

**RWE Renewables UK Dogger Bank  
South (West) Limited**

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South (East) Limited**

# **Dogger Bank South Offshore Wind Farms**

**Environmental Statement**

**Volume 7**

**Appendix 4-1 - Ofgem and National Grid Electricity System  
Operator HND Statements**

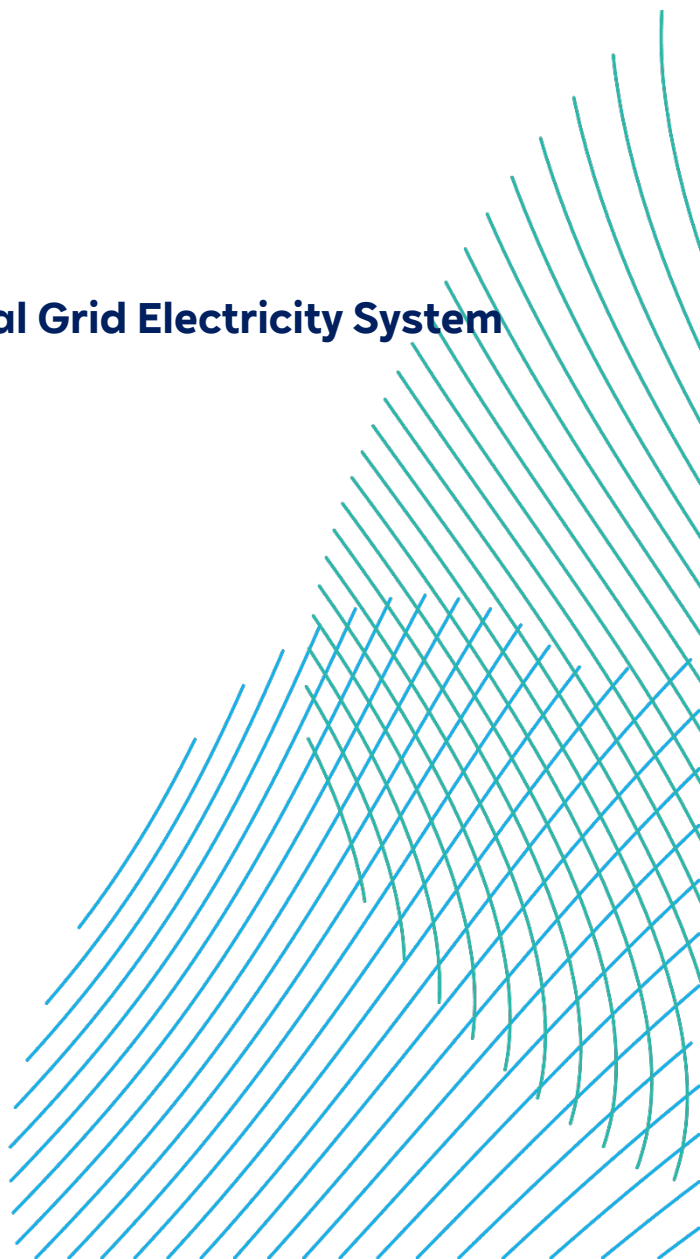
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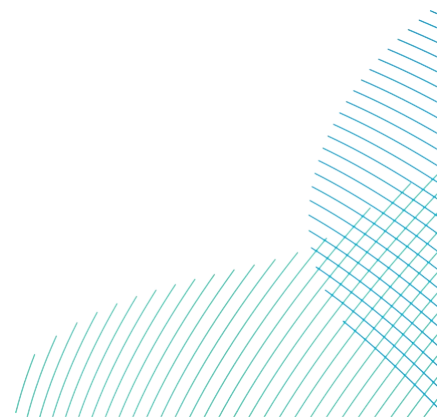
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# HND Impact Assessment – South Cluster outcome summary

February 2024

## Brief overview

In July 2022, ESO published the first Holistic Network Design<sup>1</sup> (HND) setting out a single, integrated design that supports the large-scale delivery of electricity generated from offshore wind, taking power to where it's needed across Great Britain. Since the publication of the HND, Transmission Owners (TOs) and in scope offshore wind developers with non-radial connections have started to produce the Detailed Network Design (DND).

As part of the DND phase, TOs and developers consider the designs in more detail and potential design changes are to be expected. This required ESO to develop a process to assess the impact of these changes, against the baseline of the HND, using the four HND design criteria. These changes may include a change in technology, a change in cable route or length or a change of network configuration that would have a material impact on the design criteria. We developed this process during summer 2023 with input from stakeholders, and have referred to this as the HND Impact Assessment process<sup>2</sup>.

Deviations from the recommendations may have wider implications for the transmission network and other industry processes. It is important that we understand the full impact of any design changes, as there may be consequences that are not immediately obvious, and the ESO is best placed to conduct this holistic assessment.

## Submission

On 31st August 2023, we received the first Impact Assessment from National Grid Electricity Transmission (NGET) with a design change on behalf of HND parties which were due to be electrically connected off the east coast of England. These parties are known as the “South Cluster” (given their location in relation to other HND projects) and include NGET, SSEN-T, RWE (Dogger Bank South (DBS) East and DBS West) and SSE Renewables and Equinor (Dogger Bank D). The group submitted four categories of designs, ranging in levels of interconnection. The request follows recent movements in the global supply chain of HVDC technology making the HND network in this area challenging to deliver for 2030.

## Outcome

The Impact Assessment has identified a design which presents benefits across several Network Design Objectives compared to the original HND design (the ‘baseline’). The best performing design, referenced as Category D (see map below), has reduced interconnection for the South Cluster compared to the baseline HND, with the three offshore wind farms of the South Cluster connecting directly to shore via lower capacity cables (1.44GW) and a single transmission cable (2GW) coming from the Northern Cluster to Lincolnshire.

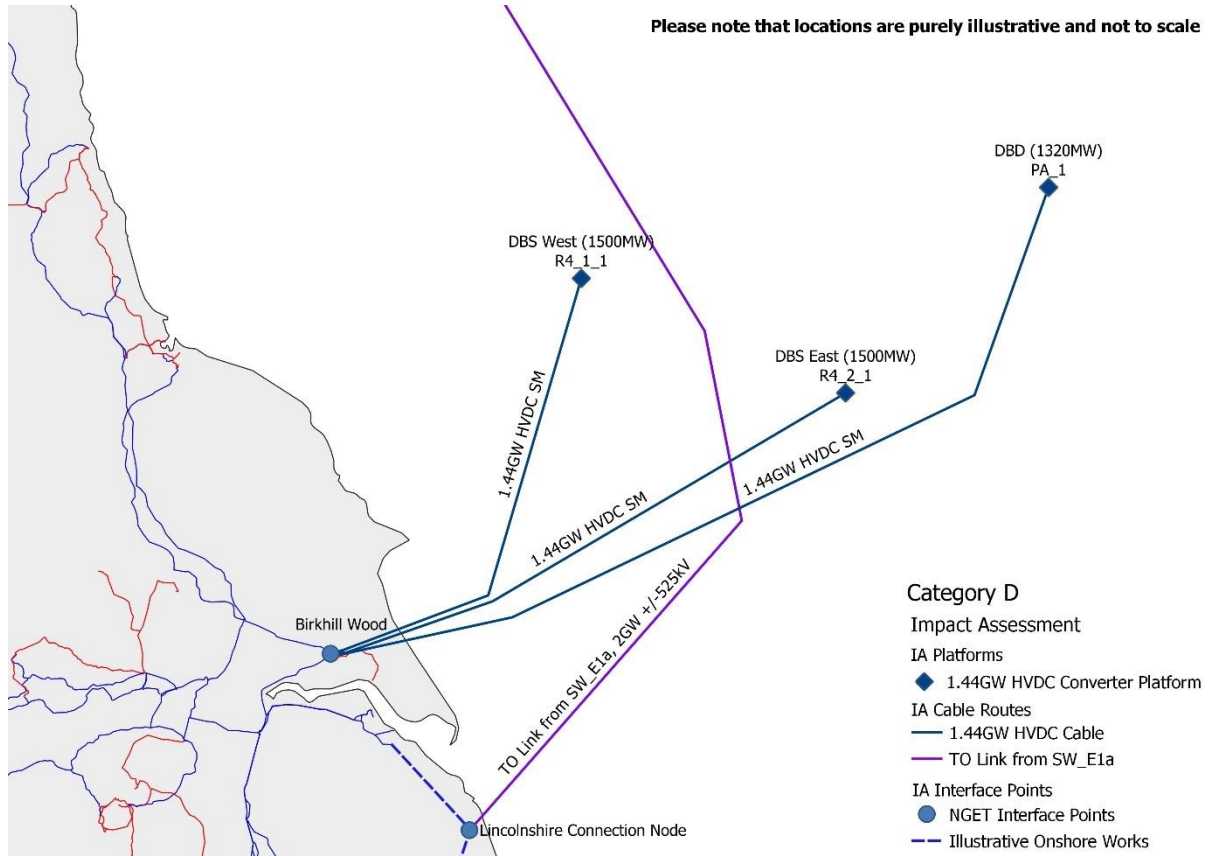
There are a number of changes that have occurred since the HND was published in 2022 which have led to this outcome. Increases in the cost of Offshore equipment above the rates of general price increases, challenges in the supply chain for transmission assets, and the identification of

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<sup>1</sup> [The Pathway to 2030 Holistic Network Design | ESO \(nationalgrideso.com\)](https://www.nationalgrideso.com)

<sup>2</sup> [Offshore Coordination Project | ESO \(nationalgrideso.com\)](https://www.nationalgrideso.com) – see “Progressing delivery of the Holistic Network Design (HND)” section

opportunities to realise additional electrical and physical capacity are key factors. A significant driver of this assessment and outcome is the updated delivery timescales for different technology types provided to the ESO by the Southern Cluster parties, meaning the original HND design would be delayed by a number of years. The Category D design delivers economic benefits by enabling earlier connection of generators, operability benefits in providing a simpler design, environmental benefits in reducing assets in a marine area that is sensitive to cabling, and a small change in community impact driven by an additional convertor station being required onshore.



(Map showing the Category D design for the HND South Cluster – locations are illustrative and not to scale)

## Governance

On 15<sup>th</sup> December 2023, this outcome was presented to the Offshore Transmission Networks Review (OTNR) Transmission Networks Board (TNB) in order to ratify that the necessary considerations had been applied. This is consistent with the approval sought for HND and HND Follow up Exercise (HND FUE). We presented the outcome of the assessment and an explanation of the process that we followed, in order to provide sufficient evidence to the group to demonstrate that we had followed the required process and ask for their sign off. The group confirmed they believe the required process had been followed, which means the outcome of the Impact Assessment is now finalised.

## Next Steps

When available, we will publish Ofgem’s response to our letter communicating the outcome of the South Cluster Impact Assessment, which we anticipate will communicate the asset classification of the new design.

Stuart Borland  
Deputy Director, Offshore Network Regulation  
Ofgem  
10 South Colonnade  
London E14 4PU

██████████@ofgem.gov.uk

National Grid ESO  
Faraday House  
Gallows Hill  
Warwick  
CV34 6DA

██████████@nationalgrideso.com  
nationalgrideso.com

19 February 2024

## ESO letter to Ofgem regarding HND South Cluster Impact Assessment and asset classification

Dear Stuart,

In July 2022, ESO published the first Holistic Network Design<sup>1</sup> (HND) setting out a single, integrated design that supports the large-scale delivery of electricity generated from offshore wind, taking power to where it's needed across Great Britain. Since the publication of the HND, Transmission Owners (TOs) and in scope offshore wind developers with non-radial connections have started to produce the Detailed Network Design (DND). As part of that process, TOs and developers have identified potential design changes which required us to develop a process to assess the impact of these changes, against the baseline of the HND, using the four HND design criteria. We have referred to this process as the HND Impact Assessment process<sup>2</sup>.

Deviations from its recommendations may have wider implications for the transmission network and other industry processes. It is important that we understand the full impact of any design changes, as there may be consequences that are not immediately obvious, and the ESO is best placed to conduct this holistic assessment.

The purpose of this letter is to communicate the outcome of the first impact assessment and the changes to the original recommended HND. We also wish to request that Ofgem consider the asset classification of the new recommended design for the "South Cluster" (as defined below) of the HND.

The first group to submit design changes for the Impact Assessment process were the HND developers and TOs due to be electrically connected off the east coast of England. These parties are known as the "South Cluster" (due to their location in relation to other HND projects) and include NGET, SSEN-T, RWE (Dogger Bank South (DBS) East and DBS West) and SSE Renewables and Equinor (Dogger Bank D). The request follows recent movements in the global supply chain of HVDC technology making the HND network in this area challenging to deliver for 2030.

The group submitted four categories of designs, ranging in levels of interconnection. Upon completing the Impact Assessment for the HND South Cluster, Category D performed more favourably against the HND design objectives than all other categories, as well as the baseline design. Further detail of the new design, the factors influencing the outcome of the Impact Assessment, and the potential benefits of the design change can be found in the accompanying South Cluster Impact Assessment Outcome [summary document](#) on the ESO HND website.

<sup>1</sup> [The Pathway to 2030 Holistic Network Design | ESO \(nationalgrideso.com\)](#)

<sup>2</sup> [Offshore Coordination Project | ESO \(nationalgrideso.com\)](#) – see "Progressing delivery of the Holistic Network Design (HND)" section

There are a number of changes that have occurred since the HND was published in 2022 which have led to this outcome. Increases in the cost of Offshore equipment above the rates of general price increases, challenges in the supply chain for transmission assets, and the identification of opportunities to realise additional electrical and physical capacity are key factors. The Category D design delivers economic benefits by enabling earlier connection of generators, operability benefits in providing a simpler design, environmental benefits in reducing assets in a marine area that is sensitive to cabling, and a small change in community impact driven by an additional convertor station being required onshore.

On 15<sup>th</sup> December, ESO took an agenda item on the South Cluster Impact Assessment to a meeting of the Offshore Transmission Networks Review (OTNR) Transmission Networks Board, in order to ratify that the necessary considerations had been applied<sup>3</sup>. This is consistent with the approval sought for HND and HND Follow up Exercise (HNDFUE). We presented the outcome of the assessment and an explanation of the process that we followed, in order to provide sufficient evidence to the group to demonstrate that we had followed the required process and ask for their sign off. The group confirmed they believe we had followed the required process which means the outcome of the Impact Assessment is now finalised.

In October 2022, Ofgem set out the criteria for determining the appropriate classification<sup>4</sup> of each asset in the HND, in order for the correct licence to be granted. We are now advising Ofgem of the change to the network design in this region so that Ofgem can consider the asset classification for infrastructure proposed in the Category D design for the South Cluster. This will provide clarity for TOs and developers progressing the DND for the Category D design.

We welcome your response. If you have any questions or comments related to points raised in this letter or require further information to carry out the asset classification of the design, please do get in touch.

Yours sincerely

Graham Stein

Head of Offshore Coordination Network Planning

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<sup>3</sup> PowerPoint Presentation ([nationalgrideso.com](http://nationalgrideso.com)) – see Governance section

<sup>4</sup> [Offshore Transmission Network Review: Decision on asset classification | Ofgem](#)



Making a positive difference  
for energy consumers

Graham Stein, Head of Offshore Coordination Network Planning  
National Grid ESO  
Faraday House  
Gallows Hill  
Warwick  
CV34 6DA

Offshore Coordination Team  
[offshore.coordination@ofgem.gov.uk](mailto:offshore.coordination@ofgem.gov.uk)

27 March 2024

## **Response to National Grid ESO regarding HND South Cluster Impact Assessment & Asset Classification**

Dear Graham,

We are writing to you in response to the letter you sent to us on 19 February 2024, advising us of the change to the network design in the South Cluster region of the Holistic Network Design (**HND**) following the outcome of the South Cluster Impact Assessment.<sup>1</sup>

We respond in this letter to your request for us to consider the asset classification for the infrastructure proposed in the revised network design. We have set out the relevant publications and regulatory framework used in making our determination of the resulting classifications for assets in the South Cluster.

Should you have any questions regarding any of the matters raised in this letter, please contact the Offshore Coordination Team at [offshore.coordination@ofgem.gov.uk](mailto:offshore.coordination@ofgem.gov.uk) to discuss.

Yours faithfully,

**Stuart Borland**  
**Deputy Director, Offshore Network Regulation**

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<sup>1</sup> [ESO letter to Ofgem regarding HND South Cluster Impact Assessment and asset classification \(nationalgrideso.com\)](#)



## Background

### *The Holistic Network Design*

The HND<sup>2</sup> was published (the July 2022 HND) as part of the Offshore Transmission Network Review (**OTNR**)<sup>3</sup> launched in 2020 by the then Department for Business, Energy and Industrial Strategy (**BEIS**), now the Department for Energy Security and Net Zero (**DESNZ**).

The OTNR has since moved from review to implementation stage as of May 2023, in order to deliver a single, integrated solution to support the delivery of offshore wind across the UK to meet the target of 50GW of offshore wind by 2030 and reduce carbon emissions.

### *The Impact Assessment*

Following the publication of the HND, parties involved progressed to the next stage of the design known as the Detailed Network Design (**DND**). Over the course of this work, parties have identified a number of issues associated with the delivery of the design as presented in 2022. A number of changes were proposed in the South Cluster, in response to evolving supply chain conditions and increased costs of offshore equipment required to deliver the HND. These changes required examination through National Grid Electricity System Operator's (NGESO) Impact Assessment process.<sup>4</sup>

The process assesses proposed design changes to the July 2022 HND in order to ensure that they remain compliant with the original design objectives, as any deviations from the baseline HND have potentially far-reaching implications for the transmission network, consumers, the environment, and wider industry.

As the next stage of the HND progresses to the DND an impact assessment for design changes was introduced in response to evolving conditions in supply chain constraints and increases in the cost of offshore equipment required to deliver the HND.

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<sup>2</sup> [The Pathway to 2030 Holistic Network Design | ESO \(nationalgrideso.com\)](https://www.nationalgrideso.com/2022/07/20/2022-holistic-network-design/)

<sup>3</sup> [Offshore transmission network review - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/offshore-transmission-network-review)

<sup>4</sup> [HND and HND FUE Impact Assessment Process \(nationalgrideso.com\)](https://www.nationalgrideso.com/2022/07/20/2022-holistic-network-design/)



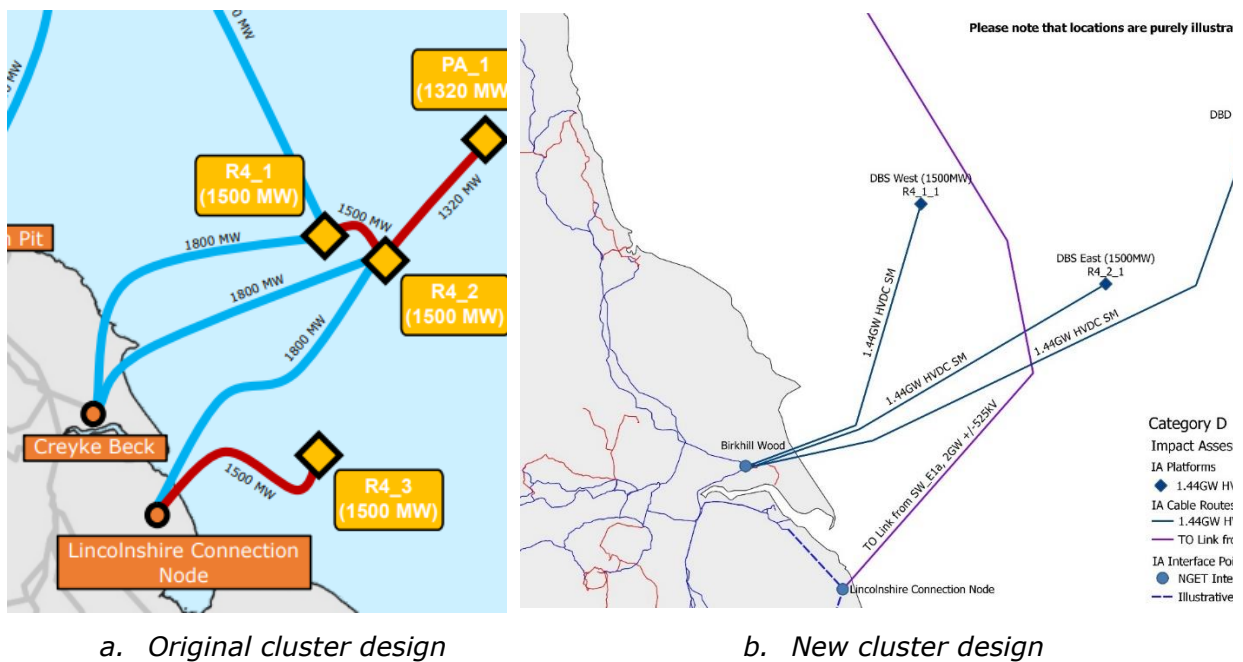
## Changes to the HND

The outcome of the impact assessment has resulted in a change in asset configuration in the area of the HND referred to as the South Cluster, detailed in **Figure 1**<sup>5</sup>.

In order to facilitate earlier connection dates of offshore wind and due to supply chain constraints and cost of offshore infrastructure, a change was sought from a highly coordinated design to a radial one. The new configuration in **Figure 1b** was deemed by NGESO's Impact Assessment to provide the greatest overall benefit in economic, deliverability, and environmental terms, of four proposed design changes from the baseline HND.

These changes were presented to the Transmission Networks Board (**TNB**) on 15 December 2023, who confirmed that the necessary considerations had been applied and the required process had been followed, therefore the outcome of the Impact Assessment is now finalised.

**Figure 1 – Original & new designs for the South Cluster**



<sup>5</sup> [ESO, HND Impact Assessment – South Cluster outcome summary \(nationalgrideso.com\)](https://www.nationalgrideso.com)

## Asset Classification

With the introduction of a new design, NGESO asked us to consider the activities by the assets in this design for the purposes of licensing, which requires a new classification. We have applied the asset classification principles and methodology as set out in our October 2022 decision<sup>6</sup>, which outlined classifications for the July 2022 HND assets (**Figure 1a**), to the assets in **Figure 1b**.

In addition to the following definitions, we set out classifications in **Table 1** below and give further detail on the process as applied to each asset in **Annex 1**.

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<sup>6</sup> [Offshore Transmission Network Review: Decision on asset classification | Ofgem](#)

### *Radial offshore transmission*

We consider a radial offshore solution to be a transmission system which fulfils both of the following criteria:

- Infrastructure is used for transmission in an area of offshore waters of electricity generated by a single generating station in such an area, and
- Infrastructure connecting a single offshore generating station directly to a point on the transmission system owned by a transmission owner. This point may be physically located onshore or offshore, and its designation as onshore or offshore will be determined by its primary electrical function (primary usage), as opposed to its location.

### *Non-radial offshore transmission*

We consider a non-radial offshore solution to be a transmission system which fulfils both of the following criteria:

- Infrastructure used for transmission in an area of offshore waters of electricity generated by two or more generating stations in such an area, and
- Infrastructure connecting two or more offshore generating stations to a point on the transmission system owned by a transmission owner. This point may be physically located onshore or offshore, and its designation as onshore or offshore will be determined by its primary electrical function (primary usage), as opposed to its location.

### *Onshore transmission*

Under the Electricity Act 1989, onshore transmission is not defined but for the purposes of the HND it is regarded as any transmission<sup>7</sup> not falling within the definition of offshore transmission<sup>8</sup> and under the existing regime onshore transmission assets are owned by TOs.

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<sup>7</sup> As defined in section 4(4) of the Electricity Act 1989

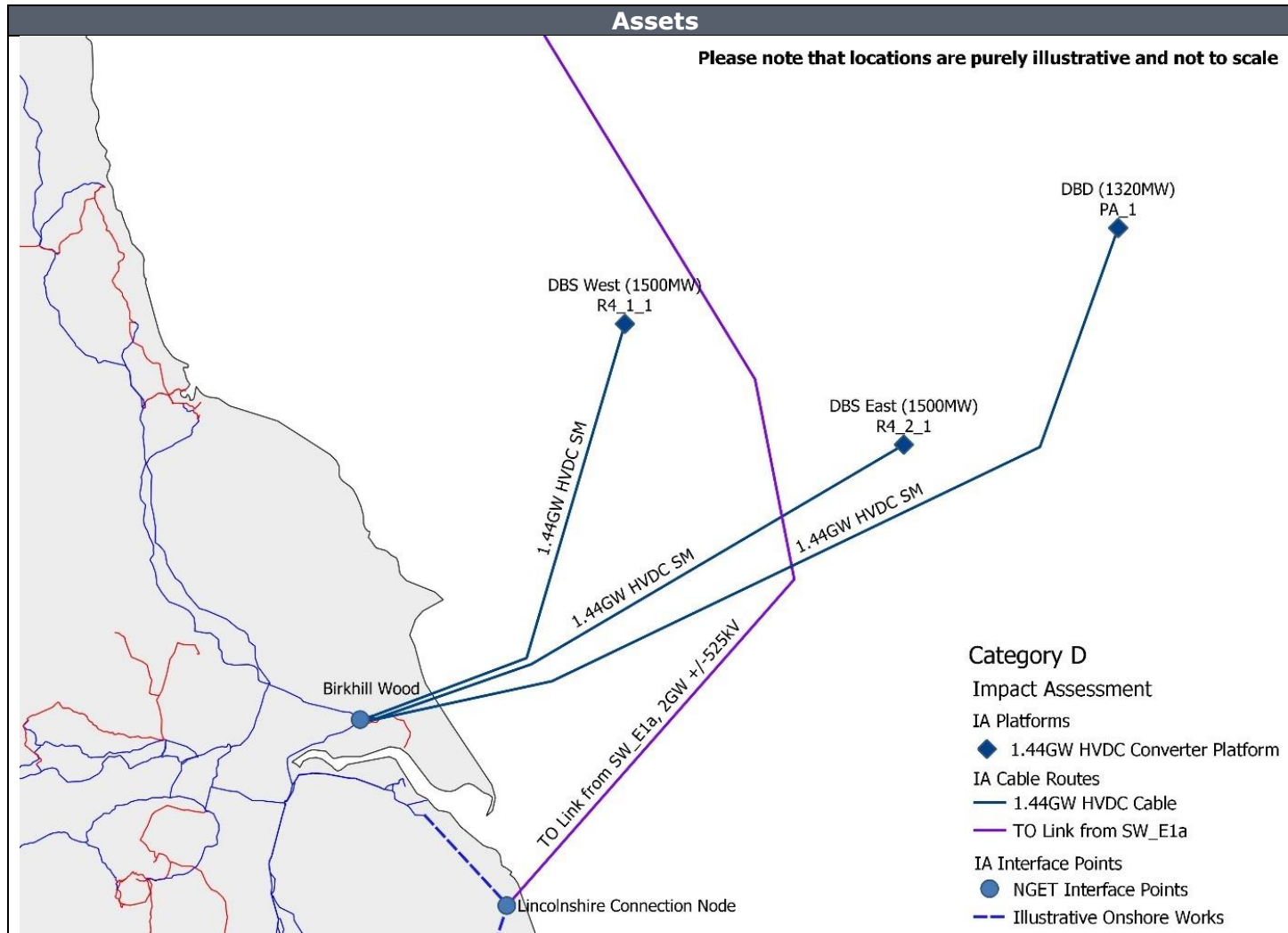
<sup>8</sup> As defined in section 6F(8) of the Electricity Act 1989.

**Table 1 – Classification of assets**

Using the methodology indicated, we have classified the assets of the revised design of the South Cluster as follows:

<b>Circuit</b>	<b>Classification</b>
PA_1 – Birkhill Wood	Radial Offshore Transmission
R4_1 – Birkhill Wood	Radial Offshore Transmission
R4_2 – Birkhill Wood	Radial Offshore Transmission
SW_E1a – Lincolnshire Connection Node	Onshore Transmission

## Annex 1. South Cluster asset classification



Circuit	Legislative Review	Technical Review		Legal Verification	Classification
		Power Flow	Capacity Utilisation		
PA_1 – Birkhill Wood	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from PA_1 substation to onshore substation.	1.32GW OWF using 1.44GW substation & HVDC cable.	Wholly used to convey electricity generated offshore at PA_1 OWF to onshore substation.	Radial Offshore
R4_1 – Birkhill Wood	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_1 substation to onshore substation.	1.5GW OWF using 1.44GW substation & HVDC cable.	Wholly used to convey power generated offshore at R4_1 OWF to onshore substation.	Radial Offshore
R4_2 – Birkhill Wood	Infrastructure is used for transmission in offshore waters, of electricity generated by a single generating station. Used for conveying electricity generated by OWF to transmission system.	Unidirectional flow from R4_2 substation to onshore substation.	1.5GW OWF using 1.44GW substation & HVDC cable.	Wholly used to convey electricity generated offshore at R4_2 to onshore substation.	Radial Offshore
SW_E1a – Lincolnshire Connection Node	Infrastructure is used for transmission in offshore waters, of electricity generated onshore. Used for conveying electricity generated by onshore through transmission system.	Unidirectional flow from SW_E1a to Lincolnshire Connection Node	2GW onshore (most), 1.5GW OWF & substation (part) using 2GW HVDC cable.	Neither wholly nor mainly used to convey electricity generated offshore, therefore onshore. Continues & completes eastern bootstrap reinforcement link.	Onshore (reinforcement)