nationalgrid

Laleham 132kV Extension

Needs Case Summary

National Grid Electricity Transmission
Needs Case

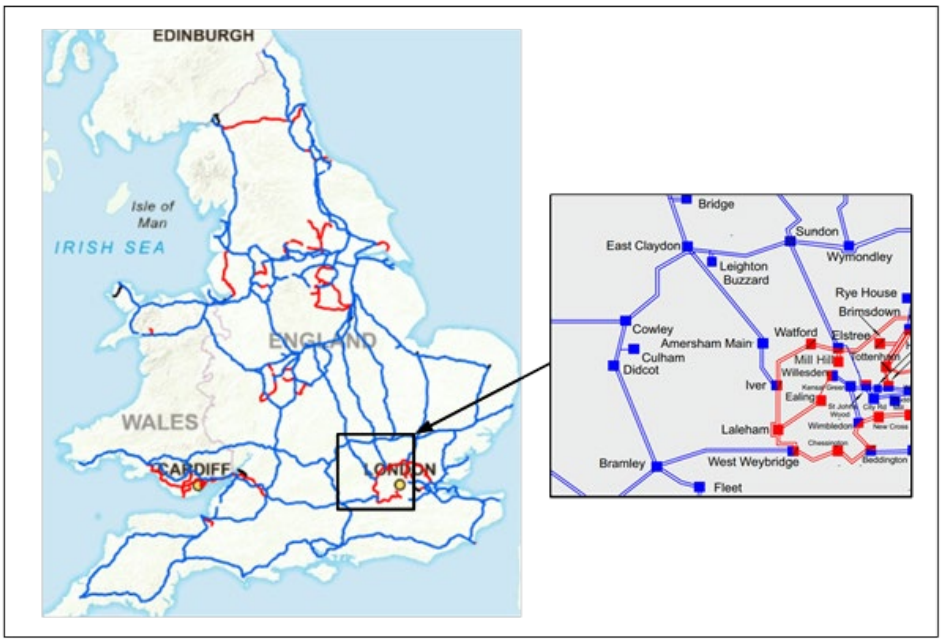
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1. Background

Laleham 132kV Extension is a demand-driven reinforcement project in West London. It will extend the existing 132kV substation into a new standalone gas-insulated switchgear (GIS) building using SF6-free technology, connected to the existing site by a new busbar section. It will also replace the four existing supergrid transformers with larger units to increase capacity at the site.

Electricity demand in West London is growing rapidly, driven particularly by new data centres. Laleham is an important connection point in this area, supplying the local distribution networks. The existing site is tightly constrained by a dual carriageway, a neighbouring quarry and a reservoir, and is surrounded by green belt land and flood risk areas. These constraints have shaped our choice of a proportionate solution that can be delivered within our existing site.

Figure 1: Proposed location of investment on our network



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

This Needs Case is being submitted as part of the RIIO-ET3 Load Re-opener (LR) mechanism under Special Condition 3.18 (Load Re-opener and Price Control Deliverable) of the Electricity Transmission Licence Conditions. The project was originally proposed for Track 2. Following Ofgem's Draft Determinations for investments submitted in the May 2026 Load Re-opener window, it is now proceeding via Track 3. This submission seeks Ofgem's approval of the project's needs case and preferred solution, and seeks Pre-Construction Funding (PCF) under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable).

2. Investment Drivers

The primary driver is customer connections. Five customers designated as Gate 2 connections as part of Connections Reform are contracted to connect at Laleham.[1]

[1] The customer connection pipeline has been refined through 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.

We have checked that our preferred solution remains the most appropriate way to meet the needs of the confirmed customers, and the two bays previously allocated to this customer will be retained as spare bays.

The investment is also needed to maintain compliance with the Security and Quality of Supply Standard (SQSS), which sets how securely the network must be able to supply customers. Contracted demand at Laleham now exceeds what the existing supergrid transformers can securely supply if one of them is out of service. The transformers therefore need to be replaced with larger units.

The investment is not driven by the condition of existing assets. Our latest assessment shows that the large majority of assets at the site are in the lowest risk category. A small number of separate asset health interventions are planned at the site during RIIO-T3 and are funded separately. Where these coincide with the load-related works, we will coordinate delivery to improve efficiency and minimise disruption.

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 **nine longlist options** within five strategic option categories: do nothing, market-based, non-transmission whole-system, making use of existing assets, and building a new substation.

From the longlist, we **shortlisted options D-2, E-1, E-2 and E-3** following a high-level assessment against balanced scorecard criteria (see table, below). Options A-C were rejected because they could not deliver compliant customer connections. Option D-1 was rejected because extending the existing live GIS hall offered no significant benefit over D-2 and would be materially more complex and less safe to construct. Option E-4 was rejected due to major consenting, construction and programme risks, and the significant compensation costs associated with building on the neighbouring quarry site.

Table 1: Summary of longlist options assessment

Option	Details	Shortlist?	Preferred?
A	Do nothing counterfactual	No – cannot deliver compliant customer connections	
B	Market-based solution	No – cannot deliver compliant customer connections	
C	Non-transmission, whole systems solutions	No – cannot deliver compliant customer connections	
D-1	Extend the existing 132kV GIS building and install a new busbar section	No – no significant benefit over D-2 and significantly less constructable	
D-2	Extend the existing 132kV substation via a new standalone GIS building, connected with a new busbar section	✓	✓
E-1	Replace the existing 132kV GIS substation with a new 132kV AIS substation on golf course land north of the existing site	✓	
E-2	Replace the existing 132kV and 275kV substations with new 132kV and 400kV AIS substations	✓	

Option	Details	Shortlist?	Preferred?
E-3	Build a new 400kV AIS substation and extend the existing 132kV GIS substation	✓	
E-4	Build a new 132kV AIS substation on the quarry site south of the existing substation	No – major consenting and construction risks, and significant land compensation costs	

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.

Table 2: Qualitative trade-offs between the shortlisted options

Criteria	Option D-2	Option E-1	Option E-2	Option E-3
Engineering	**Benefit.** A compact SF6-free GIS extension that integrates with the existing 132kV substation, using space set aside in previous works. It connects all contracted customers, but takes the site to its practical limit, with limited scope for further expansion.	**Detractor.** Delivers a compliant connection, but requires significant new 275kV infrastructure. The site lies in a flood zone with potential ground risks, and there is no clear technical advantage to offset these constraints.	**Benefit.** New 400kV and 132kV substations provide greater capacity, resilience and easier future expansion, and align with the longer-term strategy to uprate the wider area to 400kV. However, it is a much larger and more complex design.	**Benefit.** Offers similar capacity and resilience benefits to E-2, but relies on long 132kV cable connections between the new and existing sites, increasing design complexity and fault risk.
Environmental	**Benefit.** All works stay within the existing site boundary, avoiding green belt and greenfield impacts. Environmental effects are minor compared with the new-build options.	**Neutral.** Flat terrain reduces earthworks and no designated habitats have yet been identified nearby. However, the site lies within a woodland priority habitat network and the floodplain, so ecological sensitivity remains uncertain.	**Detractor.** Greenfield development affecting grassland and woodland, requiring ecological mitigation. The site is in a flood zone, with additional ground risk from historic landfill.	**Detractor.** Has the same greenfield impacts as E-2, plus additional impacts from a long cable route that crosses sensitive areas.
Deliverability	**Strong benefit.** The new GIS building can be constructed largely offline, reducing interaction with live equipment and improving safety and programme certainty. It avoids the land and consenting dependencies faced by the other options.	**Detractor.** Can be built offline, but land acquisition, unexploded ordnance risk and the need for consents introduce programme uncertainty.	**Neutral.** Can be built offline with a relatively simple internal layout, but new overhead line works, a nearby third-party pipeline and uncertain ground conditions add complexity.	**Detractor.** A long, multi-stage cable route with trenchless and utility crossings and multiple third-party interfaces increases programme and construction risk.
Economic / consumer value	**Benefit.** Lowest cost. Makes efficient use of existing land and infrastructure, delivers all contracted	**Detractor.** A new-build option with significantly higher cost, including land purchase and	**Benefit.** Provides future-proofed capacity aligned with the longer-term 400kV strategy and	**Neutral.** Aligned with the longer-term 400kV strategy, but significantly higher cost from the new

	connections with good cost certainty and avoids speculative investment in unconfirmed future capacity.	compensation costs, plus added programme risk without a clear offsetting benefit.	avoids long cable connections. However, the scale of the build makes it significantly more expensive and weakens near-term consumer value.	substation and long cable route, with no commensurate benefit over E-2.
Consenting / stakeholder	**Strong benefit.** Can be delivered under permitted development rights within our existing operational site.	**Strong detractor.** Requires acquisition of golf course land in the green belt and formal consents. Proximity to homes and likely traffic impacts increase stakeholder sensitivity.	**Neutral.** Requires multiple consents for a large greenfield site in the green belt, but avoids the multi-landowner cable routing needed for E-3.	**Detractor.** Requires consents for a large greenfield site plus extensive third-party land agreements for cable routing, with a higher risk of challenge and delay.

5. Quantitative Trade-offs Between the Shortlisted Options

The table below expresses the position of the different shortlisted options relative to Option D-2. 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-2	Option E-1	Option E-2	Option E-3
Cost-book estimate	1	1.39	2.69	2.57
Total capital cost over the 50-year appraisal period, including replacement	1	1.39	2.69	2.57
Net present value (cost)*	1	1.38	2.73	2.61
Undiscounted carbon and losses costs	1	1.39	3.41	3.68
Useful economic life	1	1	1	1

**Lower is better*

Option D-2 is the most economical option on every cost measure. On the initial cost-book estimate, Option E-1 is around 39% more expensive, while Options E-2 and E-3 are roughly 2.6 to 2.7 times the cost of D-2, reflecting the scale of new substation works and land required. The net present value comparison shows the same pattern. Option D-2 also has the lowest carbon and losses costs, with E-2 and E-3 more than three times higher, mainly due to the carbon from construction and higher transmission losses. All options assume the same asset life, so useful economic life does not differentiate between them.

6. Preferred Solution

Based on a qualitative and quantitative assessment of the shortlisted options, **Option D-2 is the preferred option** because:

- It offers the **best consumer value**, with the lowest cost-book estimate and the highest net present value of the shortlisted options. It makes efficient use of our existing land and infrastructure, avoiding the cost of acquiring land and building a new substation.

- It is the **most deliverable option**. The new GIS building can be constructed largely offline within our existing site, reducing interaction with live equipment. It offers the shortest programme with the least programme risk, supporting timely connection of contracted customers.
- It is a **proportionate, least-regrets solution**. It meets all confirmed customer needs and maintains SQSS compliance without speculative investment in unconfirmed capacity. Two spare bays will be retained, and assets affected by any future uprating of the wider area to 400kV are expected to be redeployable elsewhere or retained as strategic spares.
- It carries the **lowest consenting and stakeholder risk**. It can be delivered under permitted development rights without additional consents or land acquisition, avoids development on the green belt and has the lowest impact on visual amenity.
- It delivers **strategic benefits for the region**. It supports data-centre-led growth in West London and, while complementing our longer-term reinforcement strategy for West London.