nationalgrid

Birkhill Wood 400kV Substation

Eligibility Letter Summary

National Grid Electricity Transmission
Eligibility Letter

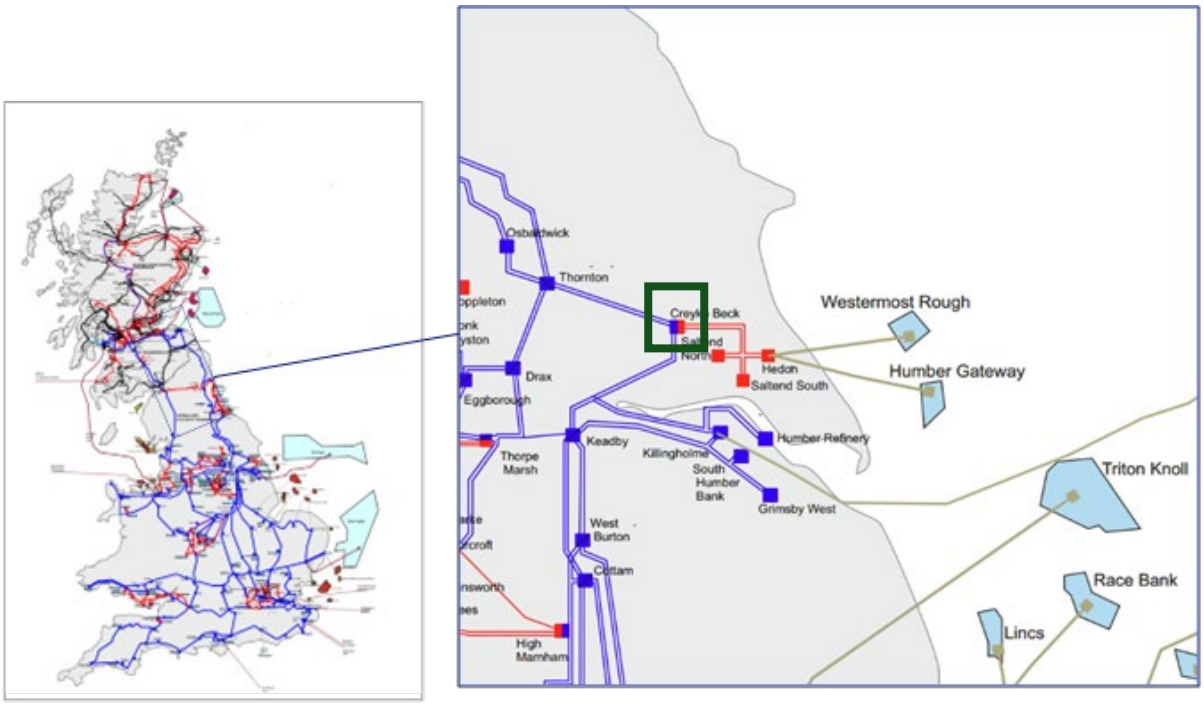
October 2026

1. Background

Birkhill Wood is a generation-driven investment near Creyke Beck in the North Humber area. It will deliver a new 400kV SF6-free gas-insulated switchgear (GIS) substation, including spare bays, approximately 700m north of the existing substation.

The existing Creyke Beck site cannot accommodate the contracted additional offshore wind connections. Birkhill Wood will provide a separate connection node on the Creyke Beck to Thornton 4ZR overhead line and the northern connection point for North Humber to High Marnham. That separately funded reinforcement provides the additional network capacity needed to export the generation.

Figure 1: Proposed location of investment on our network



*Key: **Red** = 275kV assets, **Blue** = 400kV assets. Investment location shown in **green** box.*

This Eligibility Letter seeks Ofgem's approval of project eligibility under Special Condition 3.18 of the RIIO-ET3 Load Re-opener, confirmation of Track 3 and Pre-Construction Funding under Special Condition 3.15. We also invite review of the optioneering and preferred solution. Track 3 is proposed due to the project materiality and the preferred design falls outside the PASE baseline.

2. Investment Drivers

The confirmed need comprises 4.27GW of offshore wind connections. These customers have Gate 2 status following Connections Reform.

The design also retains provision for an offered but not yet contracted connection, bringing potential capacity to 6.87GW. The need for investment does not depend on this customer proceeding. Customer dates and efficient scope remain subject to confirmation. Asset health is not a direct investment driver.

3. Options

We undertook a structured, multi-factor optioneering process to identify a proportionate and deliverable solution in the interests of consumers. We considered do nothing, market-based, non-transmission whole-system, existing asset and new-build approaches. Options E-5 to E-8 were shortlisted for detailed assessment.

Table 1: Summary of longlist options assessment

Option	Details	Shortlist?	Preferred?
A	Do nothing counterfactual	No – cannot deliver the connections or network interface	
B	Market-based solution	No – cannot deliver compliant physical connections	
C	Non-transmission, whole-system solution	No – no credible equivalent capacity or network capability	
D-1	Extend or rebuild Creyke Beck	No – insufficient space and unacceptable resilience risk	
D-2	Use Hedon 275kV substation	No – requires rebuilding at 400kV and major additional reinforcement	
D-3	Extend Thornton 400kV substation	No – substantially longer customer cables and higher costs	
E-1	New substation at Garthorpe Tee	No – longer cables and weaker boundary-capability benefit	
E-2	New substation at Fenwick Tee	No – longer cables and weaker boundary-capability benefit	
E-3	Staged AIS or GIS construction on the 4ZR route	No – design and reconfiguration inefficiencies without a programme benefit	
E-4	North–south AIS arrangement at the original site	No – two pipeline diversions and extensive overhead-line diversion	
E-5	SF6-free GIS at the original preferred site	Yes	Yes
E-6	AIS wraparound at the original preferred site	Yes	
E-7	AIS south of the 4ZR route, north-east to south-west arrangement	Yes	
E-8	AIS north of the 4ZR route, north-east to south-west arrangement	Yes	
E-9	AIS south of the 4ZR route, north–south arrangement	No – greater ecological and heritage constraints	
E-10	AIS south of the 4ZR route, north-east to south-west arrangement	No – heritage, landscape, residential and access constraints	

4. Qualitative Trade-offs Between the Shortlisted Options

The table below sets out how the four shortlisted options compare against the balanced scorecard criteria used in our qualitative assessment. Ratings reproduce the submission's assessment; the narrative explains the main trade-offs.

Table 2: Qualitative trade-offs between the shortlisted options

Criteria	Option E-5	Option E-6	Option E-7	Option E-8
Engineering	**Benefit.** Avoids both pipeline diversions and higher flood-risk areas. Requires a temporary overhead-line diversion; GIS spares can have long lead times.	**Strong detractor.** Avoids the gas-main diversion but requires SABIC pipeline and substantial overhead-line diversions, plus flood protection.	**Benefit.** Avoids both pipelines and provides the required connection capacity and space for expansion.	**Benefit.** Avoids both pipelines. A technically feasible overhead-line connection and space for expansion are available.
Environmental	**Neutral.** Smaller footprint limits habitat, farmland and landscape impacts and allows biodiversity gain on site. Alternative insulating gas remains a greenhouse gas.	**Detractor.** Larger footprint affects habitats, watercourses and Flood Zones 2 and 3, requiring additional mitigation land.	**Detractor.** Avoids significant flood risk, but loses high-quality agricultural land and has limited landscape screening.	**Neutral.** No identified flood constraint or adjacent priority habitat; agricultural land loss and hedgerow removal remain considerations.
Deliverability	**Benefit.** Overhead-line and substation works can proceed in parallel. No pipeline or Park Lane diversion is needed.	**Strong detractor.** Diversions and enabling works precede construction. Delivery is approximately four years later than E-5.	**Neutral.** Avoids pipeline diversions, but switching sites now requires further land, design and consenting work and delays connections.	**Benefit.** Avoids pipeline diversions, but rural access needs traffic management. Switching sites now would delay connections.
Economic / consumer value	**Benefit.** Lowest initial capital cost and fewer land, civil and third-party costs. Equipment faults may require longer outages.	**Neutral.** Higher initial cost but a marginally better modelled NPV. Longer delivery and additional dependencies weaken overall consumer value.	**Detractor.** Larger footprint and substantial excavation and fill increase land, civil and mitigation costs.	**Detractor.** Highest initial capital cost. Larger footprint and earthworks increase costs, despite avoiding pipeline diversions.
Consenting / stakeholder	**Neutral.** Planning consent secured. Smaller footprint reduces land and consenting interfaces.	**Strong detractor.** Multiple landowners, utility approvals and bridleway diversion increase consenting complexity.	**Strong detractor.** Nearby housing and overlap with proposed wind-farm and solar-farm development boundaries create material interfaces.	**Benefit.** Fewer residential constraints than E-7; identified as the preferred alternative AIS site. Development-boundary overlaps remain.

All four options provide future expansion capacity. E-6 to E-8 are PASE-aligned AIS comparators. E-5's departure from PASE is justified in the submission by the combined land, engineering, environmental, consenting and delivery implications, rather than pipeline avoidance alone.

5. Quantitative Trade-offs Between the Shortlisted Options

The table below expresses the position of Option E-5 relative to Option E-6, E-7 and E-8. The cost-book estimates reflect our view at the time of optioneering and allow a like-for-like comparison of the shortlisted options. To ensure we can maintain a competitive tender process and in turn protect consumer value, we have anonymised conductor supplier names and have only provided cost ratios.

Table 3: Quantitative trade-offs between the shortlisted options

Measure	Option E-5	Option E-6	Option E-7	Option E-8
Cost-book estimate (£m)	1	1.17	1.20	1.28
Total capital cost including replacement (£m, undiscounted)	(1)	(1.17)	(1.20)	(1.28)
Net present value (£m, discounted)*	(1)	(0.99)	(1.06)	(1.13)
Construction carbon (£m, undiscounted)	(1)	(1.23)	(1.21)	(1.24)
Gas leakage (£m, undiscounted)	(1)	(1)	(0.8)	(0.8)
Electrical losses comparison	Not separately reported	Not separately reported	Not separately reported	Not separately reported
Replacement assumption	40 years	40 years	40 years	40 years

***Parentheses denote negative values as reported. A less negative NPV is better. The 40-year replacement assumption is common to all options; it is not a separately evidenced asset-life comparison.*

E-5 has the lowest initial capital cost. E-6 has a marginally better NPV, but its approximately four-year longer delivery and greater third-party dependencies outweigh that advantage in the overall assessment. The CBA does not include a probability-weighted adjustment for additional delay; this remains a qualitative consideration.

Earlier availability of the Birkhill Wood interface enables North Humber to High Marnham benefits sooner. The submission identifies material (+£100m) cumulative constraint costs associated with a four-year delay. This benefit belongs to the separate reinforcement, with Birkhill Wood providing the enabling interface, and should not be double counted.

6. Preferred Solution

Based on the qualitative and quantitative assessment, Option E-5 is the preferred solution because:

- Consumer value: it has the lowest initial capital cost and the strongest overall balance of cost, delivery certainty and earlier benefits, despite E-6's marginal NPV advantage.
- Deliverability: it avoids major pipeline diversions and allows overhead-line and substation works to proceed in parallel, supporting earlier customer and network connections.
- Futureproofing: two spare bays and provision for additional bays retain flexibility for future network requirements without relying on them to justify the investment.
- Environmental considerations: its compact footprint avoids Flood Zones 2 and 3 and limits farmland, habitat, landscape and civil-work impacts.
- Stakeholder considerations: planning consent is secured and the smaller footprint reduces land, utility and consenting interfaces.
- Strategic benefits: it provides the northern interface for North Humber to High Marnham and accommodates provision for further generation, removing the need to progress Wanless Beck as a separate substation.

The preferred scope remains subject to the developing security and resilience requirements, which may affect scope, land, cost or programme. Any consequential changes will be presented at the Needs Case stage.