

Outer Dowsing Offshore Wind

Outline Documents

ORCP Design Principles Statement

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Acronyms & Definitions

Abbreviations / Acronyms

Acronym	Expanded name
CLG	Community Liaison Group
DAD	Design Approach Document
DCO	Development Consent Order
DPS	Design Principles Statement
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
GT R4 Ltd	The Applicant. The special project vehicle created in partnership between Corio Generation (and its affiliates), Gulf Energy Development and TotalEnergies.
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
IDB	Internal Drainage Board
NGSS	National Grid Onshore Substation
nm	Nautical Mile
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
ODOW	Outer Dowsing Offshore Wind (The Project)
OnSS	Onshore Substation
ORBA	Offshore Restricted Build Area
ORCP	Offshore Reactive Compensation Platform
PEIR	Preliminary Environmental Information Report

Terminology

Term	Definition
The Applicant	GTR4 Limited (a joint venture between Corio Generation (and its affiliates), TotalEnergies and Gulf Energy Development), trading as Outer Dowsing Offshore Wind.
Baseline	The status of the environment at the time of assessment without the development in place.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the sensitivity of the receptor, in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils

Term	Definition
	the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Landfall	The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore.
Mitigation	Mitigation measures are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
National Grid Onshore Substation (NGSS)	The National Grid substation and associated enabling works to be developed by the National Grid Electricity Transmission (NGET) into which the Project's 400kV Cables would connect.
National Policy Statement (NPS)	A document setting out national policy against which proposals for Nationally Significant Infrastructure Projects (NSIPs) will be assessed and decided upon
Outer Dowsing Offshore Wind (ODOW)	The Project.
Offshore Export Cable Corridor	Offshore Export Cable Corridor (ECC) The Offshore Export Cable Corridor (Offshore ECC) is the area within the Order Limits within which the export cables running from the array to landfall will be situated.
Offshore Reactive Compensation Platform (ORCP)	A structure attached to the seabed by means of a foundation, with one or more decks (including bird deterrents) housing electrical reactors and switchgear for the purpose of the efficient transfer of power in the course of HVAC transmission by providing reactive compensation.
Offshore Substation (OSS)	A structure attached to the seabed by means of a foundation, with one or more decks and a helicopter platform (including bird deterrents), containing— (a) electrical equipment required to switch, transform, convert electricity generated at the wind turbine generators to a higher voltage and provide reactive power compensation; and (b) housing accommodation, storage, workshop auxiliary equipment, radar and facilities for operating, maintaining and controlling the substation or wind turbine generators.
Offshore Restricted Build Area (ORBA)	The area within the array area, where no wind turbine generator, offshore transformer substation or offshore accommodation platform shall be erected.
Offshore Reactive Compensation Platform Restriction Area	The Area within the Offshore Reactive Compensation Platform Area, where no Offshore Reactive Compensation Platforms can be erected
Order Limits	The area subject to the application for development consent. The limits shown on the works plans within which the Project may be carried out.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Preliminary Environmental Information Report (PEIR)	The PEIR was written in the style of a draft Environmental Statement (ES) and provided information to support and inform the statutory consultation process during the pre-application phase.

Term	Definition
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.
Project Design Envelope	A description of the range of possible elements that make up the Project's design options under consideration, as set out in detail in the project description. This envelope is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Statutory consultee	Organisations that are required to be consulted by the Applicant, the Local Planning Authorities and/or The Planning Inspectorate during the pre-application and/or examination phases, and who also have a statutory responsibility in some form that may be relevant to the Project and the DCO application. This includes those bodies and interests prescribed under Section 42 of the Planning Act 2008.
Trenched technique	Trenching is a construction excavation technique that involves digging a trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.
Trenchless technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking the open ground and digging a trench.

1 Introduction

1.1 Purpose of the Design Principles Statement (DPS)

1. This ORCP Design Principles Statement (DPS) sets out the key design principles adopted by the Project for the Offshore Reactive Compensation Platform(s) (ORCPs) and outlines those principles that will be adopted in the development of the detailed design of the ORCPs prior to commencement of construction. This document is secured by Condition 13(1)(a), Part 2, Schedule 11 of the DCO.
2. At this stage in the development process, decisions on the number of ORCPs (up to a maximum of two), exact locations of the ORCPs and the precise technologies and construction methods that will be employed have not been confirmed.
3. The key principles set out in this document will be followed by the Project within the design plan that must be submitted to the Marine Management Organisation (MMO) pursuant to Schedule 11 (Transmission Assets Deemed Marine Licence), condition 13(1)(a).

1.2 Advice on Good Design

4. The Project's approach to good design aligns with guidance set out in the Planning Inspectorate's recently published 'Nationally Significant Infrastructure Projects: Advice on Good Design' (October 2024), which identifies a good design process as comprising the following six components;
 - *'an effective, intentional, transparent, and deliverable process;*
 - *a collaborative, multi-disciplinary approach including positive community and land rights engagement;*
 - *a succinct and ambitious vision for the project, underpinned by a clear analysis of the context for the place, its environment and the opportunities for creating social value, including for the local and wider economy;*
 - *a clear statement of design principles that will drive the project and deliver wider value and benefits beyond the core purpose of the scheme;*
 - *a narrative that explains how the approach to design has evolved, the reasons for the choices that have been, or will be, made, an explanation of the multiple beneficial outcomes the project will achieve and how they will be secured; and*
 - *design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control.'*
5. The Applicant has been committed to good design from the outset of the Project and fulfils these six components of good design in the following ways.
6. **'An effective, intentional, transparent, and deliverable process.'** This document summarises the design processes that guide the Project and the consideration of key design solutions and decisions, it sets out the overarching vision, design principles and commitments, and outlines how these will be implemented through into detailed design. The Applicant is keeping detailed records of all work undertaken as part of the Project, including all meetings, consultation events, surveys, desk-based studies, consideration of alternatives and development of design solutions. This is to ensure that the process is transparent, is responding to the requirements of the Project and is following an evidence-based approach to deliver the best practicable outcomes.
7. **'A collaborative, multi-disciplinary approach including positive community and land rights engagement.'** The Applicant has drawn together a multi-disciplinary team of specialists, collectively covering the breadth of disciplines relevant to the Project and with invaluable experience of working on similar NSIP projects. The specialists have worked collaboratively with the client team, engineers and each other to ensure a holistic and systems-wide approach.

8. The Applicant has also implemented a comprehensive programme of community engagement, to ensure all parties are being kept well informed and up-to-date with the progress of the Project and provided the opportunity to contribute meaningfully to the refinement of the Project. While the Landfall Community Liaison group has been focused on the project landfall, onshore cable route and onshore substation, the purpose of the landfall CLG will now be expanded to involve key local stakeholders in the design and development of the ORCPs, and will continue to act as a two-way communication channel between local communities and the project team while helping to foster local involvement and ownership of the Project.
9. ***'A succinct and ambitious vision for the project, underpinned by a clear analysis of the context for the place, its environment and the opportunities for creating social value, including for the local and wider economy.'*** The DAD (Document Reference 8.18) sets out the overarching vision for the Project which states *"Our next generation offshore wind farm will help form the backbone of the UK's net zero energy system, engaging communities, delivering opportunities, and empowering transformational environmental change."* This vision expresses the nationally significant role of the Project in delivering green energy and also its locally significant role in delivering positive change within the local community. For example, the Applicant has to date organised six rounds of engagement with the Community Liaison Groups and aims to continue with regular meetings post consent.
10. ***'A clear statement of design principles that will drive the project and deliver wider value and benefits beyond the core purpose of the scheme.'*** Section 3 of this document sets out the specific design principles that will be delivered in respect of the Project and with reference to the National Infrastructure Commission's four key considerations; climate, people, place and value. In total, there are 8 design principles with activities set out that will enable their implementation. It should be noted that this DPS is considered a 'live' document that will be updated during examination and post consent to ensure the optimisation of good design.
11. ***'A narrative that explains how the approach to design has evolved, the reasons for the choices that have been, or will be, made, an explanation of the multiple beneficial outcomes the project will achieve and how they will be secured.'*** Ongoing careful and accurate documentation of all Project stages is being undertaken by the Applicant. The DAD (Document Reference 8.18) and this ORCP DPS present a narrative that explains how the approach to design has evolved and will continue to evolve and how the multiple benefits of the Project will be secured through the draft DCO. The documentation of the siting of onshore and offshore infrastructure is presented in Chapter 4 of the ES – Site Selection and Alternatives. As the detailed design is progressed post consent, the DAD (Document Reference 8.18) and this ORCP DPS will be updated accordingly to reflect the greater level of detail regarding design decisions and the multiple beneficial outcomes of the Project.

12. ***‘Design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control.’*** The Project has appointed a Design Champion for the Project who will ensure effective governance around the implementation of good design, by making sure the design principles are fit for purpose, the structured design process enables the optimisation and implementation of the design principles, and that the design review process leads to a robust and defensible outcome.

2 The ORCPs

2.1 Engineering Design Factors

2.1.1 Need for and purpose of an ORCP

13. The purpose of the Project is to generate electricity from wind power offshore, bring this power ashore and feed it into the UK National Grid, operated by NGET. The electrical transmission infrastructure required includes offshore substation platforms, offshore export cables, a landfall and transition joint bays and buried onshore cables leading to the Project's confirmed connection point. It is anticipated to generate renewable electricity equivalent to the annual electricity consumption of over 1.6 million households and will play a critical role in achieving the UK Government's ambition to deliver 50 GW of offshore wind by 2030 and to achieve net zero by 2050.
14. The Project's HVAC transmission systems will require reactive compensation equipment to reduce the reactive power generated by the capacitance of the offshore export cable to maximise the amount of power delivered to the National Grid Electricity Transmission System. The electrical equipment required, primarily shunt reactors and HV switchgear will be provided in the form of HVAC ORCPs.

2.1.2 Functional Requirements

15. The ORCPs will be an essential component of the Project's HVAC transmission system, housing hazardous equipment in the offshore environment. Functionality, reliability and safety are essential to the design which must comply with appropriate technical and safety standards, including the obligations placed on the designer and principal designer under the Construction (Design and Management) Regulations (2015) as well as the requirement of Maritime and Coastguard Agency and Trinity House in relation to navigational safety.

2.1.3 Siting of ORCP(s)

16. The final location of ORCPs will be defined post-consent in the detailed design stage. The siting [of](#) the ORCPs will be limited to be located within the area defined as Works No. 7 in the Offshore Works Plans (~~PD1-005~~[REP4a-003](#)) and will consider a number of factors including final electrical system design, water depth, ground conditions, marine traffic and other existing and planned offshore infrastructure as well as other relevant engineering and economic considerations.

17. In addition, the Applicant has committed to an Offshore Reactive Compensation Platform Restriction Area in which the ORCP(s) will not be sited, as shown in Figure 1. This provides a 500m buffer to the Inner Dowsing, Race Bank and North Ridge (IDRBNR) Special Area of Conservation (SAC), with a distance of over 1000m from the sandbank features, as shown in Figure 2.

~~17.~~ The Project has already reduced the potential impact of the ORCPs through design changes, which, [as well as the commitment to the Offshore Reactive Compensation Platform Restriction Area](#), included moving the ORCPs from initially being sited 6km off the coast to a distance of at least 12km, ~~and a commitment to not using GBS foundations~~. Further details on the siting of the ORCPs can be found in ES Chapter 4 Site Selection and Consideration Alternatives (APP-059) and the Design Approach Document (document 8.18 submitted at Deadline 4).

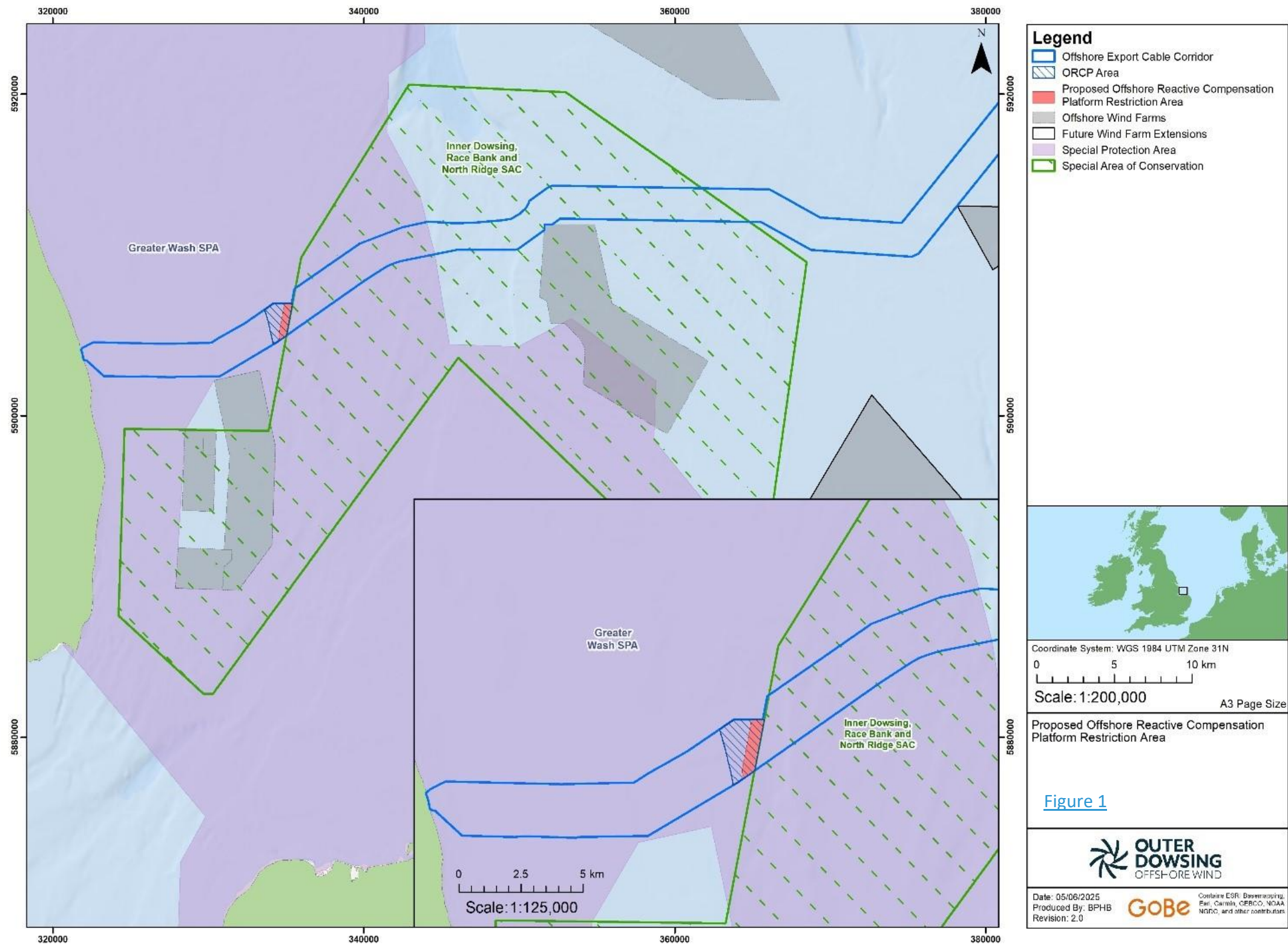


Figure 1 The location of the proposed Offshore Reactive Compensation Platform Restriction Area

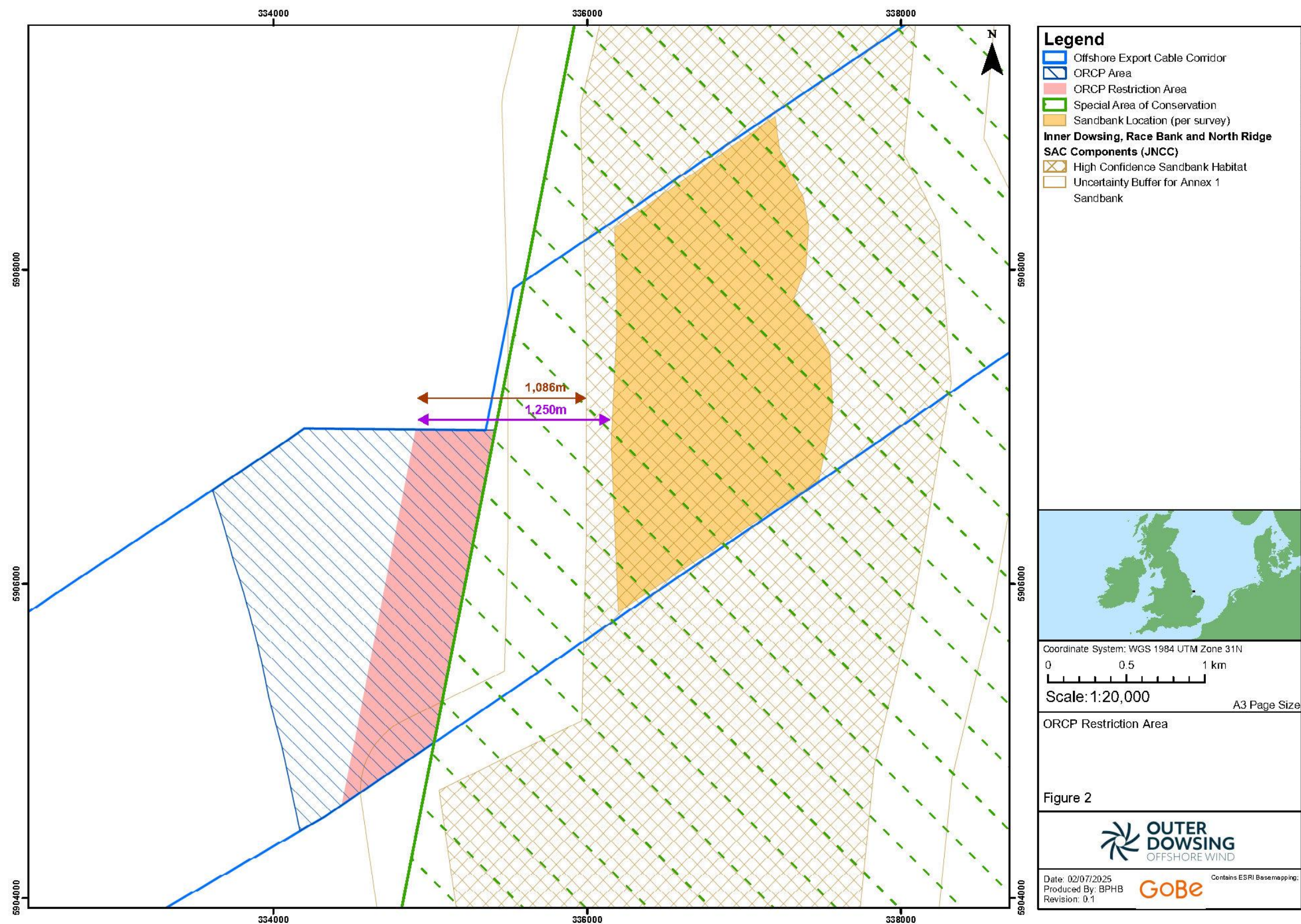


Figure 2 The Distances from the ORCP Restriction Area to the IDRBNR SAC sandbank feature.

2.1.4 Maximum Design Parameters

18. The design of the ORCPs will be developed during 2025 and finalised post-consent within the maximum design envelope defined in the DCO and assessed in the ES. The Project's maximum design parameters for the ORCPs are outlined in Table 2.1. ~~It should be noted that the parameters of the ORCPs are currently subject to a proposed change following the submission of a Change Notification at Deadline 3, The Applicant's Change Notification dated 13 December 2024 – Deadline 3 (REP3-050).~~

Table 2.1: Maximum Design Parameters for the ORCP

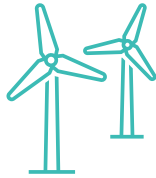
Parameters	Design Envelope
Number of independent structures	2
Topside – maximum main structure length (m)	90
Topside – maximum main structure width (m)	90
Topside – maximum height (including auxiliary structures, such as crane, but excluding antennae and masts) (m LAT)*	59.2
Maximum height of any mast, antenna or lightning protection located on the ORCPs (m LAT)	79.2
Topside maximum elevation from upper level of foundation to roof deck (m)	30
Topside – footprint (m ²)	8,100

3 Design Principles Adopted

3.1 Key Design Elements

19. The design and delivery process to be adopted for the ORCPs can be summarised as follows:
 - Engagement with local communities through the Landfall Community Liaison Group and offshore statutory stakeholders;
 - Preparation of this ORCP Design Principles Statement;
 - As outlined in the DAD, continued input from stakeholders through the design review process during detailed design;
20. The design principles are outlined in Section 3, categorised in line with the four design principles to guide the planning and delivery of major infrastructure as set out in 'Design Principles for National Infrastructure' (National Infrastructure Commission, February 2020).

Plate 3.1 The Four Design Principles for National Infrastructure (National Infrastructure Commission, February 2020).



Climate

Mitigate greenhouse gas emissions and adapt to climate change



People

Reflect what society wants and share benefits widely



Place

Provide a sense of identity and improve our environment



Value

Achieve multiple benefits and solve problems well

Table 3.1 Design Principles to be adopted

Ref	NIC Design Principle	Applicant's Design Principle	Activity
1	People and Value	Safety	Safety of the public, other sea users and operatives is the overriding principle that must be given the highest priority when making every design decision. The ORCP design will be in accordance with the requirements of the Maritime and Coastguard Agency, Trinity House, Civil Aviation Authority, Health and Safety Executive and all other relevant design standards.
2	People and Value	Functionality and Reliability	The design of all components shall be functional and fit for the purpose of maximising the generating capacity within the technical, environmental and energy affordability constraints of the Project, supporting the reliability and certainty of the power supply to the network and to displace carbon emissions helping to meet national and international carbon reduction targets, in line with the project objectives.
3	People and Value / Place	The visual impacts of ORCP infrastructure will be minimised as far as possible by the use of appropriate design, materials, shape, colour, lighting and finishes	The design process of the ORCPs, while also taking consideration of other key environmental and engineering consideration, will take into account the opportunities to reduce the visual impact of the ORCPs. The ORCP DPS process will consider a range of design aspects and the objective of reducing visual impact will continue to be a guiding principle of the process. Lighting will be designed in accordance with the Outline ORCP Lighting Management Plan (document 9.23 submitted at Deadline 4).

Ref	NIC Design Principle	Applicant's Design Principle	Activity
4	People and Value	Parish Councils, local residents and relevant planning Authorities will be represented in the design development and consultation process	The Project has an established network of 'Community Liaison Groups' (CLGs) that it has consulted with regularly during the project's development stage alongside a series of Public Information Days (PIDs) that have been undertaken at each (non-targeted) consultation phase for members of the public. The Project will engage with the Landfall CLG on the detailed design of the ORCPs.
5	Climate, People, Place and Value	Consider 'Good Design' in line 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)	The Advice on Good Design from PINS, Criteria for Good Design from EN-1, and objectives of Climate, People, Places and Values from the PINS Design Principles guide are key to the process to develop the principles in this table.
6	Climate, People, and Place	<u>The design will optimise generation of renewable energy to displace carbon emissions and help meet national and international carbon reduction and renewable energy targets, in line with the project objectives.</u> Incorporation of ecological enhancement considerations within the ORCP design where possible.	<u>The purpose of the project is to generate renewable electricity and export it to the National Grid. The technical design of the ORCPs will ensure the maximum benefit of energy generation from the Project is delivered to the National Grid.</u> Ecological based solutions for scour protected will be considered and prioritised (where possible) in the detailed design of the ORCPs scour protection (if required).

Ref	NIC Design Principle	Applicant's Design Principle	Activity
7	People, Climate Place and Value	Develop an integrated design. The design will optimise generation of renewable energy to displace carbon emissions and help meet national and international carbon reduction and renewable energy targets, in line with the project objectives.	<u>By establishing the DPS, this will create a forum, bringing together engineers, landscape architects, statutory stakeholders, external specialists (such as electrical system engineers, environmental specialists, local planning representatives, environmental stakeholders and local community representatives). The project believes that in this way the whole range of design aspects and interactions can be considered. The purpose of the project is to generate renewable electricity and export it to the National Grid. The technical design of the ORCPs will ensure the maximum benefit of energy generation from the Project is delivered to the National Grid.</u>
8	People, Place and Value	<u>Implementing the Offshore Reactive Compensation Platform Restriction Area</u> Develop an integrated design	<u>This purpose of the Offshore Reactive Compensation Platform Restriction Area is to resolve concerns regarding the potential impact of the ORCP on the features of the IDRBNR SAC by ensuring no ORCPs will be located within 500m from the edge of the IDRBNR SAC and over 1000m from the sandbank features (as defined by the JNCC (2023)¹), this is shown in Figure 2.</u> By establishing the DPS, this will create a forum, bringing together engineers, landscape architects, statutory stakeholders, external specialists (such as electrical system engineers, environmental specialists, local planning representatives,

¹ JNCC (2023) *Protected Annex I Reefs in offshore SACs - polygon data - WMS layer*. Available at: <https://hub.jncc.gov.uk/assets/dfc01272-7ea5-41ea-ac04-c89eb848a768> [accessed June 2025]

Ref	NIC Design Principle	Applicant's Design Principle	Activity
			environmental stakeholders and local community representatives). The project believes that in this way the whole range of design aspects and interactions can be considered.