LVIA visualisations and showing the indicative levels that would possibly come forward (subject to further detailed design post consent).
- **Figure 16: Cross Section of Morgan substation site**

Figure 17: Cross Section of Morecambe substation site

Figure 18: Elevation of Morgan substation

- , and Error! Reference source not found. present long cross sections drawings through both the Morgan and Morecambe substation sites to supporting stakeholders understanding of the potential platform levels and development height parameters, and their relationship with the existing landform and nearest settlements.
- Error! Reference source not found. provides an extract of the long cross-section in the vicinity of the Morgan substation.
- **Figure 19: Elevation of Morecambe substation**
- provides an extract of the long cross-section in the vicinity of the Morecambe substation.

5.3.6.5 Full size copies these drawings are appended to this document.

Figure 15: Topographic Context

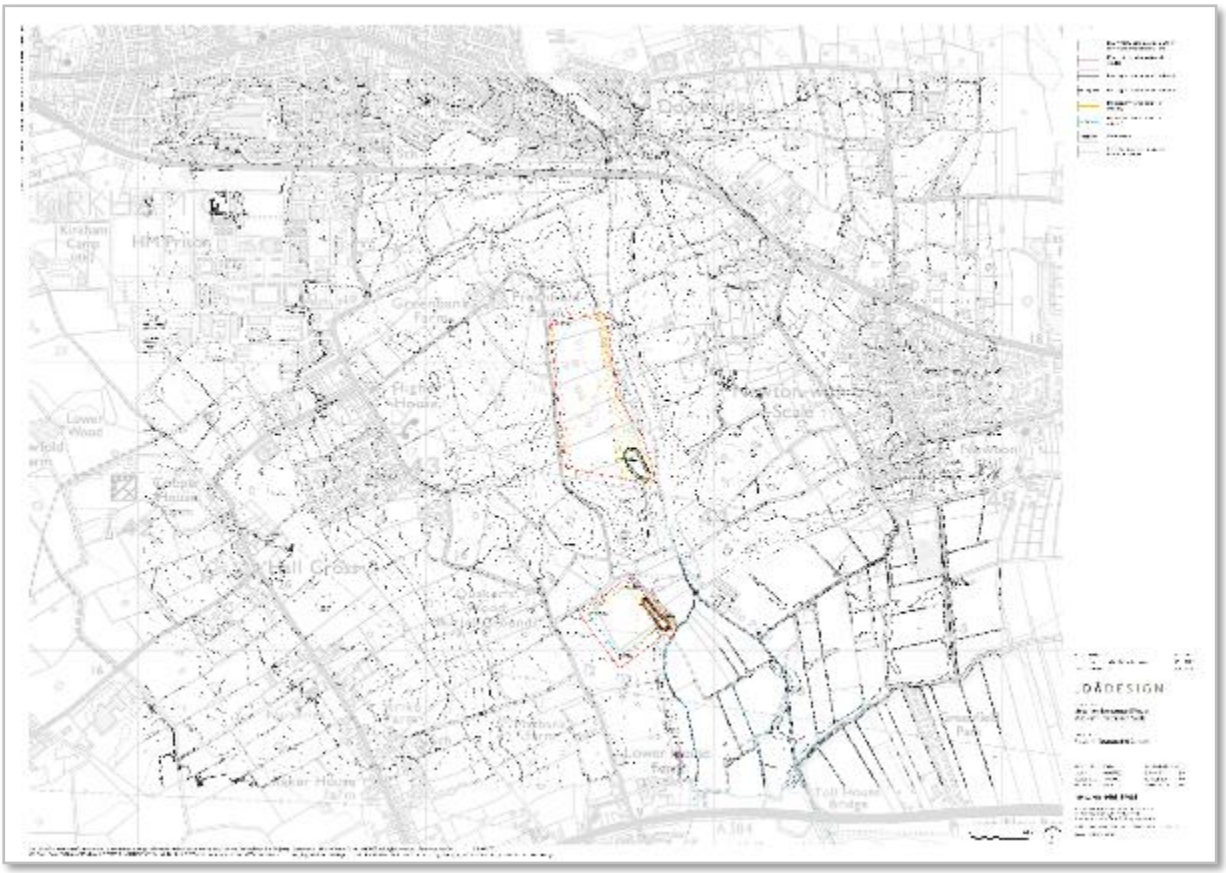


Figure 16: Cross Section of Morgan substation site

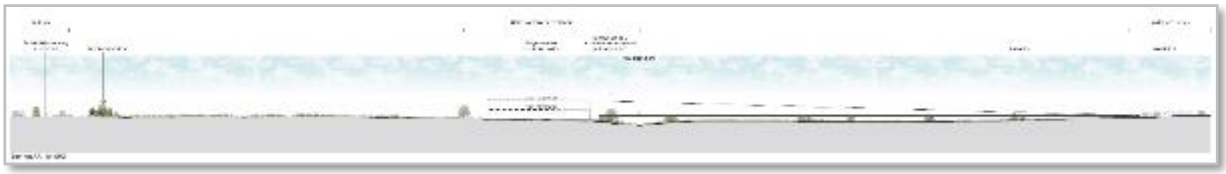


Figure 17: Cross Section of Morecambe substation site

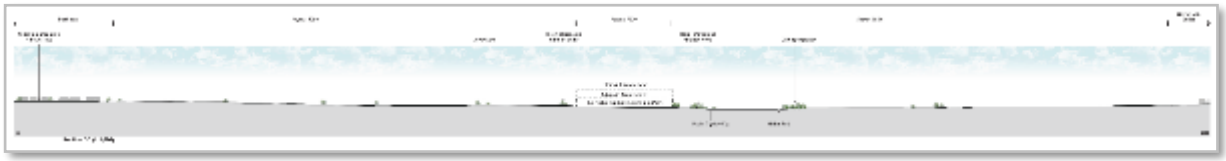


Figure 18: Elevation of Morgan substation

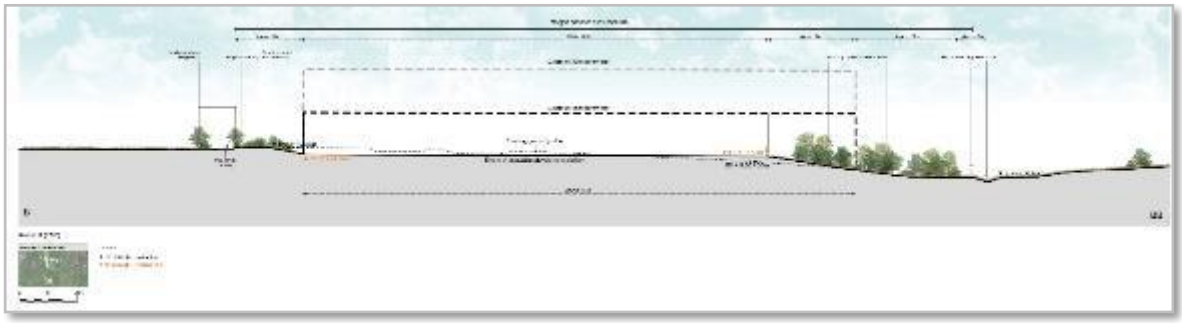


Figure 19: Elevation of Morecambe substation

Typical Grading and Earthworks activities

~~5.2.5.3~~5.3.6.6 The entire area will be stripped of all organic matter and loose rocks. Any waste material encountered will be removed as required by the environmental and geotechnical investigations. Once the surface has been cleared, the grading operation will begin. Topsoil and subsoil will be stored in separate stockpiles in line with the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (PB13298) or the latest relevant available guidance. Any suspected or confirmed contaminated soils will be appropriately separated, contained and tested before removal, if required. Further information is contained in the Outline Soil Management Plan (document reference J1.7).

~~5.2.5.4~~5.3.6.7 If it were to prove impossible or impractical to balance the earthwork quantities, it would be necessary to either export excess soil or import new fill soil. Any soil exported would be transported by a licensed waste carrier to an appropriate waste management facility. Excavations of foundations and trenches will commence following the completion of grading.

~~5.2.5.5~~5.3.6.8 The methodology for grading and earthworks will be set out in the CoCP. An Outline CoCP (document reference J1) is included in the DCO application ~~(document reference J1)~~.

~~5.2.6~~5.3.7 Substation Compound

~~5.2.6.1~~5.3.7.1 For operational, safety and maintenance reasons the landscape treatment within the substation platform is functional and defined by a very limited material palette of hard materials, typically comprising concrete pavers, concrete hard-standing, shingle and asphalt.

~~5.2.7~~5.3.8 Materiality and Form

~~5.2.7.1~~5.3.8.1 The choice of materials and form for each of the proposed substations' buildings is driven by their functional and structural requirements. The buildings are anticipated to comprise steel frames and external sheet cladding materials. The structural steelwork will be fabricated and prepared off site and delivered to site for assembly.

~~5.2.8~~5.3.9 Colour

~~5.2.8.1~~5.3.9.1 The final design of each substation will be informed by a colour study of the local landscape undertaken post-consent. The purpose of the colour study will be to inform the external appearance of each substation's buildings and structures, where it is reasonably practicable to so. This would include the identification of colours within the existing landscape to inform a possible colour palette that could be applied to the substations. It would support the integration of each substation into their local landscape context.

~~5.2.9~~5.3.10 Security Fencing

~~5.2.9.1~~5.3.10.1 Security fencing is required around the perimeter of each substation to prevent unauthorised access onto potentially dangerous areas. The fencing will be robust, fit for purpose and comply with the following technical standards: National Grid TS 2.10.02 Generic Electricity Substation Design Manual for Civil, Structural & Building Engineering – Perimeter Security and BS 1722-12 – 'Fences. Specification for steel palisade fences'.

~~5.2.9.2~~5.3.10.2 The fencing will be a maximum of 3m high and may be electrified for security purposes. Access into the substation will be through inward opening double swing gates of similar construction to the perimeter fence.

~~5.2.10~~5.3.11 Surface water drainage

Temporary Drainage

~~5.2.10.1~~5.3.11.1 Prior to the commencement of cut/fill operations, existing field drains will be diverted where intercepted and cut off ditches/drains will be provided to intercept field surface runoff where required. The design of the temporary drainage measures will be set out in the CoCP and agreed with the relevant authorities prior to construction. The key principles are set out in the Outline CoCP (document reference J1).

Operational Drainage

~~5.2.10.2~~5.3.11.2 During the operations and maintenance phase, drainage from both substations and the operational access roads will be managed in accordance with the Operational Onshore Substation Drainage Management Plan that will be agreed with the relevant local planning authority (as secured in the DCO).

~~5.2.10.3~~5.3.11.3 An Outline Operational Drainage Management Plan is included in the DCO application (document reference J10). This has been developed in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority (Lancashire County Council). It includes measures to ensure that existing land drainage is reinstated and/or maintained; measures to limit discharge rates and attenuate flows to maintain greenfield runoff rates at the onshore substations; and measures to control surface water

runoff, including measures to prevent flooding of the working areas or offsite and to ensure any runoff is treated appropriately.

5.3.11.4 Based on current understanding and in line with the SuDS hierarchy, it is anticipated that surface water run-off from the Morgan and Morecambe onshore substations will be collected by perimeter drains and attenuated within water attenuation features, prior to controlled discharge to the Dow Brook. Additional SuDS components will be incorporated as necessary (source control) and confirmed at the detailed design stage. The indicative locations of the attenuation ponds is shown in Figures 1.2 and 1.3 within the ~~Outline Landscape Management Plan~~OLMP (document reference J2). [Further enhancement of design text required ref character of water bodies, including field ponds, etc]

~~5.2.11~~5.3.12 Access

~~5.2.11.1~~5.3.12.1 The following maximum design parameters will apply to both the Morgan substation and the Morecambe substation:

- Maximum width of temporary construction access: 20m
- Maximum width of permanent access road and associated services: 15m

Morecambe substation

~~5.2.11.2~~5.3.12.2 The temporary construction access for the Morecambe onshore substation runs north from the A584 road to the temporary construction compound. A new junction will be constructed from the A584 and will include a two way traffic control system where the temporary construction access meets the new junction. This will allow construction traffic to pass safely in both directions. The length of the temporary construction access will be approximately 760m and it will be 20m in width. Space for topsoil storage, drainage and temporary fencing has been incorporated into the temporary width. Approximately 325m of this temporary construction access is shared with a construction access to the 400kV cable corridor. The Outline Construction Traffic Management Plan (document reference J5) states how this shared construction access will be managed for the duration of construction.

~~5.2.11.3~~5.3.12.3 This temporary access crosses two PRoWs. During construction, the PRoWs would be subject to appropriate temporary diversions to be agreed with Lancashire County Council as set out in the Outline Public Rights of Way Management Plan (document reference J1.5). This will include the installation of gates to the north and south of the temporary construction access to ensure the separation of construction traffic and the public.

~~5.2.11.4~~5.3.12.4 This access will be retained post-construction as an operational access for Abnormal Indivisible Load (AIL) and Heavy Goods Vehicles (HGV) deliveries to the Morecambe onshore substation. The permanent area will be reduced to 15m in width. Access gates will be in place to control access to the substation site. This operational access will not be

fenced where it crosses agricultural fields, thus ensuring agricultural activities can continue unhindered during the operational life of the substation.

~~5.2.11.5~~5.3.12.5 The main operational access for the Morecambe onshore substation will be off Lower Lane. This operational access will be approximately 130m in length with a permanent width of 15m. This operational access will be used for routine visits by cars and light goods vehicles only and will facilitate safe access during normal operations. The operational access would be fenced with a gate in place to control access to the substation site. In addition, gates will be placed to the north and south of the operational access track to allow agricultural activities to continue during the operational phase.

Morgan substation

~~5.2.11.6~~5.3.12.6 Temporary construction access for the Morgan substation will be taken via a new junction created from the A583, to the north of the site. From this new junction a temporary two-way road system to and from the site will be constructed, allowing construction traffic to pass in both directions. The length of this temporary access road will be approximately 600m and 20 m wide. Space topsoil storage, drainage, services and fencing has been incorporated into the temporary width.

~~5.2.11.7~~5.3.12.7 The permanent, operational access from the bell mouth to the Morgan substation will also be taken from this new junction. For operational purposes, the access will be a maximum of 15m wide, comprising hard standing (retained and upgraded from construction) and the remaining width required for underground services, track side drainage and any stabilisation works. The permanent access road would not include a fence, allowing for continuation of agricultural activities on the adjacent land. There would be a gated entrance to the substation which is likely to be on the northern boundary of the substation compound, close to the access road. The site will be unmanned during normal operation; however, the access provisions will allow for 24-hour access/egress for personnel and equipment for either emergency or required maintenance work requiring extended hours.

~~5.2.12~~5.3.13 ~~Landscaping~~Planting

~~5.2.12.1~~5.3.13.1 Landscape treatment of the areas surrounding the substation platforms is designed to provide an appropriate setting that manages the potential landscape impacts responds to adjacent land uses and the landscape character of the area. The Applicants are committed to additional planting to further screen the two substations and provide to biodiversity benefits, in response to the conclusions of Volume 3, Chapter 10: Landscape and visual resources.

~~5.2.12.2~~5.3.13.2 Where practicable, and as prescribed in in the oLMP (document reference J2) and the oEMP (document reference J6), existing vegetation (including woodland, trees and hedgerows) will be retained, except where temporary construction, access or enabling works are required.

~~5.2.12.3~~5.3.13.3New areas of planting, including woodland, tree belts, scrub and scrubby grassland, will provide landscape and ecological enhancements to the substation surrounds, which is currently an arable site.

~~5.2.12.4~~5.3.13.4Planting will be appropriate to the local landscape character and is intended to improve the green infrastructure network (as identified in the oLMP (document reference J2), and oEMP (document reference J6)), helping to screen and filter views of the substations from surrounding landscape and visual receptors, and integrate them into their landscape context.

~~5.2.12.5~~5.3.13.5Woodland will be planted sympathetically around each substations' perimeters to filter/screen views; breaking up the bulk and scale of the buildings and reducing the potential visual impact. This will integrate the development into its landscape context, over time.

~~5.2.12.6~~5.3.13.6Existing hedgerows will be strengthened and enhanced by planting gaps with new native species hedge plants and hedgerow trees that would provide further screening and filtering of views, enhance landscape character and provide enhanced habitats and habitat connectivity for wildlife.

~~5.2.12.7~~5.3.13.7Scrubby grassland planting will comprise a varied, tussocky grassland sward with wildflowers and a low density of scattered shrubs throughout the area. This botanically and structurally varied habitat will support a range of invertebrate species including moths, butterflies, beetles, spiders, bees and damselflies, amongst others. The habitat is also expected to support terrestrial mammals possibly including hedgehogs, voles, badgers and brown hare, breeding and foraging birds, foraging bats, reptiles and terrestrial activity by amphibians. Species-rich grassland areas will be established to provide low-maintenance ground cover, further enhancing biodiversity in non-agricultural and non-woodland areas. The presence of other enhanced and existing habitats nearby (including those outlined above) will further contribute to the overall attractiveness of the general areas around the substation site for a range of wildlife.

~~5.2.12.8~~5.3.13.8Surface water attenuation features are anticipated to be incorporated southeast of the substation sites to manage controlled discharge into Dow Brook. However, the exact location and form will be subject to detailed design.

~~5.2.12.9~~5.3.13.9Offsite soil deposition will be minimised by sensitive incorporation within the substations' locality, with appropriate storage and reuse of topsoil and subsoil to support vegetation establishment.

~~5.2.12.10~~5.3.13.10External areas will be impermeable, with surfacing comprising gravel on a permeable sub-base.

~~5.2.12.11~~5.3.13.11Further design measures will address the visual impact of the buildings, breaking down their mass in views from local roads and the bridleway.

~~5.2.12.12~~5.3.13.12 **Figure 20 ~~19~~** and **Figure 21~~21~~** present the indicative Landscape Strategy for each substation site, as reported in the oLMP (document reference J2).

5.3.13.13 Further details relating to the strategy for ecological enhancement are also provided in Volume 3, Chapter 3 Onshore ecology and nature conservation (document reference F3.3).

Figure 20: Indicative Landscape Strategy, – Morgan substation

Figure 21: Indicative Landscape Strategy, –Morecambe substation

5.4 Design Proposals: Substations

5.4.1 Overview

5.4.1.1 The following plans present the Applicants' proposals for each substation (status indicated), prepared within the parameters established by the maximum design scenarios. Thumbnail versions are provided here for reference, with full-sized plans shown on the following pages.

5.4.1.2 The sequence of plans illustrates a structured design process: beginning with an appraisal of the baseline environment and the site's context, form and function, before developing a design response that integrates layout, levels and landscape in a coherent manner. These drawings represent the current stage of design development, setting out the key layers of understanding and the measures embedded to respond to the prevailing character and conditions of the landscape.

The Applicants' indicative design proposals (thumbnails)

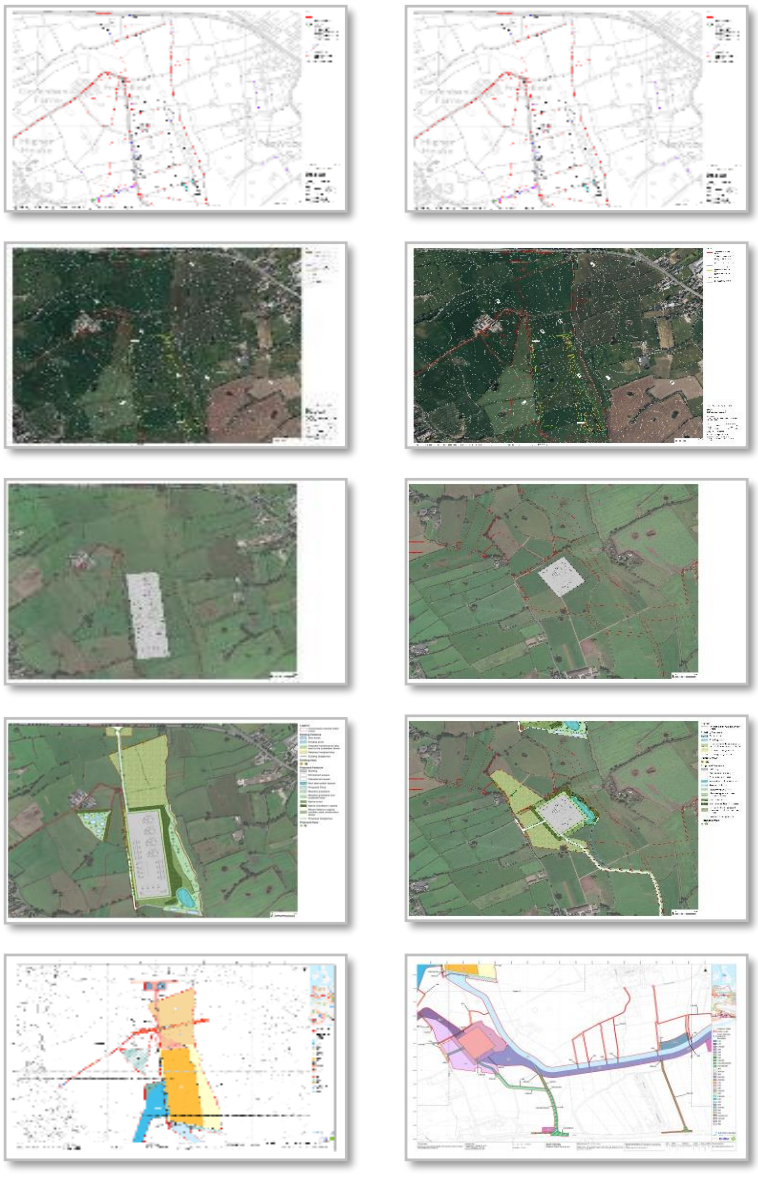


Figure 22: Existing baseline conditions, Morgan

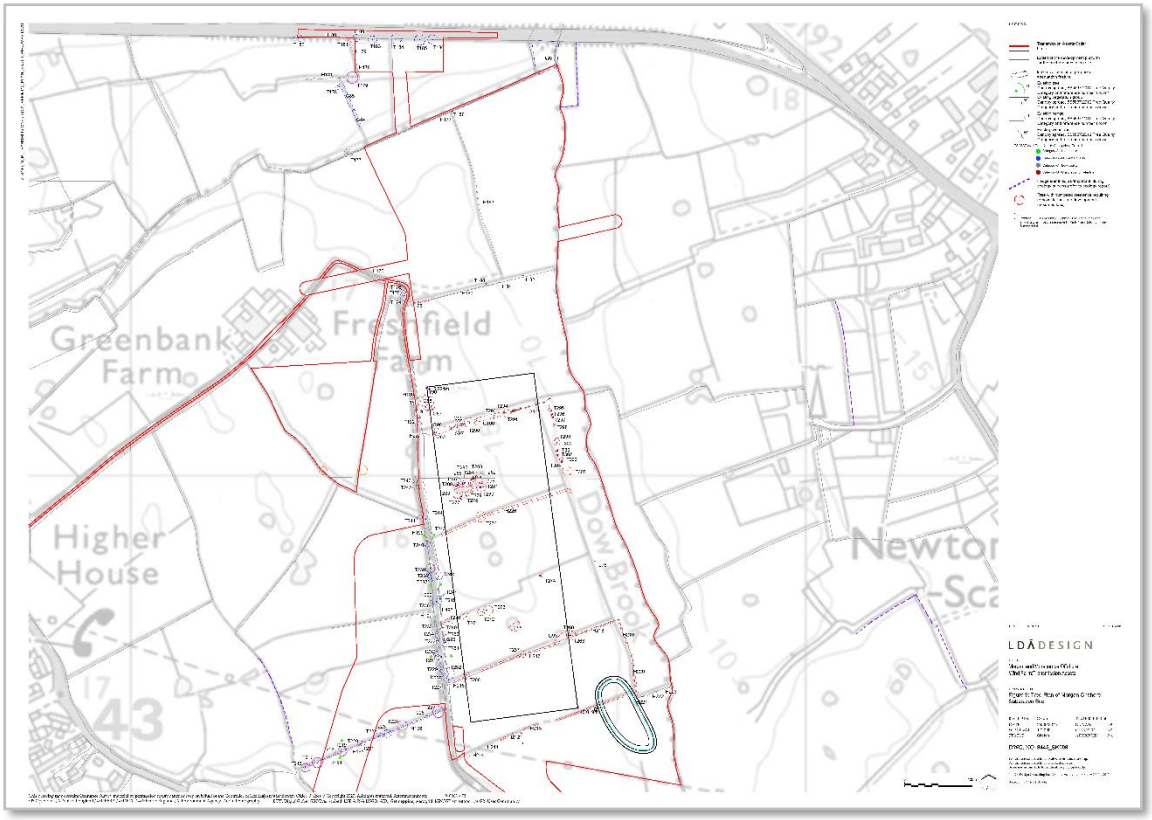


Figure 23: Existing and indicative Levels Strategy, Morgan

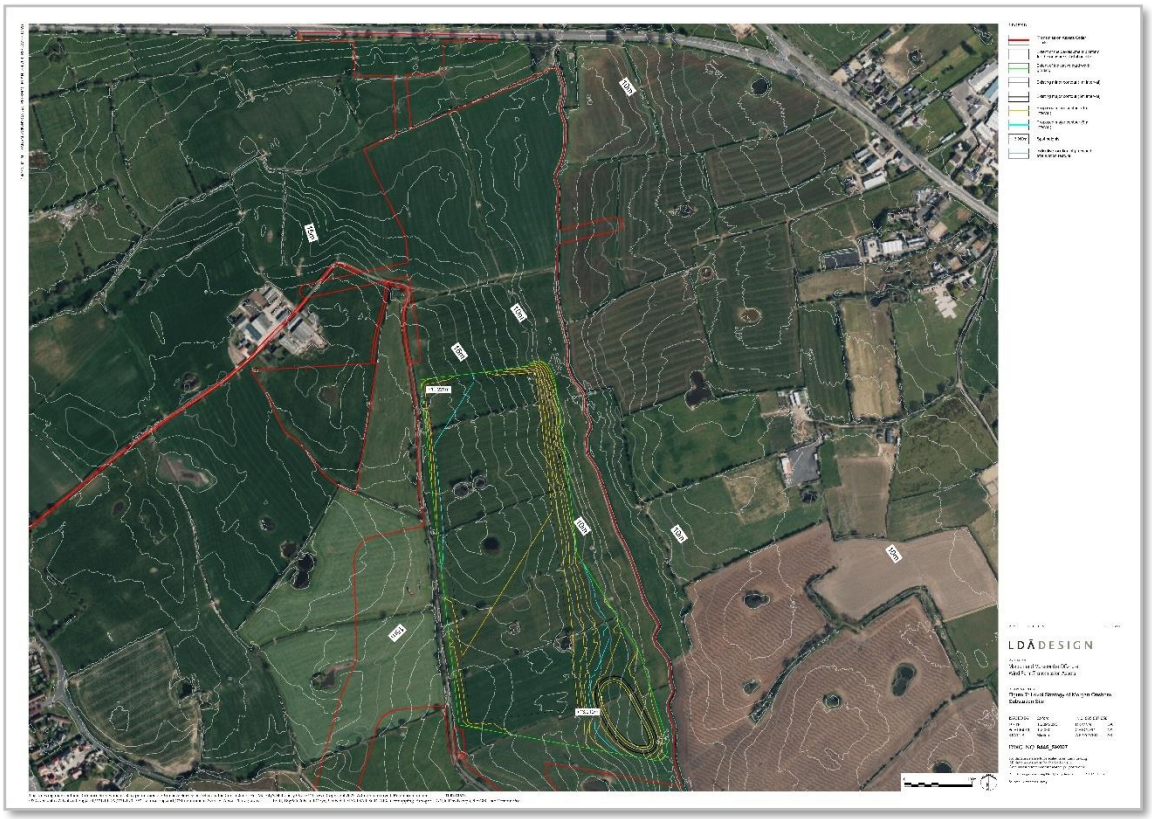
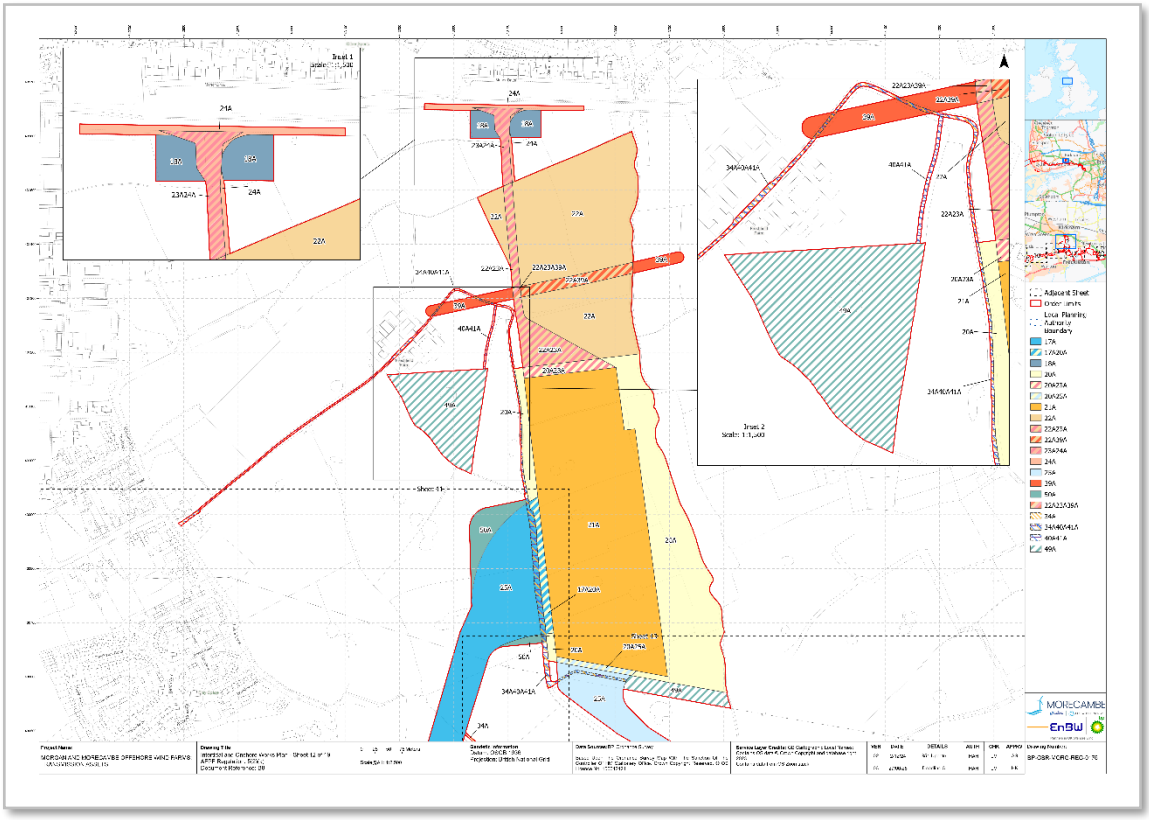


Figure 24: Indicative layout of the substation, Morgan

Figure 25: Indicative layout of the substation with indicative landscape proposals, Morgan

Figure 26: Work Plans, Morgan



5.4.1.3 The draft DCO (document reference C1) outlines the onshore works. Descriptions relevant to this document are as follows:

Work No. 20A – Morgan onshore substation environmental mitigation works consisting of— (a) permanent environmental mitigation works; (b) connections to existing drainage and creation of new sustainable drainage; (c) creation of a water attenuation feature; (d) earthworks; (e) fencing; and (f) permanent access.

Work No. 21A – Morgan onshore substation works consisting of— (a) construction of onshore substation; (b) earthworks and creation of onshore substation platform or foundations; (c) permanent environmental mitigation works; (d) connections to existing drainage and creation of new sustainable drainage; (e) creation of a water attenuation feature; (f) up to four cable circuits and associated cable ducts connecting Work No. 17A to the Morgan onshore substation laid underground by open cut trenching or trenchless installation technique works including associated pits; (g) up to two cable circuits and associated cable ducts connecting the Morgan onshore substation to Work No. 25A laid underground by open cut trenching or trenchless installation technique works including associated pits; (h) security fencing; (i) lighting; (j) permanent access; and (k) utilities connections.

Work No. 23A – Morgan onshore substation permanent access consisting of— (a) creation of and improvement of access to highway; (b) works to visibility splays; (c) permanent environmental mitigation works; (d) connections to existing drainage and creation of new sustainable drainage; (e) fencing; and (f) utilities connections.

Work No. 41A – Morgan permanent access to Work No. 49A (Morgan permanent environmental mitigation works).

Work No. 49A - Morgan permanent environmental mitigation works including permanent access.

Figure 27: Existing baseline conditions, Morecambe

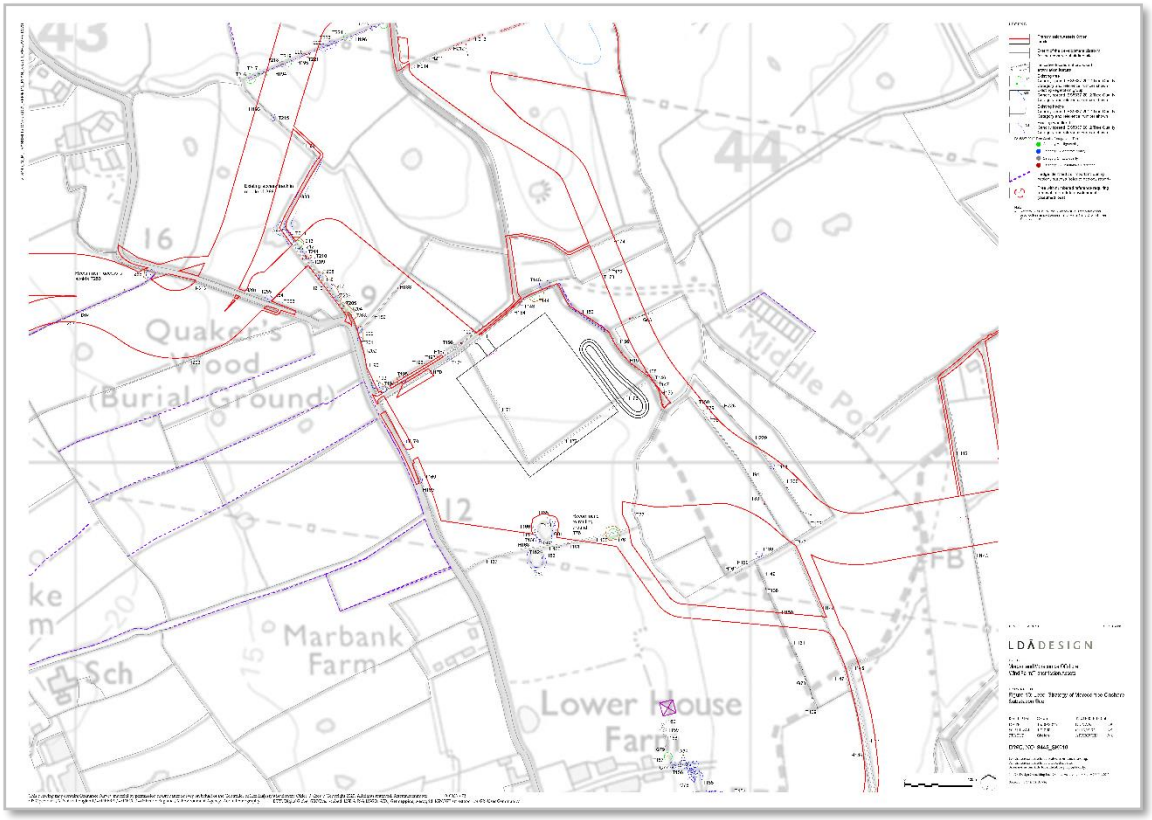
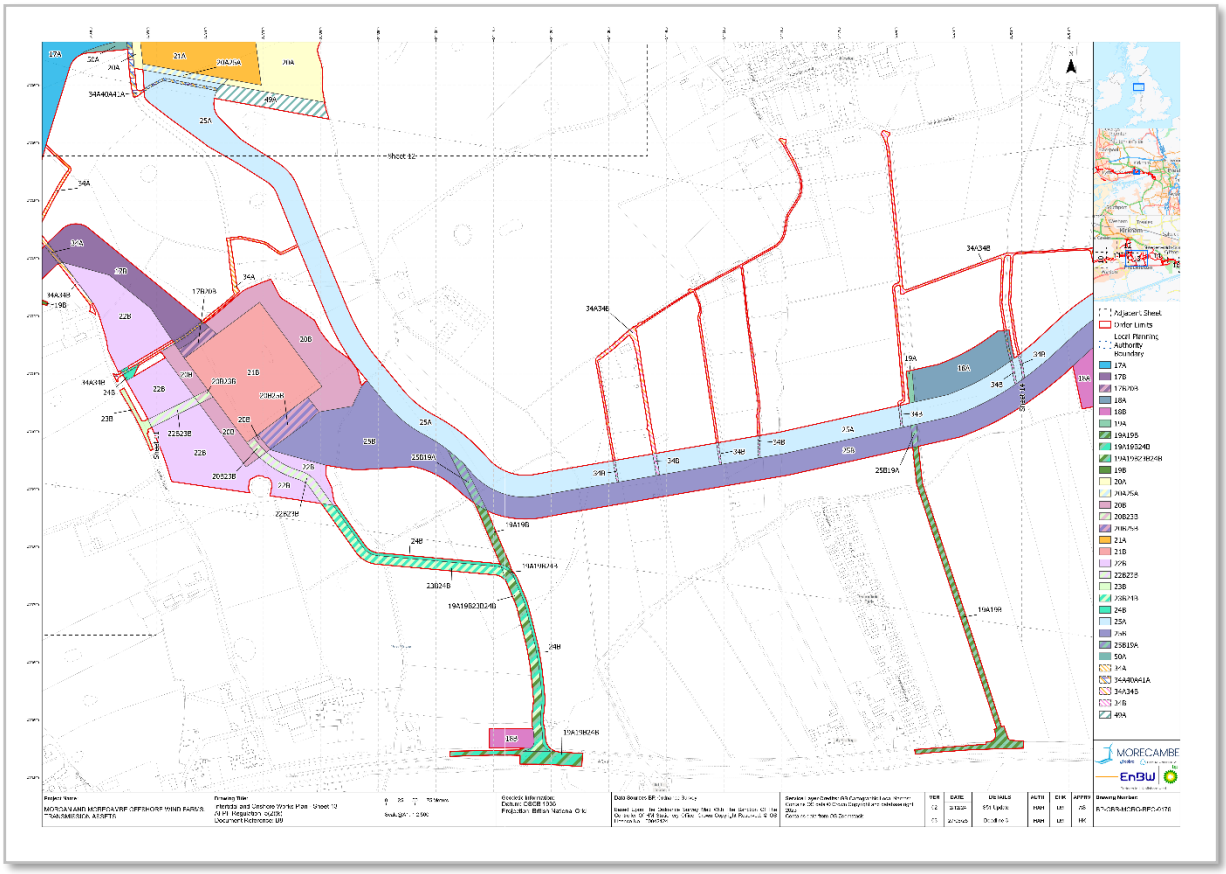


Figure 28: Existing and indicative Levels Strategy, Morecambe

Figure 29: Indicative layout of the substation, Morecambe

Figure 30: Indicative layout of the substation with indicative landscape proposals, Morecambe

Figure 31: Work Plans, Morecambe



~~5.2.12.14~~5.4.1.4The draft DCO (document reference C1) outlines the onshore works. Descriptions relevant to this document are as follows:

Work No. 20B – Morecambe onshore substation environmental mitigation works consisting of— (a) permanent environmental mitigation works; (b) connections to existing drainage and creation of new sustainable drainage; (c) creation of a water attenuation feature; (d) earthworks; (e) fencing; and (f) permanent access.

Work No. 21B – Morecambe onshore substation works consisting of— (a) construction of onshore substation; (b) earthworks and creation of onshore substation platform or foundations; (c) permanent environmental mitigation works; (d) connections to existing drainage and creation of new sustainable drainage; (e) creation of a water attenuation feature; (f) up to two cable circuits and associated cable ducts connecting Work No. 17B to the Morecambe onshore substation laid underground by open cut trenching or trenchless installation technique works including associated pits; (g) up to two cable circuits and associated cable ducts connecting the Morecambe onshore substation to Work No. 25B laid underground by open cut trenching or trenchless installation technique works including associated pits; (h) security fencing; (i) lighting; (j) permanent access; and (k) utilities connections.

Work No. 23B – Morecambe onshore substation permanent access consisting of— (a) creation of and improvement of access to highway; (b) works to visibility splays; (c) permanent environmental mitigation works; (d) connections to existing drainage and creation of new sustainable drainage; (e) fencing; and (f) utilities connections.

~~5.3~~5.5 Design Approach: Cable route and habitat mitigation

~~5.3.1.1~~5.5.1.1 *[This section will outline/ signpost how the cable route is reinstated and how the habitat mitigation area is design with ref to oLMP (document reference J2) and OEMP (document reference J6).]*

~~5.4~~5.6 Design Approach: Construction Phase

~~5.4.1.1~~5.6.1.1 *[This section will outline / signpost how the construction phase will be controlled with reference to CEMP]*

5.7 Project Level Design Principles

5.7.1.1 As outlined in **Section 4.6**, during the Examination phase, the **Strategic Design Principles** (and *Design Codes*) for each onshore substation site were reviewed collaboratively with the relevant local planning authorities.

5.7.1.2 This engagement allowed the Applicants and relevant Local Planning Authorities to agree refined Design Principles and Design Codes that address local character, landscape sensitivities, and other site-specific considerations.

5.7.1.3 These refined **Project Level Design Principles** will continue to guide subsequent post-consent detailed design, in accordance with the relevant DCO Requirement(s) and Project Level Design Codes, as described in greater detail in the next section of this document.

5.7.1.4 *[Note: these principles are currently under review with the Councils]*

Table 5-1: Project Level Design Principles [under review]

Project Level Design Principles	Delivery
NIC Principle: Climate	
CL1. Maximum generation capacity Optimise the siting and layout of Transmission Assets to support efficient transfer of energy from Generation Assets, contributing to net zero.	Substation layout and cable routing designed to reduce transmission losses and futureproof capacity.
CL2. Promote sustainability Apply whole-life carbon thinking to minimise emissions across construction, operation and decommissioning stages.	Use of low-carbon materials, off-site fabrication where practicable, and a construction emissions reduction strategy.
CL3. Resilient and Adaptable Design Design to withstand future climate risks, including high wind exposure and surface water flooding specific to the Fylde context.	Integration of sustainable drainage, resilient material selection, and elevated infrastructure where required.
CL4. Local Climate Mitigation Measures Mitigate climate impacts within Order Limits through strategic landscape interventions that also provide biodiversity benefits.	Use of shelterbelts, species-rich grassland, and native planting in coordination with BNG strategy.
NIC Principle: People	
PE1. Coordinated approach Align delivery of the two grid connection projects to reduce disruption and maximise shared benefits to communities.	Construction phasing strategy developed to avoid cumulative effects.
PE2. Be a considerate neighbour Minimise disruption to residents in Kirkham, Wesham, Singleton, and surrounding settlements.	Noise, traffic, and visual mitigation embedded into detailed design and construction management.

PE2.1 PRoW rerouting Relocate footpaths and bridleways to maintain tranquillity and enhance eastward views over Dow Brook, if possible, following the detail design.	
PE3. Responsive Stakeholder Engagement and Knowledge Ensure design reflects local input from Fylde Borough Council and Lancashire County Council	The Applicants to agree programme for post consent development in conjunction with FBC, as discharging LPA.
NIC Principle: Places	
PL1. Reinstate and Strengthen Landscape Framework Reinstate field boundaries, hedgerows and shelterbelts disrupted by construction.	Landscape restoration secured through the Outline LEMP and DCO Requirements.
PL2. Enhance Ecological Networks Deliver measurable BNG and improve ecological connectivity across agricultural landscapes.	Use of latest Defra Metric; habitat types prioritised in alignment with Local Biodiversity Action Plan.
PL3. Integrate with Landscape Character Frameworks Respond to local character areas (e.g. Fylde Coastal Plain) and strategic landscape policies.	LVIA-led layout evolution; design based on *Fylde Landscape Character Assessment* and *Lancashire Landscape Strategy*. These principles will be progress in discussion with the local authority as part of design evolution, in support of Requirements discharge to secure good design
PL3.1. On-site screening Use a combination of mounding and fencing to reduce perceived height and screen internal infrastructure.	
PL3.2 Topographic response Manipulate site levels using gentle, naturalistic slopes to visually recess structures.	
PL3.4 Reflect landscape structure Reflect the irregular landscape structure using blocks of woodland planting informed by local field patterns.	
PL4. Multi-Functional Design Interventions Embed green infrastructure that delivers screening, biodiversity and water management	Green infrastructure principles integrated into Outline LEMP and final landscape design proposals prepared following discussions with local authorities, pre requirement submission.
PL5. Design for Local Identity Respond to the rural character, settlement pattern, and vernacular architecture of Fylde.	Architectural response and treatment, fencing, and landscape design to respect local character, and will be developed in support of Requirement discharge.
PL5.1 Materiality Integrate built form into landform using natural materials (e.g., stone, timber, brick) to reflect rural vernacular or resemble farm buildings.	
PL5.2 Surfacing Use sympathetic surface materials for access tracks and compound surrounds, avoiding stark contrasts like white concrete.	

PL5.3 Fencing Treatment Avoid palisade fencing in rural contexts; specify fencing that are visually sympathetic.	
NIC Principle: Value	
VA1. Site Selection to Minimise Harm Avoid sensitive receptors and designated features where possible; mitigate where not.	Site selection rationale and mitigation strategy based on environmental and planning constraints.
VA2. Transparent and Design-Led Process Evidence-based, stakeholder-informed design that reflects clear principles and reasoning.	Design decisions recorded and justified via evolution logs and stakeholder documentation. The Applicants to continue dialogue with planning authority in preparation for submission for requirements discharge.
VA3. Deliver Lasting Local Benefit Provide enduring environmental and community benefits through infrastructure legacy.	Delivery of green infrastructure, biodiversity uplift, and potential community benefit features. [development of text to be explored]
VA4. Collaborative and Iterative Design Governance Maintain a structured, multidisciplinary governance process for design development.	Coordinated design and technical input to inform the design response post consent, overseen Applicants' Design Champions

6 ~~Securing Good Design~~ Post Consent Design Process and Governance

6.1 Overview

6.1.1.1 The Applicants recognise the importance of continued engagement with relevant stakeholders in the evolution of the detailed design of the proposed onshore substations. In line with best practice and to ensure a transparent and accountable process, a series of mechanisms have been established to secure future engagement following the con of development consent.

6.1.1.2 Through a combination of secured documents, embedded consultation commitments, and formal planning control mechanisms, the Applicants have ensured that proportionate and robust measures are in place to provide potentially affected persons, organisations and groups with meaningful opportunities to contribute to the detailed design of the onshore substations at the relevant stages of the post-consent process.

6.1.1.3 The Transmission Assets will therefore continue to be developed in accordance with the MDS, with design details to be submitted to the relevant planning authorities for approval prior to the commencement of construction.

6.1.1.4 To ensure that good design continues to be embedded throughout the post-consent phase, the Transmission Assets will retain the expertise of its professional design team, including qualified and chartered practitioners across the relevant disciplines, to guide and oversee this process. In addition, the Projects will appoint a board-level Design Champions to advocate for the Project's Design Principles and oversee the application of the Post-Consent Design Codes. This role will provide strategic leadership and ensure that the embedded design commitments are delivered consistently across all project stages.

6.1.1.5 The use of an Independent Design Review Panel should only be required at the request of the discharging planning authority, following the grant of consent and subject to further discussions with the Applicants, in line with pre-consent engagement.

6.1.1.6 This framework, encompassing the design process and the application of design principles and codes, is derived from best practice guidance published by the NIC. It demonstrates how the various controlling mechanisms – both documentary and institutional – interact at each stage of the Project to provide oversight, accountability, and continuity in design quality.

~~6.1.1.1 The Project will therefore continue the development of the design of all project elements, including onshore substations, in accordance with the MDS and such design details will be submitted to the relevant planning authorities for determination prior to commencement of construction. continue to ensure good design is embedded within the development of the project details, post-consent, and to guide and oversee this process, the Project will continue to use its design team, including qualified and chartered professionals in the relevant fields. The Project will also~~

~~appoint a board level design champion to champion the Project's Design Principles and the Post Consent Design Code below.~~

Table 6-1: Design Process and controlling mechanisms

Stage	Design Principles	Design Code	Design Champion
Pre-Application	Establish intent	X	X
Examination	Refine and fix commitments	Optional early draft	Nomination
Post-Consent	Referenced in Requirements	Prepared and approved	Appointed
Construction & Operation	Passive reference	Active guide for delivery	Optional monitoring role

6.2 Principal control mechanisms for post-consent design

6.2.1.1 The principal control mechanisms for post-consent design are set out below.

6.2.2 Requirement for Approval of Detailed Design

6.2.2.1 Requirement 4 of Schedules 2A and 2B of the draft DCO (document reference C1) provides for the submission and approval, by the relevant planning authority, of the final detailed design of each onshore substation prior to the commencement of construction. This Requirement ensures formal oversight of the detailed design and provides a mechanism through which stakeholder views can be considered where appropriate, securing both accountability and compliance with the design principles established in the oDP.

6.2.3 Detailed Landscape and Ecological Management Plan (LEMP)

6.2.3.1 The oLMP (document reference J2) and oEMP provide the framework for the preparation of a post-consent LEMP. Section 1.1.5 of the oLMP (document reference J2) describes the process for developing the LEMP in consultation with relevant stakeholders, in accordance with the objectives and principles of the oLMP (document reference J2).

6.2.3.2 This ensures that planting schemes, management regimes, and biodiversity enhancements are contextually appropriate and responsive to local landscape character and ecological opportunities.

6.2.4 Commitment to Continued Engagement

6.2.4.1 The Design Codes of this document includes 'Design Code 3: Continued Engagement with Stakeholders', which formalises the Applicants' commitment to ongoing consultation with relevant stakeholders on detailed design matters.

6.2.4.2 Areas for continued discussion include, but are not limited to, building materials, colour treatment, fencing and security measures, surface water drainage design, and refinement of landscape proposals as part of the development of the LEMP.

6.2.4.3 Together, these mechanisms ensure that the post-consent detailed design process is both controlled and transparent, providing clarity on how stakeholder input will be integrated and how the design principles established in the oDP will be maintained throughout the detailed design stage.

6.2.4.4 Through the EIA process a range of mitigation and monitoring measures have been identified, to avoid or reduce potential effects. All measures to be adopted by the Transmission Assets are called 'Commitments' (CoTs); aligning with the Design Framework.

6.2.4.5 The CoTs will be used to guide the final design and details for construction, operation and maintenance, and decommissioning phases.

6.2.5 Measures adopted as part of the Transmission Assets (Commitments)

6.2.5.1 Through the EIA process a range of mitigation and monitoring measures have been identified, to avoid or reduce potential effects. All measures to be adopted by the Transmission Assets are called 'Commitments' (CoTs); aligning with the Design Framework.

6.2.5.2 The CoTs will be used to guide the final design and details for construction, operation and maintenance, and decommissioning phases. The full list of CoTs can be found in Volume 1, Annex 5.3: Commitments Register (document reference F1.5.3).

6.3 Post-consent Design Process

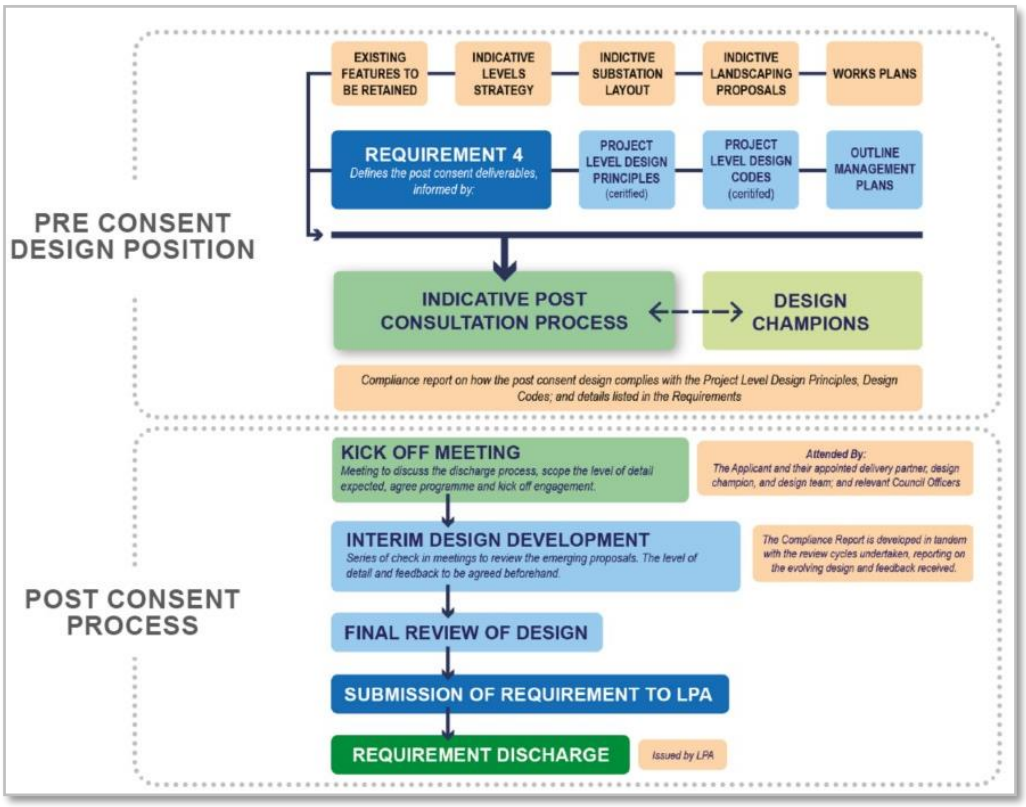
6.3.1.1 In recognition of the need for continued engagement with key stakeholders during the evolution of the detailed design of the onshore substations, the following section sets out a typical post-consent process. This approach reflects established best practice and ensures that the design process is undertaken in a transparent, accountable, and coordinated manner.

6.3.1.2 Drawing on lessons learned from comparable projects, the Applicant recognises that early and structured engagement with the relevant LPAs, supported by the appointed technical design partner and review mechanisms, provides a robust framework for progressing design development. This ensures alignment with statutory requirements, reduces risk, builds stakeholder confidence, and supports the timely discharge of post-consent obligations.

6.3.1.3 The stages described below provide a clear framework for design development, from the appointment of a technical partner through to final submission and are intended to demonstrate how the Applicants will manage post-consent requirements in a structured and transparent

manner. The process is presented as an indicative sequence, illustrated in *Figure 32: Indicative approach to post consent design* .

Figure 32: Indicative approach to post consent design evolution



Appointment of Technical Design Partners

6.3.1.4 Following consent, each Applicant will appoint a technical design partner to lead detailed substation design for their respective substation. The partner's role will be to refine layouts, inform design development, and ensure alignment with the approved outline design submitted as part of the Development Consent Order (DCO).

6.3.1.5 The technical design partner will work closely with the Applicants' teams to integrate site context, technical requirements, and environmental considerations into the evolving design.

Pre-Submission Engagement with Local Planning Authority

6.3.1.6 Early engagement will then commence with relevant Local Planning Authorities, establishing the context for subsequent design development. These meetings would typically include:

Substations

- Review proposed layouts and building/structure configurations.
- Discuss the level of design detail required to support the discharge of requirements, including landscaping, access, security, drainage, biodiversity, and lighting measures.

- Agree the coordination of submission materials, consultation requirements, and reporting protocols.
- Outline the approach to design review and agree on processes for stakeholder involvement.
- Construction compounds.
- Habitat mitigation.

Design Development Process

6.3.1.7 A structured design development~~-~~ process will concurrently support the iterative development of the substation design. This process will be supported by the development of a compliance report. The proposed stages of design development are~~,~~ as follows:

1. **Kick-off Meeting:** This meeting would introduce the Applicant's team to leading officers, clarify the post consent scope, any protocols required, and the anticipated / desired programme of engagement.
2. **Interim design development sessions:** These will comprise a series of meetings to provide an opportunity for the Applicant's team to present its emerging evolved designs, addressing input and feedback from LPAs include stakeholders, and explore design development to accord with the Project Level Design Principles and Design Code. This process will be supported by the development of a compliance report recording compliance with Design Principles and Design Code.
3. **Final Review:** This meeting would review the near-final design, ensuring it incorporates the LPAs' received feedback and recommendations before submission and the compliance report.

Finalisation and Submission

6.3.1.8 The Applicants' teams will, in this final stage, consolidate the LPA's feedback from the design process and prepare its final documentation and compliance report.

6.3.1.9 This will be presented to the LPA for informal discussion, followed by client and legal approvals, before formal submission to discharge relevant DCO requirements.

6.3.2 DCO Requirement

6.3.2.1 The draft DCO at Requirements 4 of Schedules 2A and 2B require design details of the relevant onshore substation to be submitted to and approved by the relevant planning authority prior to the commencement of construction.

~~6.1.1.2~~6.3.2.2 ~~Both~~ The discharge of Requirements 4 "Substation works" would specifically require submission of details, in respect of the substation, of:

(a)the layout;

(b)scale;

(c)proposed finished ground levels;

(d)hard surfacing materials;

(e)the dimensions, colour and materials used for the buildings;

(f)security fencing;

(g)vehicular and pedestrian access, parking and circulation areas; and

(h)proposed and existing functional services above and below ground, including drainage, power and communications cables and pipelines, manholes and supports.

Furthermore, under Requirements 3 of Schedules 2A and 2B, no onshore substation works would proceed until details of the stages of those works have been ~~notified~~submitted to and approved by~~to~~ the relevant planning authority. Construction working hours would also be subject to the limits specified in Requirements 14 of Schedules 2A and 2B.

Additional requirements in Schedules 2A and 2B of the draft DCO ~~would~~ also require submission and approval, post-consent, of:

(1) A written landscaping scheme (requirement 6)

(2) A code of construction practice (requirement 8) which would include the following as appropriate to the relevant stage:

"communications plan (in accordance with the outline communications plan);

dust management plan (in accordance with the outline dust management plan);

construction noise and vibration management plan (in accordance with the outline construction noise and vibration management plan);

pollution prevention plan (in accordance with the outline pollution prevention plan);

public rights of way management plan (in accordance with the outline public rights of way management plan);

site waste management plan (in accordance with the outline site waste management plan);

soil management plan (in accordance with the outline soil management plan);

spillage and emergency response plan (in accordance with the spillage and emergency response plan);

surface water and groundwater management plan (in accordance with the outline surface water and groundwater management plan);

construction fencing plan (in accordance with the outline construction fencing plan);

construction artificial light emissions management plan (in accordance with the outline construction artificial light emissions management plan);

biosecurity protocol (in accordance with the outline biosecurity protocol);

bentonite breakout plan (in accordance with the outline bentonite breakout plan); ~~*and*~~

contaminated land and groundwater discovery strategy (in accordance with the outline contaminated land and groundwater discovery strategy)

hydrogeological risk assessments for trenchless installation beneath the Lytham St Annes SSSI and the River Ribble crossing (in accordance with the outline hydrogeological risk assessment); and

onshore construction method statement (in accordance with the outline onshore construction method statement).".

(3) A construction traffic management plan (requirement 9)

(4) Written details of the siting, design, layout, sequencing and timing and any access management measures for any new permanent or temporary means of access to a highway to be used by vehicular traffic, or any alteration to an existing means of access to a highway (requirement 10)

(5) An archaeological written scheme of investigation (requirement 11)

(6) written ecological management plan (requirement 12)

(7) pre-construction survey ~~*work has been carried out*~~ *to establish whether a European protected species or nationally protected species under the Wildlife and Countryside Act 1981 is present on any of the land affected, or likely to be affected, by any part of that stage of the Project (requirement 13)*

(8) details of all proposed permanent fences, walls or other means of enclosure ~~*for that phase have been submitted to and approved by the relevant planning authority*~~*(requirement 15)*

(9) a written scheme for the management and mitigation of internal and external artificial light emissions (requirement 17)

(10) an operational noise management plan (requirement 18)

(11) an operational drainage management plan (requirement 20)

Requirement 22 of Schedules 2A and 2B also further require that "within six months of the permanent cessation of commercial operation of the Project [A/B] onshore works, an onshore decommissioning plan must be submitted for approval".

~~6.2~~6.4 Post-consent Design Code: Substations

6.4.1.1 In addition to ~~the above~~ Requirement 4 of the draft DCO, the onshore elements of the Project will be constructed ~~according to~~in accordance with the following post-consent Design Code.

6.4.1.2 The Design Code is a set of simple design requirements. It will be followed by the Applicant in the detailed design stages of the Project post consent and will guide design decisions to ensure good design is maintained. It will serve as a reference point for the relevant planning authority in discharging Requirements set out in the draft DCO.

6.4.1.3 *[The Design Code is being reviewed by the Councils and the Applicants to ensure it covers all relevant elements of the Requirements to support the submission and securing good design outcomes]*

Table 6-2: Design Codes [under review]

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
DC1	Onshore Substations	Reduce the visual impact of onshore substations. The design of the onshore substations will be compliant with the maximum parameters prescribed in the **draft DCO** (document reference C1). Where cost effective and efficient to do so, the Applicants will seek to further reduce the visual extent of the onshore substations through appropriate equipment procurement and layout considerations.	**Volume 1, ES Chapter 3 Project Description** (document reference F1.3). Requirement 4 of the **draft DCO** (document reference C1)	**Climate** Maximum generation capacity Prioritise sustainability **People** Coordinated approach Be a considerate neighbour **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC2	Onshore Substations	Minimise the operational noise level at the onshore substations by design. In line with the **draft DCO** (document reference C1) the Applicant will ensure the substations are designed to adhere to the specified operational noise limits in the DCO ~~an~~and will produce an Operational Noise Management Plan (NMP) post-consent, subject to approval from the relevant Local Planning Authority.~~, which will set out the following:~~ ~~• any necessary noise attenuation and mitigation measures~~ ~~• Noise limits~~ ~~• Scheme for monitoring noise attenuation and mitigation measures~~	**ES Chapter** (document reference C1). Requirement ~~3~~18 of the **draft DCO** (document reference C1)	**Climate** Prioritise sustainability Resilient design **People** Coordinated approach Be a considerate neighbour

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
		The Applicants will meet with the Councils as required to discuss the findings of the ONDR and will address reasonable queries arising from such engagement. The Applicants will seek to minimise the operational noise rating level below the limits set out in the **draft DCO** (document reference C1) and avoid any perceptible tones and other acoustic features at any residential receptor that would attract a correction in accordance with BS4142:2014+A1:2019, insofar as these mitigation measures do not add unreasonable costs or delays to the Projects or otherwise result in adverse impacts on other aspects of the environment (e.g. landscape and visual impacts).		
DC3	Design process	Continue engagement with stakeholders. Continued engagement with the relevant stakeholders, such as the relevant planning authority, in relation to the detailed design of the onshore substations.	**Outline CoCP** (document reference J1)~~**Communications Plan** (document reference J1.1)~~	**Climate** Maximum generation capacity Prioritise sustainability Resilient design **People** Coordinated approach Be a considerate neighbour
DC4	Design process	Take account of feedback This feedback will ensure opportunities are identified, tested and pursued to achieve an appropriate, fit-for-purpose design outcome. Through the Applicant's pre-application consultations with the relevant stakeholders, feedback has been received which has already influenced the Project's design.	~~**Communications Plan** (document reference J1.1)~~**Outline CoCP** (document reference J1)	**Climate** Maximum generation capacity Prioritise sustainability Resilient design **People** Coordinated approach Be a considerate neighbour

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
DC5	Design process	Designate a senior business representative as the design champion A board-level design champion for each project will be appointed and maintained throughout the design and construction phase, in order to maintain the necessary focal point, co-ordinate and monitor the progression of good design.	Requirement ~~3~~4 of the **draft DCO** (document reference C1)	**Climate** Maximum generation capacity Prioritise sustainability Resilient design **People** Coordinated approach Be a considerate neighbour **Places** Landscape restoration Ecological Enhancement
DC6	Design process	Maintain Good Design Consider 'Good Design' in line this Code, the Project's Design Principles and with the requirements of Overarching National Policy Statement for Energy (NPS EN-1) and the National Infrastructure Commission's 'Design Principles for National Infrastructure' (National Infrastructure Commission, February 2020) to inform the Project's design process.		**Climate** Maximum generation capacity; Prioritise sustainability, Resilient design. **People** 4. Coordinated approach; Be a considerate neighbour. **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC7	Onshore substation	Minimise the visual impacts of the onshore substation as far as possible.	Requirement 4 of the **draft DCO** (document reference C1)	**Climate** Maximum generation capacity; Prioritise sustainability;

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
		Appropriate building design, sensitive placing, use of appropriate design and materials, including shape, layout, colouration and finishes will be actively sought as part of the procurement process.		Resilient design. **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC8	Onshore substation	Maximise screening effect using softscaping, landscaping and planting. On-site mitigation planting proposals will be undertaken around the onshore substations in order to minimise their visual effect and to maximise screening opportunities from key viewpoints/receptors, while also responding to local landscape character, pattern and growing conditions.	Requirement ~~4~~6 of the **draft DCO** (document reference C1)	**Climate** Prioritise sustainability; Resilient design. **People** Be a considerate neighbour. **Places** Landscape restoration; Ecological Enhancement.
DC9	Onshore substation	Use of bunds to support visual screening. The overall site design will explore the opportunity for site won topsoil and subsoil materials to be reused on-site within landscape earthworks 'bunds'. These bunds will support the visual screening of the onshore substations while having a gradual external slope gradient that appears natural and complements the existing terrain (when looking towards the onshore substations).	Requirement ~~3~~4 of the **draft DCO** (document reference C1)	**Climate** Prioritise sustainability; Resilient design. **People** Be a considerate neighbour. **Places** Landscape restoration; Ecological Enhancement.
DC10~~1~~	General and onshore substation	Using low maintenance ground cover species, establishing native woodland and returning surplus land to agricultural uses.	Requirement ~~4~~6 of the **draft DCO** (document reference C1)	**Climate** Prioritise sustainability,

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
		Landscaping planting of species rich grassland areas will be established to provide a low maintenance ground cover for areas that are not to be returned to agricultural use or planted as woodland. Where feasible, the overall site design will also identify and maximise land around the onshore substations that will be returned to agricultural use during the operational period.		Resilient design **People** Coordinated approach; Be a considerate neighbour **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC112	General	Maximise the habitat creation within the Order Limits and incorporate ecological enhancement. On-site mitigation planting will promote Biodiversity Benefit and planting proposals will be considered along with building design and layout of ancillary structures. The overall site design should have regard to the potential for embedded ecological mitigation, biodiversity benefit. The SuDS solution for the onshore substations, as a minimum, will include a water attenuation feature which will deliver habitat creation on the site.	Requirement 46 of the **draft DCO** (document reference C1)	**Climate** Prioritise sustainability, Resilient design **People** Coordinated approach; Be a considerate neighbour **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC123	Lighting	Minimise the use of artificial lighting. Artificial lighting during the construction of the onshore substations will be as low as practicable. The onshore substations will not be permanently lit.	Requirement 38 of the **draft DCO** (document reference C1) **Outline Construction Artificial Light Emissions Management Plan** (document reference J1.11)	**Climate** Prioritise sustainability, Resilient design. **People** Coordinated approach;

No.	Project Element	Design Code	Relevant Parameters	Relevant Design Principles
		Implementation of a detailed design that aligns with the Design Principles document will ensure that levels of light spill on to bat roosting, foraging and commuting habitats are not significant.		Be a considerate neighbour **Places** Landscape restoration; Ecological Enhancement. **Values** Respect the landscape and avoid sensitive features
DC134	General	Optimise the generation of renewable energy through design. The fundamental purpose of the Project is to combat climate change through the deployment of a renewable energy source. The functional nature of the onshore substations and the need to operate a safe and efficient electricity transmission asset is a fundamental design constraint that must be recognised at all times, whilst achieving the above-mentioned design principles.		**Climate** Maximum generation capacity; Prioritise sustainability, Resilient design.

7 References

7.1.1.1 Department for Energy Security and Net Zero (22 November 2023, updated 17 January 2024.) Overarching National Policy Statement for energy (EN-1) [online]. Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1/overarching-national-policy-statement-for-energy-en-1 [Accessed 1 September 2024]

7.1.1.2 Department for Energy Security and Net Zero (22 November 2023, updated 17 January 2024). National Policy Statement for renewable energy infrastructure (EN-3) [online]. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3/national-policy-statement-for-renewable-energy-infrastructure-en-3 [Accessed 1 September 2024]

7.1.1.3 Department for Energy Security and Net Zero (22 November 2023, updated 17 January 2024). National Policy Statement for electricity networks infrastructure (EN-5) [online]. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5/national-policy-statement-for-electricity-networks-infrastructure-en-5 [Accessed 1 September 2024]

7.1.1.4 National Grid (2009). NGC Substation and the Environment: Guidelines on Siting and Design [online]. Available at: https://www.nationalgrid.com/electricity-transmission/document/146731/download [Accessed 1 September 2024]

7.1.1.5 National Infrastructure Commission Design Group. Design Principles for National Infrastructure [online]. Available at: https://nic.org.uk/app/uploads/NIC-Design-Principles.pdf

7.1.1.6 National Infrastructure Commission Design Group (May 2024). National Infrastructure Commission's Project Level Design Principles [online]. Available at: https://nic.org.uk/app/uploads/NIC-Design-Principles-Handbook-Digital-PDF.pdf

Appendix A. Supporting Material

A.1 Examples of Good Design Responses

A.1.1.1 At Deadline 3, the Applicants submitted document S_D3_7 *Environmental Statement: Technical Note: Landscape and Design Matters – Rev F01* (REP3-064), which presented a series of images to illustrate examples of good design responses.

A.1.1.2 Some of these images are reproduced here as indicative representations of different types of technology layouts, specifically in relation to the configuration and character of GIS and AIS technology. This section also includes an example of an approach to substation built form and materiality selection, and an example illustrating an approach to substation colour selection.

Plate 1: An example of a GIS layout

Plate 2: An example of an AIS layout

Plate 3: An example of an approach to a substation's built form and materiality selection

Plate 4: An example of an approach to a substation's colour selection

A.2 Supporting full size figures

- Figure 15: Topographic Context
- Figure 16: Cross Section of Morgan substation site
- Figure 17: Cross Section of Morecambe substation site
- Figure 18: Elevation of Morgan substation
- Figure 19: Elevation of Morecambe substation

Z:\9445_M_M_TRANSMISSION\7CADX_REF\9445_PLAN_250704_RECOVER.DWG

LEGEND

- Extent of the development platform for the onshore substation sites
- Extent of indicative earthwork grading
- Existing minor contour (1m interval)
- 10m — Existing major contour (5m interval)
- Proposed minor contour (1m interval)
- 10m — Proposed major contour (5m interval)
- +10.5m — Spot heights
- Indicative location of proposed attenuation feature

REV.	DESCRIPTION	APP.	DATE
B	Plan updated	NA	15/09/25
A	Finalisation of plan following client comments	NA	04/07/25

LDĀDESIGN

PROJECT TITLE

Morgan and Morecambe Offshore Wind Farm:Transmission Assets

DRAWING TITLE

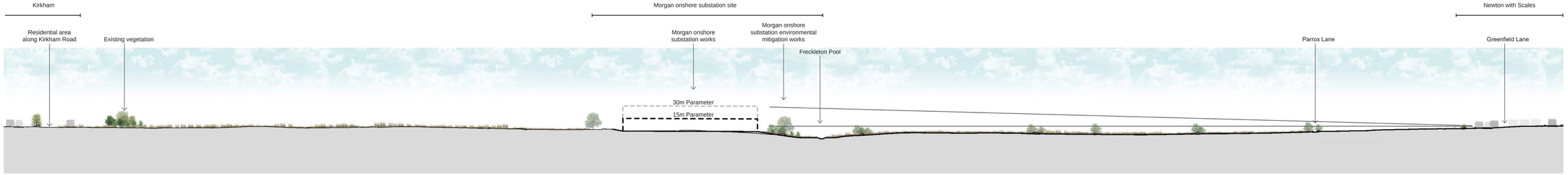
oDP Figure 15: Topographic Context

ISSUED BY	Oxford	T: 01865 887 050	
DATE	04/07/25	DRAWN	DK
SCALE@A1	1:5,000	CHECKED	NA
STATUS	Final	APPROVED	AK

DWG. NO **9445_SK002**

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources Ordnance Survey



Section AA (1:1,000)

View 1 (From Kirkham Road to Morgan onshore substation site)

View 2 (From Greenfield Lane to Morgan onshore substation site)

View 3 (From Greenfield Lane to Morgan onshore substation site)

ISSUED BY	Oxford	t: 01865 887050	
DATE	12 May 2025	DRAWN	DKa
SCALE@A1	1:1,000	CHECKED	NA
STATUS	Final	APPROVED	AK

DWG. NO. 9445_SK_001

Section Locations

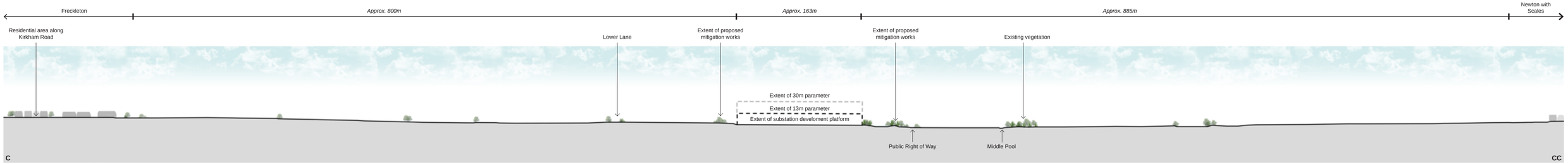
Section Locations

PROJECT TITLE

MORGAN AND MORECAMBE TRANSMISSION

DRAWING TITLE

oDP Figure 16 Cross Section of Morgan Onshore substation



Section CC (1:2,500)

View 1 from Strike Lane towards the Morecambe onshore substation site

View 2 from Grange Lane towards the Morecambe onshore substation site

View 3 from Parrox Lane towards Morecambe onshore substation site

ISSUED BY	Oxford	t: 01865 887050	
DATE	04/07/25	DRAWN	DKa
SCALE@A1	1:2,500	CHECKED	NA
STATUS	Final	APPROVED	AK

DWG. NO. 9445_SK_002

Cross Section Location Plan

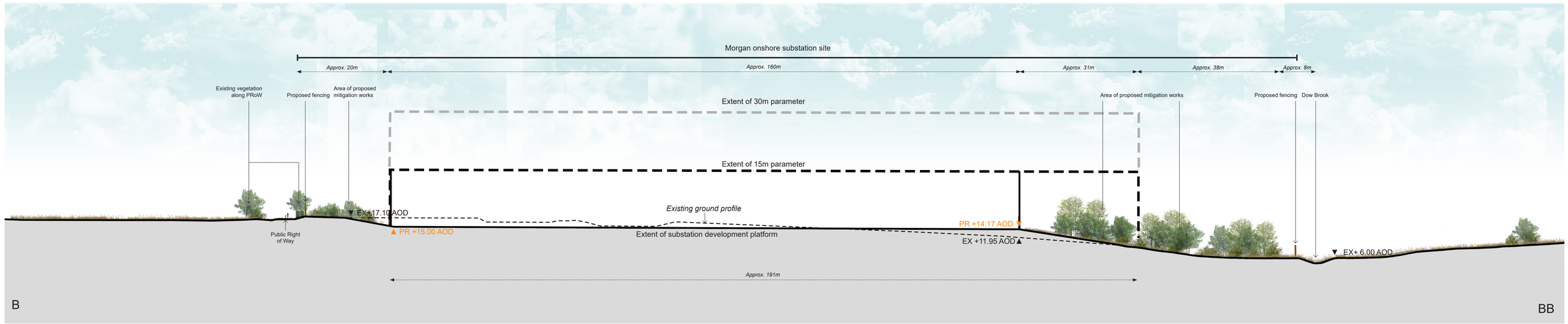
Google Street View Locations

PROJECT TITLE

MORGAN AND MORECAMBE OFFSHORE WIND FARM:TRANSMISSION ASSETS

DRAWING TITLE

oDP Figure 17: Cross Section of Morecambe Onshore Substation Site



Section B (1:500)

LEGEND

▼ EX+0.00 AOD	Existing level
▼ PR+0.00 AOD	Proposed level

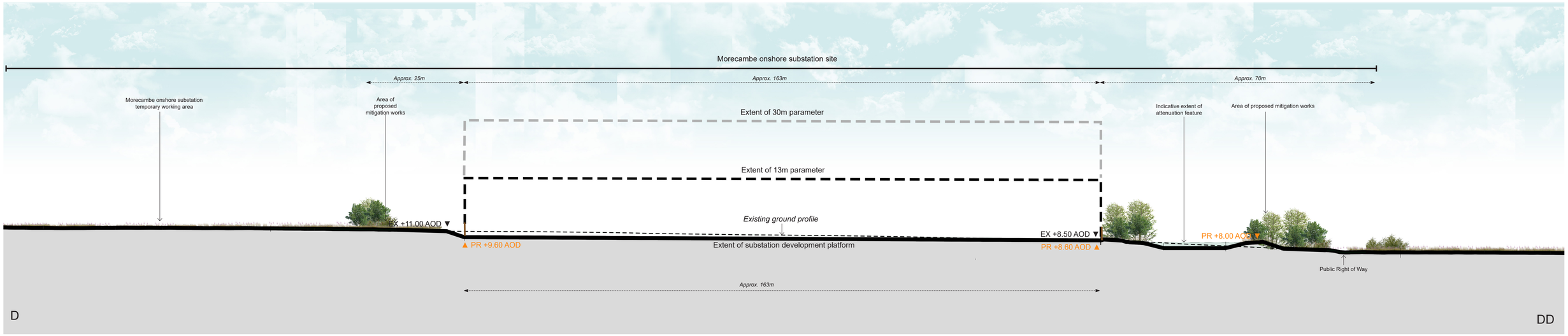
ISSUED BY	Oxford	t: 01865 887050	
DATE	18 Sept 2025	DRAWN	DKa
SCALE@A3	1:500	CHECKED	NA
STATUS	Final	APPROVED	AK

DWG. NO. **9445_SK_002**

PROJECT TITLE
MORGAN AND MORECAMBE OFFSHORE WIND FARM:TRANSMISSION ASSETS

DRAWING TITLE
oDP Figure 18: Elevation of Morgan Onshore Substation site

LDĀDESIGN



Section D (1:500)

Elevation Location Plan

LEGEND

▼ EX+0.00 AOD Existing level
▼ PR+0.00 AOD Proposed level

ISSUED BY	Oxford	t: 01865 887050	
DATE	15 Sept 25	DRAWN	DKa
SCALE@A3	1:500	CHECKED	NA
STATUS	Final	APPROVED	AK

DWG. NO. **9445_SK_006**

PROJECT TITLE
MORGAN AND MORECAMBE OFFSHORE WIND FARM:TRANSMISSION ASSETS

DRAWING TITLE
oDP Figure 19: Elevation of Morecambe Onshore Substation site