nationalgrid

RIIO-T3

Feckenham Hams Hall OHL

Eligibility Letter and Needs Case Submission – Track 3

May 2026

National Grid Electricity Transmission's Business Plan

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Reference and summary table

Field	Description
Project name	Feckenham - Hams Hall 400 kV single circuit OHL Reconductoring (Referred to in this paper as FHRE)
TO's preferred re-opener track	Track 3 Eligibility Letter (EL) and Needs Case (NC)
RRP Reference	NGT500470
BPDT / Scheme Reference Number	NGT500470
Load Board Reference	**Discussed at load board (Feb 2026)** • NGET can submit a portfolio Project Assessment for the five near term OHL schemes that were proposed to be approved in DD with ACCC which has now had type registration remove [redacted] Given maturity on costs and new optioneering, we have elected to submit an Eligibility Letter and Needs Case Submission.
Investment driver(s)	**NESO** • This project is a NESO driven project under NOA7 / tCSNP. This project received a Hold signal with an optimal delivery date of 2033 in NESO's NOA7 Refresh and was confirmed as a necessary project in the background of Transitional Centralised Strategic Network Plan (tCSNP2) in NESO's 'Beyond 2030' report and is designated as Clean Power 2030. [redacted] **Customer Connections** • There are no connection customer drivers directly associated with the project.
PASE Compliance	The preferred option is not PASE-aligned (as it does not select the highest-rated conductor available for the existing tower type). However, the quantitative and qualitative analysis shows it provides the best overall outcome when considering cost, transmission losses, deliverability and reliability risk.
Project outputs	The preferred option will enable the following outputs, aligned to the pillars of our ambition for RIIO-ET3: **Deliver the grid of tomorrow; Do the right thing for our consumers, communities and the environment** • Increase the B8 boundary capability b [redacted] as identified in the NOA7 refresh. [redacted]

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	• By replacing and refurbishing aging assets, the project will extend the operational life of the circuits, reduce the likelihood of faults and improve the overall reliability of the transmission network.		
Short list of strategic options considered	The shortlisted options for FHRE are: • **Option D-1:** the reconductoring of the single circuit [redacted] • **Option D-4**: the reconductoring of the single circuit [redacted]		
Preferred solution and explanatory narrative on the rationale	The preferred solution is option D-1: reconductor the single circuit with [redacted] This option meets the required rating by 2030 and has a lower capex cost and transmission losses when compared with option D-4.		
Expected Forecast Cost	**Estimated capital** [redacted] (23/24 prices, including risk & contingency)		
Delivery year	The delivery date for FHRE is [redacted]. Dates are subject to system access, long-lead equipment procurement and supply chain readiness.		
Applicable Reporting Tables	6.1 Scheme C&V Load Actuals		
Historic funding interaction	[redacted]		
Interactive projects	There are several other OHL reconductoring and fittings projects in the region that interface at Feckenham and Hams Hall 400 kV substations. **Feckenham 400 kV** ▪ Feckenham – Ironbridge (IFR1) NOA7 ▪ Feckenham – Minety (FMR2) tCSNP2 ▪ Feckenham – Walham customer driven **Hams Hall 400 kV** ▪ Hams Hall – Willington (ZL) asset health driven ▪ Drakelow – Hams Hall (ZF) customer driven System access is currently planned considering all interactive projects.		
Spend Apportionment	[redacted]	[redacted]	[redacted]

1. Executive Summary

1.3 Project Summary

This investment facilitates an increase to the B8 boundary capacity [redacted] and will contribute towards decarbonisation and wider net zero objectives, ensuring smooth integration of new generation sources and aligning with local and regional energy needs. It will ensure network reliability and stability by preventing overloads during fault conditions. It will replace Grade 4,5 & 6 steelworks, fittings along both ZF and ZFC routes and will strengthen the reliability and resilience of our transmission infrastructure.

1.4 Submission Purpose

This submission updates the Engineering Justification Paper (EJP) for Feckenham – Hams Hall. At Final Determination, this investment was deemed not justified on the basis that the preferred solution relied on the [redacted], for which Type Registration was withdrawn.

Since then, we have re-evaluated the investment and removed reliance on non-Type Registered conductors. For robustness, optioneering has been reviewed for this investment, and a clearly defined preferred solution has been identified, consistent with established engineering practice and currently available Type Registered conductors. Consequently, we have updated the qualitative and quantitively analysis accordingly for the short-listed options.

We are seeking Ofgem's confirmation that Track 3 EL and NC is the appropriate route for this project, and approval for our optioneering, preferred solution, and request for Pre-Construction Funding (PCF).

This paper provides an update to the Optioneering and Needs Case originally submitted within the RIIO-T3 Engineering Justification Process (EJP) for Feckenham – Hams Hall reconductoring (FHRE) reconducting. It is submitted as a combined Eligibility Letter and updated Needs Case, in accordance with the RIIO-T3 (T3) Load Re-Opener mechanism under Special Condition 3.18.

1.5 Need

The primary driver for this investment is to address the thermal limitations of the existing OHL infrastructure on the Feckenham – Hams Hall circuit, increasing its capacity [redacted] handle higher electrical loads and ensuring the reliability and security of the transmission network.

This need was signalled under FHRE in the NOA7 Refresh 2021/22 and is classified as a Clean Power 2030 (CP2030) project, facilitating an increase to the B8 boundar [redacted]. This contributes towards meeting the power transfer requirements of [redacted] across the B8 & B9 boundaries by 2035 respectively.

This investment addresses overloading issues on the Feckenham - Hams Hall circuit in high north to south flow conditions – typically interconnector exports – following a faut of either Connah's Quay to Legacy to Trawsfynydd or East Claydon to Enderby to Patford Bridge 400 kV double circuits.

[redacted]

1.6 Optioneering

We undertook a structured, multi-factor optioneering process to identify all possible options listed in Table 1. We first considered a range of strategic options, being do-nothing, hotwiring, reconductoring, upgrading, build new and dynamic line rating. From these, we built a long list of 17 options, 11 of which were sub-options of reconductoring as we considered all conductors that are compatible with the existing L2 towers. Two options met the need but only two were shortlisted as credible and taken forward for detailed analysis. The other two either did not meet the need by 2030 or were currently not a compliant solution.

Of these, option D-1 is our preferred option because it meets the need, has lower transmission losses than the alternative which supports its higher NPV and is extensively used on the network meaning we have wide-ranging operational and maintenance data.

Table 1: Summary of optioneering (longlist to short list)

Option	Details	Drivers met	Short List
Option A	Do nothing counterfactual	X	X
Option B	Hotwire the existing circuit	X	X
Option C	Installing Power Control Devices	X	X
Option D-1	[redacted]	✓	✓ (preferred)
Option D-2	[redacted]	X	X
Option D-3	[redacted]	X	X
Option D-4	[redacted]	✓	✓
Option D-5	[redacted]	X	X
Option D-6	[redacted]	X	X
Option D-7	[redacted]	X	X
Option D-8	[redacted]	X	X
Option D-9	[redacted]	X	X
Option D-10	[redacted]	X	X
Option D-11	[redacted]	✓	X
Option E	Upgrade 275 kV to 400 kV	X	X
Option F	Build a new 400 kV circuit	✓	X
Option G	Dynamic Line Rating	X	X

1.7 Cost Estimates

Based on the latest Cost Book (2023/24 prices) the preferred option, Option D-1, has an estimated total cost of [redacted] (including risk and contingency. Pre-Construction Funding of [redacted] is requested at this stage to progress surveys, stakeholder engagement, project design & engineering development, planning and early enabling works required to mature the project ahead of later re-opener stages.

The cost for all shortlisted options (including risk and contingency) are:

- Option D-1: [redacted]
- Option D-4: [redacted]

1.8 Indicative delivery program

The project is currently planned for delivery in the [redacted], which is aligned with outage and supply chain availability and the commissioning date for the project of [redacted] Design, surveys and procurement activities will progress in advance. Delivery remains dependent on system access, long-lead equipment procurement and supply chain readiness. Given the risk to deliverability from any changes to output availability, we are planning to develop a delivery strategy to validate outage requirements, minimise outages and mitigate potential issues.

2. Introduction

2.3 Overview FHRE

This paper presents our combined Eligibility Letter and Needs Case review under the Load Re-opener and Price Control Deliverable under Special Condition 3.18 for investment to reconductor the Feckenham – Hams Hall 400 kV circuit.

Through this submission we are seeking approval for:

- The project to assessed under Track 3 EL and NC
- Approval of the investment need, optioneering and our preferred option D-1: reconductoring of Feckenham – Hams Hall 400 kV single circuit with [redacted]
- Pre-Construction Funding (PCF) under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable).

This is a NOA driven investment, identified as FHRE, to increase the B8 boundary capability [redacted] This contributes towards meeting the power transfer requirements of [redacted] across the B8 and B9 boundaries respectively [redacted] This project is also designated Clean Power 2030. Whilst the main outcome of this investment is to address the primary load-driven need, this investment will deliberately address asset health considerations alongside the primary load-driven need, by replacing the conductors, fittings and any necessary corroded steelwork ensuring continued reliability and longevity of the circuit.

For this submission we have updated our optioneering and costings for an expanded range of conductors. Subject to Ofgem providing approval, we will then continue development of our Project Assessment for this project.

2.3.2 Eligibility, Project Track Statement & PASE

The project is submitted under Assessment Track 3 EL and NC because development is at an advanced stage, the need is clearly defined, and optioneering has identified a clear preferred intervention.

While the preferred option is not PASE-compliant (as it does not select the highest-rated conductor available for the existing tower type), the quantitative and qualitative analysis shows it provides the best overall outcome when considering cost, transmission losses, deliverability and reliability risk.

2.3.3 Pre-Construction Funding Request

Under Special Condition 3.15 of the Electricity Transmission licence, this investment qualifies for allowances equal to [redacted]

Based on our current forecast we have provided below breakdown of costs amounting [redacted] as part of this submission.

Table 2 below summarises the activities covered by the application of these PCF allowances based on our current progress of PCF and EEW spend. This position will be updated as we continue to mature this investment and ultimately reconciled at Project Assessment stage of the re-opener.

[redacted]

2.4 Background

2.4.2 Chronology to the investment

FHRE constitutes works to increase the capacity of the existing Feckenham-Hams Hall single circuit. The network requirement is to increase the winter post fault continuous rating [redacted]

A summary of the key milestones relating to the development of FHRE is set out below.

2022: NOA7 Refresh

- July 2022: FHRE received a **Hold / deferred delivery signal** under the NOA 7 Refresh, with an optimal delivery date of [redacted]

2024: Beyond 2030 (HND)

- March 2024: Transitional strategic network plan bridging Pathway to 2030 and the future Centralised Strategic Network Plan (CSNP) was released.
- FHRE was reiterated as a reinforcement of the previous recommendation, re-emphasising the need to deliver the 2030 pathway to support boundary capability and system resilience requirements.

2024: Clean Power 2030 (CP30) – Advice to Government

- November 2024: NESO's formal advice to Government on how to achieve a 95% clean power system by 2030.
- Clean Power 2030 (CP2030) report from NESO to HM Government, confirmed Feckenham – Hams Hall as a necessary reinforcement to support the delivery of GB's Clean Power 2030 ambitions.

2024–2025: Engineering Justification Paper (EJP) submission in T3 plan

- December 2024: The FHRE combined with Drakelow – Hams Hall was submitted as part of NGET's RIIO-T3 Business Plan through the Engineering Justification Process (EJP).
- July 2025: Draft Determination and subsequent Ofgem-NGET engagement.

2026: Submission under the Load Re-Opener

- April 2026: Drakelow - Hams Hall (customer-led) reinforcement has been removed from this Load Re-opener submission. Initial indications are that reinforcement on Drakelow - Hams Hall is not required before 2030
- May 2026: FHRE updated optioneering prepared for submission.

2.4.3 Regional & Network Context

As noted in our T3 EJP related to this project, The FHRE project is part of the larger Midlands enhancement investments. These investments aim to address the increasing demand for transmission capacity driven by the rise in renewable energy generation in the Northwest and North Wales. FHRE is essential to prevent overloading on the Feckenham – Hams Hall circuit during high north to south power flow, caused by interconnector exports.

In the Midlands, as well as the FHRE project, there will be another additional overhead line project, two reinforcement projects, one substation rebuild and a new substation build. This is all to ensure the region can cope with the additional capacity required to transfer power in, as well as through, from North to South.

In addition to these specific interfacing projects, we have identified some wider network considerations as part of this project.

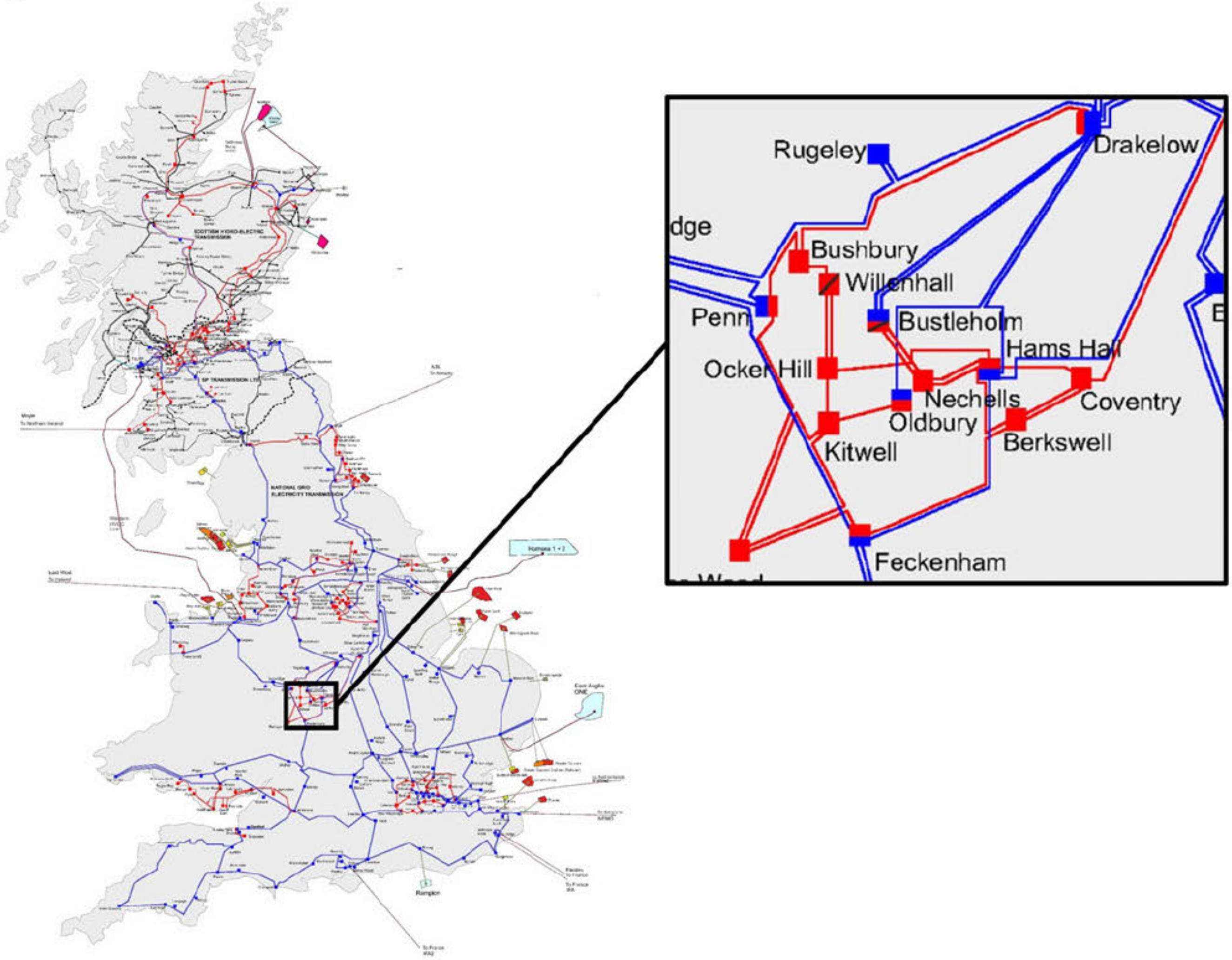
1. Midlands: Situated north-south between Scottish renewables and London demands, and east-west between the E-W interconnector to Ireland and the European interconnectors landing on the East Anglia coast, the Midlands network is a vital central hub, linking the extremities of the GB grid and providing an essential contribution to the stability and balance of the national electricity transmission system. The Midlands features a mixed demand profile, with energy consumption spread across residential, commercial and industrial sectors, though the region's demand for electricity tends to peak during winter, driven by heating needs in residential areas.

Several strategic upgrades to increase capacities and improve the power flow through and around the Midlands into Southern England have been planned. These include reconductoring of circuits, additional power-control devices on existing circuits and a new double-circuit connecting from South Yorkshire into the East Midlands network. Electricity distribution in the region is entirely served by the National Grid Electricity Distribution.

2. West Midlands: The transmission system in the West Midlands consists of 400 kV north-to-south circuits in the east with a 400 kV outer ring and 275 kV inner ring. The West Midlands is a large industrial and domestic demand centre that includes major urban centres such as Birmingham, Coventry and Wolverhampton. The region has a relatively dense population and its high urban electricity demand, is augmented by its large industrial base and extensive commercial activities. Key industries include automotive manufacturing, engineering and services, all of which are energy intensive.

3. East Midlands: The East Midlands network covers a large geographic area, including key cities such as Nottingham, Leicester, Derby and Northampton. This region is diverse, ranging from urban centres to rural areas, which requires a well-balanced and resilient grid. The East Midlands acts as a vital transit route for electricity between the North, Midlands, Lincolnshire and South of England, making this strategic location a key contributor to national electricity flow and system stability. Several strategic reinforcements have been proposed on the NGET network to increase capacity on the North to South routes via the East Midlands

Figure 1: Location of FHRE on NGET's network



[redacted]

2.4.3.1 Interactive Projects

Although, there are no interactions or dependencies between FHRE and other projects, it is important to recognise there are several OHL project interactions at the interface with Feckenham and Hams - Hall 400 kV substations. As such, coordination and portfolio management is required across all interfacing projects to ensure efficient system access and supply management.

OHL project interactions at Feckenham 400 kV substation:

- Proposed reconductoring of Feckenham – Ironbridge (IFR1 - NOA7) driven by wider works (funding via LRR)
- Feckenham – Minety (FMR2 – tCSNP2) driven by Wider Works (funding via tCSNP2 delivery track)
- Reconductoring of Feckenham – Walham. This is customer driven and the need is being assessed as part of Connection Reform (funding via T3 Volume Driver)

OHL project interactions at Hams Hall 400 kV substation:

- Proposed reconductoring of Drakelow – Hams Hall (ZF). This is customer driven and the need is being assessed as part of Connection Reform (funding via T3 Volume Driver)
- Proposed fittings replacement of Hams Hall – Willington East (ZL). This is asset health driven (funding via T3 Volume Driver)

2.4.4 Site Background

The FHRE route runs between Feckenham and Hams Hall 400 kV substations. Although the project aims to increase the capacity of this circuit, no major works will be completed on the substations.

Figure 3 provides a satellite view of the route, demonstrating where the substations are located. It also includes close-up satellite images of Feckenham and Hams Hall 400 kV substations. This connection is positioned between the B8 and B9 boundaries, as illustrated in the single line diagram above Figure 2.

Figure 3: Physical overview of Feckenham - Hams Hall 400 kV and OHL route

The current Feckenham – Hams Hall circuit is a [redacted] and consists of two routes, the ZF and the ZFC;

- ZFC – Twin Rubus, L2 towers, [redacted]
- ZF – Rubus, L2 [redacted]

The ZF section of the Feckenham – Hams Hall circuit was initially constructed in 1956. The ZFC section then followed in 1963. Both routes were fully refurbished in 1988, with twin Rubus being installed.

NGET holds wayleave agreements for this route and undertake an occupier role for these circuits and towers. Access for the route is granted under permitted development and is sanctioned under our current agreements.

The following information has been gathered by our internal lands team where we have had recent interactions with stakeholders and third parties on these circuits:

[redacted]

There are 44 Category 1 and 2 crossings along the FHRE circuit route, including 7 railway crossings, 7 motorway crossing, 1 industrial site, and multiple A and B roads. Additionally, there are 29 Category 3 and 4 crossings, the crossings of significance in these categories are DNO lines, canals, golf courses, fishing lakes, recreational areas, and a school. More information on major crossings and their locality can be found in *in the EJP (noting there have been no changes from EJP).*

Geographically, Feckenham is approximately 25km south of Birmingham, situated between Redditch and Worcester. Hams Hall sits on the northeast outskirts of Birmingham, where the M42 meets the M6 Toll.

2.4.5 Historical Funding

Feckenham – Hams Hall OHL constitutes of routes ZF and ZFC.

[redacted]

No additional funding has been provided for this project (OHL reconductoring) to date in T3, with all preliminary work completed at risk.

2.4.5.1 **Early Asset Write Offs** (EAWO)

The estimate of spend using our statutory Fixed Asset Register and estimate of remaining Regulated Asset Value (RAV) on existing assets for ZF (as of 2026) is [redacted]

3. Drivers & Needs Case

3.3 Drivers

The investment in the Feckenham-Hams Hall circuit is driven by load-related needs with additional asset health benefits:

Table 3: FHRE Drivers

Type	Description	Date
Wider-works (NOA)	Feckenham – Hams Hall circuit (FHRE) • OHL reconductoring	[redacted]

3.4 NESO Requirements

Primary Driver: Network Options Assessment

The primary driver is to contribute towards meeting the power transfer requirements of [redacted] across the B8 and B9 boundaries respectively [redacted]. To contribute to this aim, it was identified that reconductoring this circuit would enhance the B8 boundary capability [redacted]

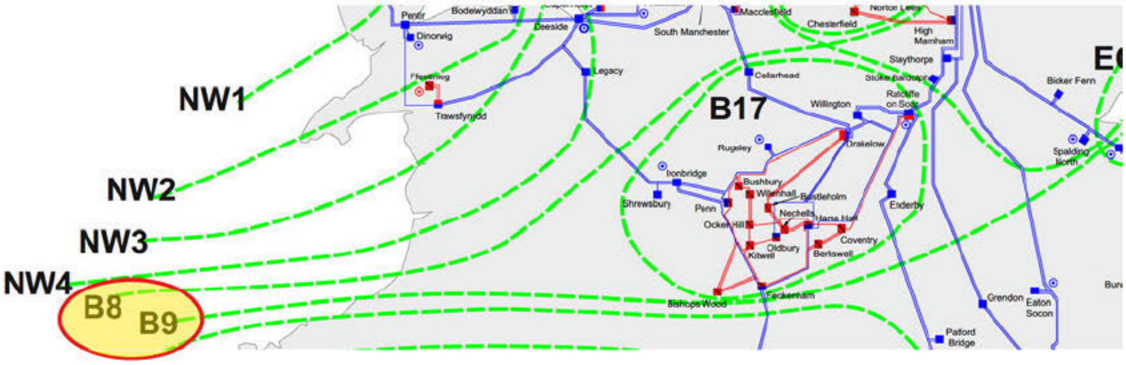
For the Feckenham – Hams Hall circuit, we identified a minimum conductor rating of [redacted] Winter post fault would be required to provide the B8 and B9 boundary capability requirements of [redacted]. As such, the thermal requirements of this driver will mean an increase of MVA on the Feckenham – Hams Hall circuit [redacted]

Wider Systems Context:

Following high north–south power flows and a double-circuit contingency on either the Connah's Quay – Legacy – Trawsfynydd or East Claydon – Enderby – Patford Bridge 400 kV circuits, power from North Wales and the East Midlands is redistributed through the 400 kV network across the West Midlands. The 400 kV routes carry the majority of this diverted flow, with power converging at Drakelow before predominantly flowing south via Hams Hall toward Feckenham to serve interconnector export demand.

Under these conditions, the Feckenham – Hams Hall circuit carries a disproportionately high share of north–south transfer and can become thermally overloaded, constraining B8 and B9 boundary capability (see Figure 4).

Figure 4: B8 and B9 Boundary Map



3.5 Asset Health

The primary focus of the FHRE investment is to increase network capacity. However, there will be asset health benefits delivered through the delivery of our preferred option associated with the existing fittings and steelwork.

[redacted]

The ZF section of the Feckenham – Hams Hall circuit was initially constructed in 1956 and 1958 respectively. The ZFC section then followed in 1963. Both routes were fully refurbished in 1988, with twin Rubus being installed.

The current condition of the conductor, fittings and steelwork on the Feckenham – Hams Hall route are as per below:

[redacted]

4. Optioneering

We follow a structured appraisal process to select the most economic and efficient solution, in the interest of consumers. We progress from longlist definition to shortlist identification through assessing each longlist option against the ability to achieve the following key outputs and benefits:

- Must achieve post-fault winter rating of [redacted] as a minimum requirement to meet the boundary uplift triggered in the NOA7 report
- Must be able to be delivered by 2030 to satisfy Clean Power 2030
- Address steelwork related condition on the Feckenham – Hams Hall circuit
- Consider opportunity to provide further capacity to address potential future needs

4.3 Strategic Options

In line with our standard optioneering process, we considered the following broad strategic options:

Table 5: FHRE high level strategic options

Option Number	Option Name	Option Description
A	Do nothing	The network is kept in its current state, and no circuit upgrades are made
B	Hotwiring	Meet the increased rating by thermally uprating the existing line (re-tensioning, clamp re-positioning and/or ECL insulator changes) to safely operate at the higher conductor temperature
C	Install power flow control devices	Meet the increased rating by installing power flow control devices enabling active control and redistribution of power flows on the network circuit.
D	Reconductoring	Meet the increased rating by increasing the capacity of the existing circuit by replacing the conductors with new higher rated conductors and all associated insulators, fittings and (if required) steelwork reinforcement
E	Upgrade from 275 kV to 400 kV	Meet the increased rating by uprating a 275 kV circuit to 400 kV
F	New circuit	Meet the increased rating by building a new circuit
G	Dynamic line rating	Meet the increased rating by using real-time monitoring and dynamic calculation of line capacity (based on actual weather and conductor conditions such as wind cooling, ambient temperature, solar heating, temperature/sag) to increase the permitted rating when conditions allow.

In total, 17 options were developed in our long list, with 11 options relating to reconductoring to assess the feasibility of all standard conductors and bundle configurations that are compatible with the existing L2 tower type along the Feckenham–Hams Hall circuit (see Table 6). All other conductors [redacted]) and alternative bundle configurations have been excluded, as they are not approved for use on L2 towers.

[redacted]

To identify the most suitable options we considered the following additional factors to the primary driver.

- We examined current and future load requirements utilising the [redacted]. Total demand is predicted to be [redacted] at Feckenham and [redacted] at Hams Hall which will mean the demand will remain high on the B8 and B9 boundary. The options consider this to ensure we do not sterilise (retain the OHL as the limiting factor) the circuit from potential future need.
- It is important to note that no sensitivity was performed in terms of timing, as timescales are limited by system access constraints due to the significant volume of works in the region.

We shortlisted two options - D-1 and D-4 for a more detailed analysis to determine which conductor system would be the most suitable to address all drivers and additional considerations. Throughout the RIIO-T3 period we will continue to verify the most efficient conductor type as material prices and technology change.

4.4 Siting

There was no siting study conducted as there is no proposed change to the existing route.

4.5 Longlist of options considered

Table 7: Longlist table

Options	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Impact	Reason for Rejecting or Taking Forward the Option[1]
A: Do Nothing **Rejected**	The network is kept as is, circuits are not uprated	N/A	N/A	**Engineering:** Would not deliver the required [redacted] **Compliance:** Would not comply with SQSS
B: Hotwiring the Feckenham – Hams Hall Circuit **Rejected**	Hotwiring is when a circuits rating is increased by operating the circuit at a higher temperature	N/A	N/A	**Engineering:** Would achieve a [redacted] which does not deliver the required 3100MVA rating
C: Install Power Control Devices [redacted] **Rejected**	installing power flow control devices enabling active control and redistribution of power flows on the network circuit.	N/A	N/A	**Engineering:** Insufficient to resolve the thermal limitations due to the increasing north-to-south power flows. Additionally, the introduction of impedance exacerbates voltage stability issues, particularly under certain fault conditions. The use of a power control device would cause overloads on adjacent circuits and exacerbate voltage issues.
D-1: Reconductor the existing circuit with [redacted] **Taken Forward**	Not PASE Compliant. New post-fault winter rating of [redacted] when strung at [redacted]	Figure 5: N.B. the layout of the route is the same for all options.	Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** This option effectively addresses the thermal limitations and meets the forecasted demand with a [redacted] rating **Cost:** Likely to be the lowest cost credible option
D-2: Reconductor with [redacted] **Rejected**	Not PASE Compliant. New post-fault winter rating of [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Compliance:** As of February 2025, type registration of [redacted] conductor has been withdrawn, therefore this is no longer a compliant solution.

[1] All conductor ratings stated in this column are in reference to winter post-fault ratings (MVA)

Options	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Impact	Reason for Rejecting or Taking Forward the Option[1]
			Some additional surveys required due to the land take at EPZ locations being different to other conductor types. Further FEED studies would also be needed due to the additional tension and ice loading this conductor is subject to.	
D-3: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating of [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Compliance:** As of February 2025, type registration for [redacted] has been withdrawn, therefore this is no longer a compliant solution.
D-4: Reconductor with [redacted] Taken Forward	PASE Compliant. New post-fault winter rating of [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** This option effectively addresses the thermal limitations and meets the forecasted demand with a [redacted] rating. Provides some futureproofing. **Operability / Deliverability:** Only [redacted] of [redacted] is deployed on the network so there is limited strategic spares, operational and maintenance data – leading to more reliability risk. **Future Proofing:** Although [redacted] is type registered at [redacted] and would deliver a [redacted] rating, existing [redacted] on the network is predominantly operated at [redacted] and therefore there is insufficient performance evidence to support adoption a [redacted]
D-5: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating would decrease from [redacted] to [redacted] when strung at		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** Would achieve a [redacted] which does not deliver the required [redacted] and is less than the existing [redacted] conductors **Compliance:** [redacted] conductor is no longer an approved conductor for new installations.

Options	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Impact	Reason for Rejecting or Taking Forward the Option[1]
	[redacted]			
D-6: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating would decrease from [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** Would achieve a [redacted] which does not deliver the required [redacted] and is less than the existing [redacted] conductors
D-7: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating would decrease from [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** Would achieve a [redacted] which does not deliver the required [redacted] and is less than the existing [redacted] conductors
D-8: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating to [redacted] when strung at the maximum permissible [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** Would achieve a [redacted] post-fault winter rating which does not meet the driver required [redacted]
D-9: Reconductor with [redacted] Rejected	Not PASE Compliant. New post-fault winter rating to [redacted] when strung at the maximum permissible [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Compliance:** Type registration of [redacted] conductor has been withdrawn, therefore this is no longer a compliant solution.

Options	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Impact	Reason for Rejecting or Taking Forward the Option[1]
D-10: Reconductor with [redacted] **Rejected**	Not PASE Compliant. New post-fault winter rating of [redacted] when strung at [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Engineering:** Would achieve a [redacted] which does not deliver the required [redacted]
D-11: Reconductor with [redacted] **Rejected**	PASE Compliant. New post-fault winter rating of [redacted]		Minor consenting requirements, only if additional ground works are needed to achieve clearance.	**Compliance:** [redacted] conductor is currently not type registered so is not a compliant solution. **Deliverability:** Type registration activities are being progressed with a single manufacturer, which is the only suppler engaged in the formal type registration process at this time **Operability:** Experience from the early deployment of newly introduced conductor technologies on the network indicates that such conductors can present operational and delivery challenges, particularly in relation to installation productivity, constructability, and the establishment of repeatable installation practices. In the absence of sufficient operational deployment, established productivity benchmarks, and mature supply chain resilience, there is currently insufficient evidence to support the inclusion of the [redacted] conductor within the optioneering beyond the initial options list.[2]
E: Upgrade 275 kV network to 400 kV **Rejected**	This option involves upgrading the existing 275 kV network to operate at 400 kV to provide additional transfer capability and progress development of a future		DCO required to increase the voltage of the OHL which would lead to a longer planning and build time. Highest risk	**Programme:** . The lead time to uprate a 275 kV network to 400 kV would not allow delivery in time to meet the boundary requirements [redacted] and Clean Power requirements for 2030. **Engineering:** Upgrading the 275 kV network would resolve the overloading issue and increase overall West Midlands network capacity but would not be met within the required timeframe.

[2] At the time of writing, the new [redacted] being progressed through type registration [redacted] Wider market engagement is ongoing, however no additional manufacturers are currently in the formal type-registration process. The current supply route has experienced constraints associated with wider global and geopolitical factors, introducing uncertainty around manufacturing capacity, delivery timelines, and supply resilience. These factors, combined with limited operational deployment to date, contribute to the overall delivery and commercial risk associated with adoption at this stage.

Options	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Impact	Reason for Rejecting or Taking Forward the Option[1]
	Midlands 400 kV ring around Birmingham.			**Cost:** High cost compared to option D **Consents**: The adjacent circuits are subject to a mix of wayleave agreements, meaning 400 kV operation is not currently consented across the route.
F: New 400 kV overhead line Rejected	Installation of new route from end to end including all new towers, fittings and conductors.	N/A	DCO required to deliver a new OHL which would lead to a 10-year planning and build time. Highest risk	**Programme:** Would not meet the required boundary capacity by 2033 and Clean Power requirements for 2030. **Deliverability:** Upgrade to 400 kV would not be met within the required timeframe. **Consents:** Would require a DCO which is high risk and lengthy **Cost:** Cost would be significantly higher than the alternative options. **Environment:** Significant environmental impact with a new build route compared to other credible options
G: Dynamic Line Rating Rejected	Installation of Sensors on the OHL to monitor and calculate real time Ratings.	N/A	N/A	**Engineering:** Would achieve a rating similar to hotwiring, which is insufficient. Additionally, it would only achieve a short-term rating that can only be used in live operational planning scenarios, not permanently as a continuous rating

Based on the rationale explained in this section we have discounted all options except two sub-options D-1 and D-4. Options A to C and option G would not meet [redacted] winter post-fault continuous rating and options E and F would not satisfy the [redacted] Only D-1 and D-4 were deemed credible as they were the only conductors that can achieve the rating and are compliant with the use of the existing L2 towers.

4.5.2 Influence of stakeholders on shortlisting

Even though the project pertains to an existing OHL route, the proposed works will impact local communities and NGET has the responsibility to manage these relationships. NGET will seek to mitigate potential disruptions (e.g., minor road closures, railway crossings, designated land assents, access to third party land, etc.) by engaging early with local stakeholders and parish councils, carrying out letter drops and communicating the disruptions to impacted residents and local businesses.

NGET proposes to engage with third parties such as landowners and local DNOs once we have completed FEED, and once we have certainty on access routes and expected road closures to complete the work scope.

Where possible, a NGET Land Officer will begin scheme development at least two years before project delivery. This provides sufficient time for a land rights audit which will highlight apparatus that is not appropriately secured. The Land Officer then has 24 months to pursue the Statutory process to secure NGET's land rights should voluntary negotiations prove unsuccessful.

A land agent, instructed by NGET's Land Officer, will write to all parties affected by a project at the earliest opportunity and when all pertinent project information becomes available to warrant a meaningful conversation. NGET's land agent will discuss all works and access requirements with affected grantors and agree suitable accesses and accommodation works if necessary. Projects will need to give sufficient time for the identification and relocation of land-based business activities such as golf courses or shoots to mitigate grantor losses. Depending on the scale and perceived impact of the works, various virtual and on-site meetings may be conducted. Stakeholder engagement will continue until an Access Pack has been created clearly detailing all accesses and associated requirements to be distributed amongst the delivery team. NGET will remain a point of contact throughout the project and will reengage with all stakeholders to ensure the project has been delivered to their satisfaction and can be closed out.

Ideally, the initial 24-month window for scheme development will create an opportunity to de-risk projects by ensuring NGET's land rights are sufficient. If this is not possible, our land agents will be instructed to negotiate new rights with landowners. The risk associated with unsecured apparatus will be flagged and monitored until a new agreement has completed. Early engagement and open, honest communication are paramount to mitigate risk and ensure the continuation of mutually beneficial relationships with NGET's stakeholder population.

4.6 Shortlisted Options

The shortlisted options for this investment below. The MVA rating stated is the winter post fault

- Option D-1: the reconductoring of the single circuit through a full asset refurbishment of both fittings and the new conductors with twin [redacted] and
- Option D-4: the reconductoring of the single circuit through a full asset refurbishment of both fittings and the new conductors with [redacted]

For all options, and using the existing towers, a full refurbishment of fittings and the new conductor will be carried out, with the need to also strengthen the infrastructure's foundation and steel. To further enhance the system's capabilities, the current earth wire will also be substituted with an optical ground wire (OPGW).

The reconductoring will extend the OHL circuit's life [redacted] as the new conductor system would be replaced, responding to the asset health-related issues previously illustrated in Section 3.3 and avoiding further interventions in the long-run.

As part of this investment, we have looked at the substation equipment and other limiting factors and determined that no further work would be required to achieve the [redacted] winter post fault rating for both shortlisted options (see Appendix D: System Design Table). The System Design Table demonstrates how the shortlisted options have been considered in the wider network context in meeting the investment drivers of the project.

For this investment, we have not costed or studied any further substation equipment as this would be additional unnecessary spend at this stage that is not required to achieve the need.

4.7 PASE

The preferred strategic option is *not* PASE-compliant (as it does not select the highest-rated conductor available for the existing tower type), the quantitative and qualitative analysis shows it provides the best overall outcome when considering cost, transmission losses, deliverability and reliability risk.

4.8 Detailed qualitative analysis of shortlisted options

Qualitative analysis was carried out to understand the strengths and weaknesses of the two shortlisted options. The different features of the options were assessed and assigned a ranking from “detractor” to “benefit”.

Based on the qualitative assessment presented in Table 8, D-1 is our preferred option because it meets [redacted] winter post-fault requirement and compared to Option D-4, it has materially lower capex and lower transmission losses, resulting in lower TOTEX ensuring value for consumers. It also uses a proven, widely deployed conductor type, reducing delivery, operational and maintenance risk and is more widely available conductor type in our supply chain.

Table 8: Qualitative analysis of two shortlisted options

	Optioneering Categories				
Option	**Engineering**	**Environmental**	**Deliverability**	**Economic/Consumer Value**	**Consenting /Stakeholder**
Option D-1 – Reconductor with [redacted]	Meets required rating but provides no headroom for futureproofing; however, it is extensively used across the network, so there is strong operational knowledge and confidence in performance as well as large availability of spares.	Lower transmission losses for [redacted] conductor comparatively to [redacted] conductor resulting in lower tCO_2 emissions during operation. Multiple type registered suppliers based in Europe, resulting in shorter supply chain journeys and lower imbedded tCO_2 due to delivery	[redacted] conductor is used extensively across the network, therefore there is sufficient experience in operation and maintenance [redacted] can increase programme requirements leading to increased outage durations. Due to the number of projects proposing to use [redacted], bulk procurement is being considered across NGET projects and will lead to reduced lead times.	[redacted] has lower capex cost and lower transmission losses versus the [redacted] alternative.	Each option requires initial outages due to the extended work programme. New assets reduce the risk of emergency system access needs, and consultation required with other asset owners to gain access.
	Benefit	Benefit	Benefit	Benefit	Neutral
Option D-4– Reconductor with [redacted]	Meets current demand and provides limited future capacity/futureproofing, but with increased losses compared with [redacted] Limited installation of [redacted]. Lack of experience in maintenance of [redacted] conductor and only a single source supplier for spares with long lead times.	Higher transmission losses for [redacted] comparatively to [redacted] resulting in higher tCO_2 emissions during operation. [redacted] resulting in longer supply chain journeys and higher imbedded tCO_2 due to delivery	[redacted] first installed on the network in 2013. The installation of [redacted] was found to be technically more complex. There is limited knowledge and expertise of [redacted] installation within the supply chain. [redacted] creating sole-supplier dependency; manufacturer capacity and delivery capability not fully assured, introducing programme/cost/supply-chain risk.	[redacted]-specific: conductor/material costs are higher than Matthew GAP; draft states TOTEX is higher due to increased transmission losses (MWh) when using [redacted]	Each option requires initial outages due to the extended work programme. New assets reduce the risk of emergency system access needs, and consultation required with other asset owners to gain access.
	Neutral	Detractor	Detractor	Detractor	Neutral

4.9 Detailed quantitative analysis of shortlisted options

4.9.1 Cost estimates of shortlisted options

To assess the shortlisted options, cost estimates have been created for quantitative economic comparison. All capex costs are derived from NGET's latest Cost Book (23/24 prices). Estimating Units Lines (EULs) have been used to generate cost estimates based on the scope of work and the new assets to be acquired for each option. For each EUL, [redacted], based on historic project analysis, to account for unforeseen circumstances and to mitigate risks during implementation.

Table 9: Cost Estimate Breakdown

Option	OHL (£m)	Cables (£m)	Substation (£m)	Total (exc. risk) (£m)	BNG (£m)	Total (incl. [redacted] risk) (£m)
D-1 Reconductor with [redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
D-4 Reconductor with [redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Option D-1 is lower cost than Option D-4 because [redacted] conductors are approximately [redacted] than [redacted] conductors.

4.9.2 Cost drivers

The project's cost estimates are based on current market conditions, with ongoing work to refine requirements. Using the cost book, the main factors driving the costs for the shortlisted options are:

- Unit costs of OHLs

4.10 Cost Benefit Analysis

4.10.1 Purpose and Approach

Our Cost Benefit Analysis (CBA) evaluates the economic efficiency and consumer value of the proposed transmission investments. This analysis aligns with Ofgem's Load Re-opener Guidance and Submission Requirements.

The CBA process integrates monetised benefits such as constraint cost savings, system efficiency improvements, and consumer bill impacts, alongside a comprehensive Whole-Life Cost Analysis (WLCA) that captures capital expenditure, operational and maintenance costs, replacement cycles, carbon impacts, and future extendibility. This dual approach ensures a balanced assessment of both short-term economic benefits and long-term cost efficiency, avoiding the risk of asset stranding or future inefficiencies.

Our CBA considers:

- Robust optioneering and sensitivity testing: We have evaluated credible alternatives, including 'do nothing' and 'do minimum' scenarios, to confirm that the preferred solution delivers the optimal balance of technical performance, environmental impact, and economic benefit.

- Quantification of constraint cost reductions: Using system operator modelling outputs and historical data, we quantify expected savings from reduced system constraints, which translate into direct consumer bill benefits.
- Assessment of delay impacts: The financial consequences of potential project delays on constraint costs and consumer bills are modelled through risk-adjusted scenarios, providing a clear understanding of the value of timely delivery.
- Inclusion of socio-economic benefits: Where quantification is challenging, qualitative evidence supported by stakeholder engagement and regional development plans highlights the wider economic benefits, including job creation and inward investment.
- Consideration of non-monetised benefits: We explicitly identify benefits that are qualitative or not readily monetisable, such as enhanced system operability, resilience, and environmental improvements, ensuring full transparency of the value proposition.
- Alignment with policy and government targets including Net Zero and AI Growth Zones: The CBA reflects the influence of national and local policies, including Clean Power 2030, net zero commitments, and economic growth plans demonstrating how the investment supports the broader energy transition.

We have assessed consumer value by comparing the whole-life costs and benefits of five shortlisted connection and substation delivery options using Ofgem's RIIO-ET3 CBA template. The assessment is completed relative to a counterfactual and on a discounted basis over a 50-year appraisal period (2027–2076), consistent with the CBA methodology.

For each option considered, we have quantified:

(i) Initial CAPEX investment required

(ii) Future end of life replacement costs

The supporting CBA model quantifies the costs and benefits for this project. Using the Ofgem RIIO-ET3 CBA template spreadsheet, the CBA compares the discounted cost and benefits for consumers for the following two shortlisted options.

- D-1 Reconductor with [redacted]
- D-4 Reconductor with [redacted]

4.10.2 CBA Outcome

Lifetime Cost-Benefit Analysis: The lifetime costs and benefits refer to a 50-year period starting [redacted]

Table 10: Lifetime Cost-Benefit Analysis (2023/2024 base prices, central carbon pricing, discounted values)

Option	Initial Investment (£m)	PV of Lifetime Costs (£m)	PV of Monetised Benefits (£m)	NPV (£m)
Option D-1	[redacted]	[redacted]	[redacted]	[redacted]
Option D-4	[redacted]	[redacted]	[redacted]	[redacted]

On the basis of the discounted lifetime CBA results (Table 10), Option D-1 delivers the [redacted] and therefore represents the preferred option on consumer value grounds. Option D-4 delivers an NPV of [redacted] and is therefore lower than D-1. This analysis is subject to confirmation through deliverability, consents/land, outage and risk considerations, and any CBA sensitivities set out in the assumptions below.

4.10.3 Assumptions of the CBA analysis

Core assumptions and sensitivities. The CBA results are based on the following high-level assumptions (with sensitivities used to test robustness where appropriate):

- Appraisal period of 50 years (2027–2076), with costs and benefits discounted and presented relative to the counterfactual.
- Cost base: 2023/2024 prices, aligned to the Ofgem RIIO-ET3 CBA template inputs (including treatment of replacement CAPEX and maintenance).
- Carbon: central base case carbon price applied for monetising construction carbon, SF6/alternative gas leakage and losses, with scenario testing for alternative carbon price trajectories.
- Benefits scope applied consistently across options; where option-specific benefits exist (e.g. constraints), the basis and evidence are documented and applied consistently.
- Key sensitivities considered (as applicable): timing/phasing, CAPEX uncertainty ranges, delivery/outage risk, and benefit parameter uncertainty (including losses and leakage assumptions).

4.10.4 Costs

A summary of all Capex and Opex costs is illustrated in the following table:

Table 11: Summary of all additional Capex costs (2023/2024 base prices)

Option	Total CAPEX (£m)		Total costs (£m)
	Initial works (£m)	Future replacement (40yr) (£m)	
Option D-1	[redacted]	[redacted]	[redacted]
Option D-4	[redacted]	[redacted]	[redacted]

4.10.5 Benefits

The following benefits have been included within the CBA:

- Carbon cost of construction reduction
- Transmission loss reduction
- Constraint cost reduction

Constraint costs included in the CBA have been created using a constraint cost tool. The cost demonstrates the anticipated boundary constraints under outage for replacing conductors. This is particularly useful in this case given not all options have a secondary replacement contributing to the NPV.

Table 12: Summary of constraint costs (2023/2024 base prices)

Option	Boundary Under Constraint	Number of Days Under Constraint	Total Constraint Costs (£m)
Option D-1	[redacted]	[redacted]	[redacted]
Option D-4	[redacted]	[redacted]	[redacted]

Table 13 presents the summary of all (undiscounted) benefits, including environmental and non-environmental benefits, considering the central base case carbon price.

Table 13: Summary of all benefits

Option	Environmental Benefits		Non-Environmental Benefits	Total Benefits (£m)
	Carbon costs of construction (£m)	Gas leakage (£m)	Transmission loss(£m)	
Option D-1	[redacted]	[redacted]	[redacted]	[redacted]
Option D-4	[redacted]	[redacted]	[redacted]	[redacted]

4.11 Preferred solution

Following the assessment of the qualitative analysis and quantitative analysis above we consider that Option D-1: is the preferred solution. Option D-1 (reconductoring [redacted] at 170°C) meets the [redacted] winter post-fault requirement and can be delivered within the NOA7 and CP2030 required timescales, while providing the lowest whole-life cost.

It also uses a proven, widely deployed conductor type, reducing construction delivery, operational and maintenance risk and improving access to conductor availability within the supply chain; whilst still enabling the full refurbishment of fittings and targeted steelwork/foundation interventions to address emerging asset health needs in a single coordinated programme.

4.11.2 Project benefits, outputs & deliverables

The preferred option is Option D-1: Reconductor with [redacted]

The key outputs and benefits delivered by this option, and how they align to the pillars of our ambition for RIIO-ET3 are as follows:

Table 14: Summary of outputs and benefits

Output & Proposed PCD	The reconductoring of Feckenham – Hams Hall 400 kV single circuit with [redacted] to meet the NOA7 Refresh driver to increase the B8 and B9 boundary [redacted] respectively
• Increasing the circuits' winter post-fault rating from [redacted] aligning with the next limiting factor of the substation civil infrastructure. • Enhancing the B8 and B9 boundary [redacted]. • Ensuring network reliability and stability by preventing overloads during fault conditions. • By reinforcing the Feckenham-Hams Hall circuit and replacing fittings and [redacted] that will require intervention by the end of RIIO-ET3, we will strengthen the reliability and resilience of our transmission infrastructure including preventing overloads during fault conditions. • This investment will contribute to the net zero energy transition, ensuring smooth integration of new generation sources and aligning with local and regional energy needs. • Carrying out a single programme of works allows for more cost- and time-efficient delivery, aligning with system access opportunities, minimising supply chain risks whilst minimising environmental and local impacts.	

5. Project Delivery

5.3 Proposed deliverability programme

A summary of the schedule is show in Table 15. The delivery date (ACL - Available for Commercial Load) for FHRE [redacted]. The programme of works considers various factors to ensure its successful execution. System access and resource availability over the ET3 period have been assessed, allowing for indicative outage dates to be identified. The outage required to deliver the preferred option is currently estimated to be completed over one outage season by FY30.

[redacted]

Milestone	Dates
Gate B	[redacted]
Tender Launch	
Full Sanction	
Gate C	
Contract Award	
First Site Access	
ACL	
All works complete	

5.4 Procurement & contracting strategy

The surge in electricity network growth as well as global supply chain disruptions, have resulted in an increasingly constrained supply chain market. Recognising that NGET needs to deliver a RIIO-ET3 workbook of unprecedented scale, NGET has developed 'Signature Strategies' to identify solutions to the fundamental supply and demand problem that NGET increasingly faces for each of its key asset classes – substations, overhead lines, and cabling and tunnelling.

For OHLs, we are partnering with the supply chain through the Electricity Transmission Partnership to secure long-term commitments, driving efficiency and ensuring the scale-up of key resources such as line workers. Following Front-End Engineering Design (FEED), the project will be progressed through a two staged EPC contract with a pre-allocated partner, with each stage subject to assurance on scope, cost, programme and value for money. This approach, and the use of the ETP, supports delivery pace while maintaining appropriate governance and commercial assurance. NGET will also explore the use of the Advanced Procurement Mechanism and bulk purchase of conductor to secure manufacturing slots ahead of need, thereby de-risking delivery and ensuring consumer value.

In addition, development for FHRE has been commenced early to maximise programme flexibility. A planned one-year "strategic pause" will be introduced following completion of FEED, enabling an "off-the-shelf" project to be maintained in a state of readiness for onward progression into delivery. This provides NGET with the advantage of accelerating delivery should an outage become available prior to 2030 and enables an agile response to portfolio-level changes in system access assumptions. Overall, this approach improves resilience by retaining optionality and helping to mitigate outage-related delivery risk across the portfolio.

5.5 Risk & risk management

As previously highlighted in the qualitative options analysis, the preferred option does still present some risks; these are detailed in the following (Table 16) with their respective mitigation measure:

Table 16: Risks and mitigation measures of the proposed option

Category	Risk	Mitigation measure
Design & Technical Complexities	OHL foundations upgrades may be needed due to loadings of the new Matthew GAP conductor.	A full round of surveys will be undertaken at front end design, such as ground investigations and intrusive foundation inspections, to assess the current ground and soil conditions and the condition of the L2 tower foundations. This will inform whether foundation upgrading/strengthening is needed
	Steelwork strengthening may be needed and condition steelwork on the L2 towers may be required.	Design will run an L2 tower analysis with the loading of the [redacted] conductors [redacted] For CBA purposes these potential costs have been estimated. These include the procurement of [redacted]
Operation & Maintenance	There is a risk of not having the correct number of strategic spares for the new conductor system and NGET linespersons trained.	NGET's Operations team will ensure that enough strategic spares are available to cover the new [redacted] conductor system. [redacted] installation methods will be introduced in NGET linesperson training.
Safety, Health & Security	Given the nature of a full OHL refurbishment and more intrusive work to be carried out, there is a risk to protection of 3rd party assets.	NGET will engage early with 3rd parties to ascertain the most suitable protection or closure of each asset. OHL wiring work will be carried out under single circuit outage conditions, and an experienced OHL contractor will be selected in line with NGET safety rules.
Planning, Land & Consent	Not agreeing temporary access work, routes, and timings for OHL refurbishment work with landowners could cause programme delays, safety issues and a worsening of relationships with landowners.	NGET lands teams will engage early with landowners to ascertain the most suitable access routes and timings to access lands. The programme will ensure that sufficient time is given to allow this engagement.

Category	Risk	Mitigation measure
	Ecological consenting and licenses may be needed for SSSI and habitat/species such as Dormouse or Great Crested Newts, which could lead to programme delays.	NGET when planning the job will develop a plan that limits habitat and species displacement. Full ecological surveys on the potential work areas and access routes will be carried out to then engage relevant authorities/agencies to obtain ecological consents/licenses and to develop a plan of works that limits habitat/species displacement. Any Biodiversity Net Gain needed will be identified as part of the environmental surveys however due to this being existing infrastructure and access/enabling works being temporary no habitat should be permanently lost therefore BNG will be low.
Third Party Impact & Network Coordination	3rd party asset owners such as DNO's and [redacted] may be affected by the work (e.g., scaffold structures, outages, or closures).	NGET will engage early with 3rd parties to ascertain they are aligned with the project and its timings.
Environment & Sustainability	Some of the works might fall within a Site of Special Scientific Interest (SSSI), which may increase the potential for loss of habitat.	A comprehensive ecological survey of all work sites and access routes allows early engagement of environmental agencies to agree on plan of works that limits habitat/species displacement. Any Biodiversity Net Gain needed will be identified as part of the environmental surveys however due to this being existing infrastructure and access/enabling works being temporary no habitat should be permanently lost therefore BNG will be low.
	There is a carbon cost of construction associated with the works.	The works will seek to minimise the carbon footprint of the Investment in line with NGET's OHL design principles aimed at diminishing the impacts associated with high voltage OHLs and promoting the environmental quality of an area, as well as NGET's commitment to deliver carbon neutral construction by 2026. The CBA/selection of the preferred Investment solution factored in the carbon cost of construction.
Timing of Programme & Resources	The long programme of works will require more resources and a more skilled workforce in an already constrained market.	Early engagement with the market will allow to plan, establish and secure the resources needed for the project.
	Procurement delays for some long lead items (e.g., conductors) may cause an overall delay in the programme of works.	Early engagement with contractors so that the materials can be ordered in a timely manner. There is also a potential for free issues materials (i.e., spares that NGET has already procured for other projects and have not been used).

Category	Risk	Mitigation measure
	Securing and scheduling a suitable outage and delivery window for this project is a significant risk given the criticality of the circuit and desire to minimise impact on any customers.	OHL delivery is contingent on planned system access. Changes to outage availability or assumptions present a risk to critical-path delivery. This risk is managed through early validation of outage requirements, coordinated sequencing across interfacing works, and a delivery strategy that reduces reliance on outages, supported by contingency sequencing to maintain key milestones.
Cost	An increase in exchange prices of metal would increase the £-cost of the preferred solution. Early phase development – no project-specific risk register	We assume that OFGEM will introduce an appropriate mechanism to address the impact of Real Price Effect inflation. We have applied a [redacted] risk and contingency uplift to reflect typical project risk and contingency costs. This project is currently in an early phase of development (between stages 4.0 to 4.2) and consequently has less detailed scope definition and no project-specific risk register. The [redacted] risk and contingency uplift reflect unaccounted project risks including material deviation from the original scope assumption and unforeseen delays. Derivation of the [redacted] is explained in the NGET Cost Assessment and Benchmarking Approach Annex of our submission

6. Conclusion

This document outlines the investment decision making process relating to the proposed strategy for the uprating the Feckenham – Hams Hall 400 kV OHL circuit.

The works to be undertaken involve reconducting of the ZFC and ZF OHL circuits by replacing the existing [redacted] with [redacted]

In addition to delivering the primary investment driver (i.e. increase B8 boundary capacity [redacted] the preferred option offers a robust and deliverable solution within the required CP2030 timescales. The use of proven technology on existing infrastructure reduces delivery risk, avoids unnecessary repeat interventions, and ensures strong alignment with NGET's regional strategy and strategic investment principles.

The preferred option minimises the need for repeat asset-health driven interventions associated with a secondary, ageing OHL infrastructure, driver as a direct outcome of addressing the primary investment driver. Delivering these works as a single, coordinated programme enables efficiencies and defers the requirement for future replacement of degraded OHL assets.

The investment has a forecasted expenditure of [redacted] and is expected to be delivered by FY [redacted] The proposed solution offers significant design and network resilience benefits compared to other options:

- Replacing the conductor system will limit number of asset health interventions, avoiding a double programme of works and a double mobilisation of construction.
- Providing the required [redacted] capacity to meet required capacity while also being the most cost-effective solution for the consumer.

This submission outlines a preferred solution to satisfy the investment drivers. It seeks confirmation of eligibility under Special Condition 3.18, confirmation of eligibility for PCF under Special Condition 3.15, confirmation of re-opener Track 3 EL and NC and formal approval of the preferred option.

Table 17: Investment Summary

Main drivers	Load related: Increase B8 boundary capability [redacted] to address power flow demands and system stability Identified as a CP2030 project, aligning with the UK Government's strategic commitment to delivering clean power across the grid by 2030 while maintaining security of supply.
Selected Option	Option D-1 – Reconductoring [redacted]
Estimated Cost & Timing	**Estimated Cost** • Estimated capital cost: [redacted] (2023/24 prices, incl. Risk & contingency) **Timing:** Achieve [redacted] by [redacted]
Outputs	The investment will enable the following outputs: • Increase the B8 boundary capability [redacted] respectively; and increase the winter post fault rating of the circuit to [redacted] • Contribute to Net Zero by utilising existing infrastructure to minimise the impact on communities, and deliver under a single programme of works for efficient delivery

Appendices

Appendix A: Glossary

Table 18: Glossary:

Acronym	Definition
ACCC	Aluminium Conductor Composite Core
BPDT	Business Plan Data Template
CBA	Cost Benefit Analysis
CSNP	Centralised Strategic Network Plan
CP2030	Clean Power 2030
DCO	Development Consent Order
DNO	Distribution Network Operator
EAWO	Early Asset Write Offs
EBRE	East Claydon Enderby Patford Bridge Reconductoring
EEW	Early Engineering Works
EPC	Engineering Procurement and Construction
EJP	Engineering Justification Paper
EoL	End of Life
EPC	Engineering Procurement and Construction
FEED	Front End Engineering Design
HND	Holistic Network Design
IFR1	Feckenham-Ironbridge Reconductoring Project
MVA	Megavolt Ampere
MW	Megawatt
NESO	National Energy System Operator
NGET	National Grid Electricity Transmission
NOA	Network Options Assessment
OHL	Overhead Line
PASE	Pre-Approval of Solutions by Engineering framework (from Ofgem)
PCF	Pre-Construction Funding
RAV	Regulated Asset Value
RIIO T3	Revenue = Incentives + Innovation + Outputs - Electricity Transmission 3 (Regulatory Period)
SQSS	Security and Quality of Supply Standard
SSSI	Site of Special Scientific Interest
tCSNP	Transitional Centralised Strategic Network Plan
TWR	Transmission Works Review

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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