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Walpole West 400kV AIS Extension

Eligibility Letter Summary

National Grid Electricity Transmission
Eligibility Letter

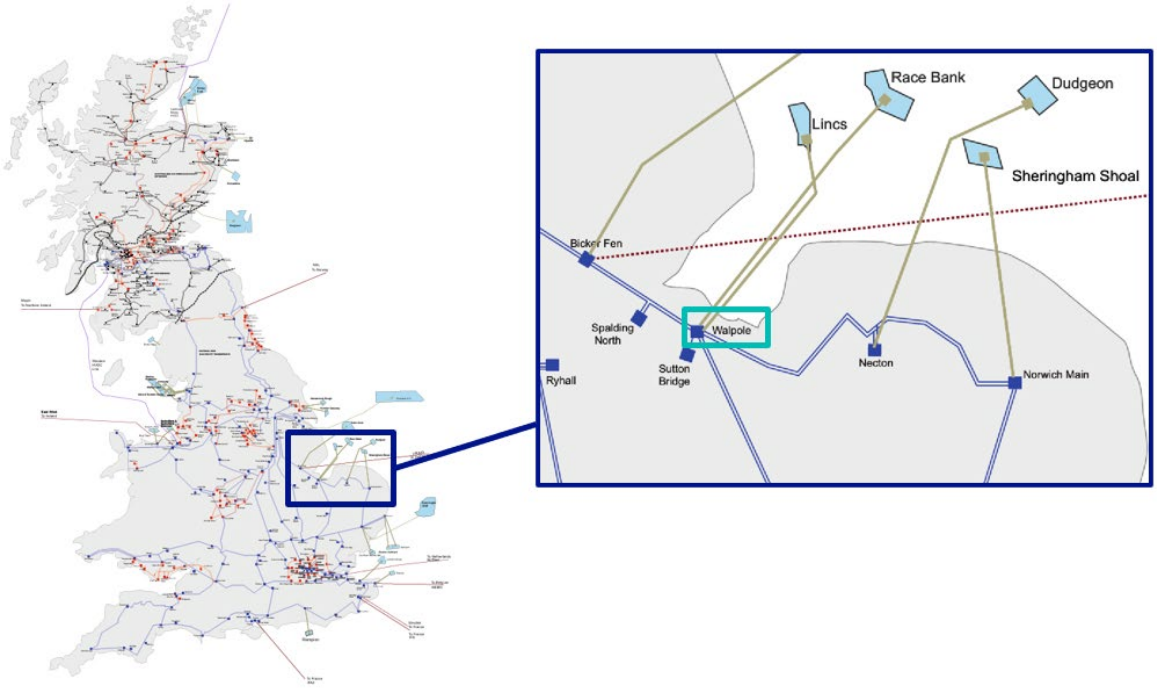
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1. Background

The Walpole West 400kV AIS Extension is a load-driven project at Walpole substation in East Anglia. It will extend the existing 400kV substation, providing a connection bay for a new generation customer and undertaking asset circuit reconfiguration to accommodate the increased demand.[1]

Walpole is a key node on the transmission network with a large influence on power flows out of East Anglia. The region is strategically important for transporting renewable energy, with significant growth in offshore wind, solar and battery storage connecting to the network.

Figure 1: Location of the proposed investment on our network



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

This Eligibility Letter is being submitted as part of the RIIO-ET3 Load Re-opener (LR) mechanism.[2] This submission requests Ofgem's approval of project eligibility and seeks approval of the project's needs case and preferred solution. This submission further requests Pre-Construction Funding (PCF) and confirmation that the project should proceed as a Track 2 project.[3]

2. Investment Drivers

The driver for this investment is customer connections. The investment provides a connection bay for a Gate 2 Phase 2 generation customer at 400kV.[4] Connections Reform studies have also identified this investment as enabling works for around 9.5GW of Gate 2 generation, including major offshore wind projects. Currently, both circuits connect to the same busbar section at Walpole. Moving one circuit onto a new section removes this limitation and reduces the risk of generation being curtailed.

[1] The asset reconfiguration includes extension of the existing main and reserve busbars.
[2] Under Special Condition 3.18 (Load Re-opener and Price Control Deliverable) of the Electricity Transmission Licence Conditions.
[3] Under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable) of the Electricity Transmission Licence Conditions.
[4] The customer connection pipeline has been refined through a process known as Connections Reform. As part of this process, projects that did not meet the required progression criteria were reassigned to Gate 1, removing less mature projects from the near-term connection background. The remaining projects (Gate 2, which is split into Phases 1 and 2) therefore represent the current view of the most credible and deliverable customer connections.

3. Options

We undertook a structured, multi-factor optioneering process to identify a proportionate and deliverable solution in the interests of consumers. We first identified **11 longlist options** within five strategic option categories: do nothing, market-based, non-transmission whole-system, making use of the existing substation, and building a new substation.

From the longlist, we **shortlisted options D-5, D-6 and D-7** following a high-level assessment against balanced scorecard criteria (see table, below). Options A-C were rejected due to their failure to deliver a compliant customer connection. Options D-1 to D-4 were rejected due to engineering, operational and safety challenges and poorer consumer value. Option E was rejected because a new substation could not be delivered in time to meet the need and would cost consumers more.

Table 1: Summary of longlist options assessment

Option	Details	Shortlist?	Preferred?
A	Do nothing counterfactual	No – cannot deliver compliant customer connection	
B	Market-based solution	No – cannot deliver compliant customer connection	
C	Non-transmission, whole systems solutions	No – cannot deliver compliant customer connection	
D-1	extension of the existing Main and Reserve busbars 2 using rigid busbars	No – operational and safety complexity due to proximity of existing overhead line	
D-2	extension using rigid busbars with an “S” shape (90-degree change in direction)	No – more infrastructure required; maintenance and access challenges	
D-3	extension using rigid busbars with an “S” shape, with feeder bay back-to-back with new bus coupler	No – more infrastructure required; maintenance and access challenges	
D-4	extension using flexible and rigid busbars, with feeder bay back-to-back with new bus coupler	No – more infrastructure required; non-standard design needing specialist resource	
D-5	extension of the existing Main and Reserve busbars 2 using rigid busbars, with access from the south	✓	
D-6	extension of the existing Main and Reserve busbars 2 using rigid busbars	✓	
D-7	extension of the existing Main and Reserve busbars 2 using rigid busbars[5]	✓	✓
E	Construct a new 400kV substation	No – cannot be delivered in time; highest cost	

4. Qualitative Trade-offs Between the Shortlisted Options

The table below sets out how the three shortlisted options compare against the balanced scorecard criteria used in our qualitative assessment.

[5] Distinguished from D-6 by additional bay, reserve busbar section circuit breaker, and a wider cable easement.

Table 2: Qualitative trade-offs between the shortlisted options

Criteria	Option D-5	Option D-6	Option D-7
Engineering	**Detractor.** Meets the need, but with access only from the south, this results in a constrained layout. This makes construction and routine maintenance more difficult.	**Neutral.** A more standard layout than D-5, with perimeter and internal access roads that improve construction, operation and maintenance.	**Benefit.** Builds on D-6 by adding a reserve busbar section circuit breaker, giving more flexible running arrangements, plus space for an extra future bay.
Environmental	**Neutral.** Smallest land take, as it stays within distribution network operator (DNO) land. Construction impacts are local and manageable.	**Neutral.** Slightly larger footprint than D-5. Construction impacts are local and manageable through standard mitigation.	**Neutral.** Similar construction and carbon impacts to the other options. The larger footprint is balanced by avoiding future rework.
Deliverability	**Detractor.** Constrained layout makes delivery of equipment and materials complex.	**Neutral.** Easier construction access and commissioning, although the northern road sits closer to an existing overhead line, requiring careful controls.	**Benefit.** The most buildable arrangement. A wider cable easement addresses a constraint found during design development.
Economic / consumer value	**Neutral.** Lowest upfront cost. Constrained layout creates ongoing operational and maintenance inefficiencies.	**Benefit.** A more standard layout reduces construction risk and maintenance complexity, supporting better value over the asset life.	**Benefit.** Maximises future flexibility at the site, reducing the likelihood of costly future rework and fence-line changes. Improved operability reduces constraints.
Consenting / stakeholder	**Benefit.** Avoids buying land from another landowner, reducing stakeholder dependency.	**Detractor.** Requires DNO land and another strip of land, increasing the risk of delay.	**Detractor.** Same land and planning requirements as D-6, although the improved layout makes best use of the land acquired.

5. Quantitative Trade-offs Between the Shortlisted Options

The table below expresses the position of the different shortlisted options relative to Option D-7. 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 only provided cost ratios.

Table 3: Quantitative trade-offs between the shortlisted options

Measure	Option D-5	Option D-6	Option D-7
Cost-book estimate	0.94	0.98	1
Total capital cost over the 50-year appraisal period, including replacement	0.94	0.98	1
Net present value (cost)*	0.94	0.98	1
Undiscounted carbon and losses costs	0.89	0.99	1

**Lower is better*

Option D-5 is the most economical option on the initial cost-book estimate and net present value, mainly because it avoids buying additional land and has a smaller footprint. Option D-7 costs around 6% more than D-5 and around 2% more than D-6. We consider the marginal cost difference is outweighed by the operability, access and long-term flexibility benefits of Option D-7, which reduce the likelihood of costly future rework at the site and best secures consumer value in the long-term.

6. Preferred Solution

Based on a qualitative and quantitative assessment of the shortlisted options, **Option D-7 is the preferred option** because:

- It offers the **best long-term consumer value**. It provides additional space for future optionality for only a marginally higher cost than the next best option. These are delivered as civil works only, making this a low-regret choice that can avoid more costly reinforcement works and disruption. Further, this investment enables the connection of wider large offshore wind connections in the region which can result in less curtailment due to increased power flow capabilities – providing consumers with lower constraint costs.
- It is the **most deliverable and operable layout**. It has full access around the extension, a reserve busbar section circuit breaker for more flexible operation, and a wider cable corridor. These features could not be accommodated within the existing designs of the other options.
- It **futureproofs the Walpole site**. The nearby new substation planned in the area has no space for further expansion, and we have received early interest from prospective customers wishing to connect at Walpole 400kV – these increase the importance of building in future-flexibility at the Walpole substation. This also supports a coordinated site strategy, enabling generation connections across East Anglia and aligning with planned fault level uprating works at Walpole to reduce the risk of inefficient redesign or rework.