nationalgrid

RIIO-T3

Upgrade of Eggborough to Thorpe Marsh 400kV single circuit (ETRE)

Eligibility Letter – Track 2

May 2026

National Grid Electricity Transmission's Business Plan

Confidential

Table of Contents

Reference and summary table

Topic	Description
Name of Project	*ETRE – Reconductoring of Eggborough – Thorpe Marsh 400 kV single circuit*
TO's preferred re-opener track	Track 2 Eligibility Letter (EL)
RRP References	NGT500532
BPDT / Project Reference Number	NGT500532
Load Board Reference	NGT500532
Investment Driver	**NESO** • This project was first identified as a NESO driven project under NOA7. It received a "essential" signal under HND and is designated as Clean Power 2030. • As such, this investment supports the delivery of key UK government energy policy objectives and the regulatory framework set through RIIO–T3 and the CP2030 pathway, by enabling a secure, affordable and resilient electricity system capable of accommodating sustained growth in demand and generation. • *The delivery of ETRE, [redacted] o achieve its full benefit.*
PASE Alignment	Project is PASE compliant as uses highest rated conductor on existing L6 towers. Primary – highest rated conductor being used.
Outputs	[redacted] ETRE is a reinforcement which is not directly on a circuit which crosses the B8 boundary. However, under certain system conditions, [redacted] by unlocking an up-stream network bottleneck that enables a substantial amount of power to be transferred across the boundary.
Short list of strategic options considered	• Reconductoring and cable replacement is the only viable longlisted option that meets the need by the required date
Preferred solution and explanatory narrative on the rationale	Reconductoring and cable replacement is the only option that meets the need by the required date. [redacted]
Expected Forecast Costs	The current estimated view of capex in 23/24 price base is [redacted] applying [redacted] composed of an underlying estimate of [redacted] and a risk/uncertainty provision of [redacted] In line with our approach to the [redacted] was applied as it captures [redacted]

Delivery Year	[redacted] This is based on [redacted] The [redacted] delivery date for ETRE is [redacted]
Extension cost	N/A
Applicable Reporting Tables	BPDT 10.5 ET Pipeline log and RRP 2024-25 E1.11_ET Pipeline Log. within catch-all tCSNP2 forecast in both tables.
Historic Funding interactions	Ofgem's decision on the regulatory treatment of tCSNP2 options in December 2024 placed ETRE in the Small/ Medium project track. [redacted]
Interactive Projects	[redacted] TMCF (coordination) [redacted]
Spend Apportionment	[redacted]

1. Executive Summary

1.1. Project Summary

ETRE will resolve the thermal overload on the circuit between Eggborough and Thorpe Marsh, [redacted] on [redacted]

ETRE was identified as one of the projects required to achieve the Clean Power 2030 ambition, strengthening the previously identified need case via the NOA process.

The proposed reconductoring with [redacted] provides the highest capacity that can be achieved with the existing towers on the circuit, thus providing the highest uplift possible while maintaining existing infrastructure.

1.2. Submission purpose

ETRE is an in-flight CP2030 project, confirmed by NESO. In line with [redacted] and as [redacted] has been [redacted]

Notwithstanding this, ETRE has been developed consistently with NGET's wider tCSNP2 Refresh approach, as set out in our submissions to Ofgem and NESO. This includes [redacted]

For costs, [redacted]

From a regulatory perspective, ETRE was included in the Small and Medium Delivery Track in Ofgem's December 2024 tCSNP2 funding decision[1], reflecting an expected project cost of under [redacted]. As a result, and despite its CP2030 status, ETRE did not receive funding through that decision.

[redacted]

We are seeking Ofgem's confirmation that ETRE is eligible for assessment under the Load Re-opener. We are also seeking confirmation that Track 2 EL is the appropriate route for this project, approval of Pre-Construction Funding (PCF) of our preferred solution.

Note:

[redacted]

[1] tCSNP2 decision
https://www.ofgem.gov.uk/sites/default/files/2024-12/tCSNP2_decision.pdf

1.3. Need

The requirement to reinforce the existing Eggborough-Thorpe Marsh 400 kV single circuit, known as ETRE, was signalled as Proceed-Critical in the "Beyond 2030" report by NESO (March 2024) and is classified as a Clean Power 2030 (CP2030) required project. The project will assist in uplifting the [redacted] which is key to support increasing power flows across the network.

ETRE also [redacted] he tCSNP2 refresh outcome [redacted] for ETRE [redacted]

1.4. Optioneering to date

An options appraisal process has been undertaken to determine a preferred strategic option that achieves the best balance between National Grid's statutory and non-statutory duties, and to enable subsequent engagement with core stakeholders.

We first considered a range of strategic options (a longlist), including do-nothing, power flow control, hotwiring, hybrid of reconductor and replace cable and new overhead line (OHL). These underwent Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis and Critical Success Factor (CSF) analysis.

From these 5 longlist options, one was shortlisted for further refinement and detailed analysis: Option 4: Hybrid: reconductor & replace cable.

Following evaluation of conductor options and the cable installation options, the two following refined options were proposed for detailed analysis and CBA:

[redacted] Option 4.1 Hybrid: reconductor & replace cable [redacted]

[redacted] Option 4.2 Hybrid: reconductor & replace cable [redacted]

Based on the outputs of our optioneering, [redacted] the preferred strategic option for ETRE is:

[redacted] Option 4.1 Hybrid: reconductor & replace cable [redacted]

Based on the development activities that have been undertaken so far, the selected option accommodates the project driver and meets the network need. Additionally, [redacted] exceeds future energy demand requirements and is feasible to deliver by the optimal delivery date as seen in the "Beyond 2030" publication by NESO. There may be challenges concerning the delivery of the option, due to requirement to replace the existing cable, however these will be further investigated in the next stage of development when FEED contractors are onboarded.

The option protects against a double circuit fault; offers a less complex consenting process for cable replacement than new OHL; and supports future growth in customer demand and generation.

[redacted]

1.5. Cost Estimates

Based on the latest Cost Book (2023/24 prices) has an estimated total cost of . Pre-Construction Funding of is requested at this stage to

The cost for

There is a on the assessment at the . Based on the current assessment is most suitable to support the proposed solution and meet technical requirements.

1.6. Indicative Delivery Programme

The current estimated delivery date is July 2030, based on [4]. The the project is The summary include and in advance. First site access is due to commence see section 2.2.2.1 – Interactive Projects.

2. Introduction

2.1. ETRE

This paper presents our Eligibility Letter under the Load Reopener and Price Control Deliverable under Special Condition 3.18 for investment to reinforce the Eggborough-Thorpe Marsh 400 kV single circuit.

Through this submission we are seeking:

- Approval of the investment and our preferred option for ETRE: reconductoring of Eggborough – Thorpe Marsh 400 kV single circuit, replacement of the existing cable section

[3] As set out above, in order to provide more

[4] As set out above, in order to

- Confirmation of the proposed Track 2 EL of the re-opener process, because ETRE is an in-flight, NESO confirmed CP2030 project [redacted]
- Pre-Construction Funding (PCF) under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable).

This investment is driven by the network need as identified by the NOA process. ETRE was signalled as Proceed-Critical in the "Beyond 2030" report published by NESO (March 2024). It is classified as a Clean Power 2030 (CP2030) required project. ETRE will [redacted] to address increased power flows.

On the basis of a clear Proceed signal from the NESO and CP2030 Needs Case and the Ofgem tCSNP2 decision, we will continue to progress this project unless further NESO analysis or Ofgem feedback suggests otherwise.

2.1.1. Eligibility, Track & PASE

Given ETRE is a CP2030 project triggered by the NOA process, which is aligned with PASE requirements, we are submitting this project under Assessment Track 2 EL.

2.1.2. Pre-Construction Funding Request

Under Special Condition 3.15 of the Electricity Transmission licence, this investment qualifies for allowances equal to 8.2% of its total forecasted cost (£[redacted] at the time of this Load Re-opener Eligibility Letter submission).

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

Table 1 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.

We confirm that no PCF activity included in this submission has been funded through baseline allowances, other re-openers, or alternative licence mechanisms.

Table 1 – Estimated costs for pre-construction activities (£m, 23/24 prices)

[redacted]

2.2. Background

2.2.1. Chronology

ETRE constitutes works to increase the capacity of the existing Eggborough – Thorpe Marsh 400 kV single circuit. As seen in the tCSNP2 studies, the network requirement was to increase the winter post fault rating from [redacted] However, following [redacted]

[redacted]

The project has selected the preferred strategic option. As part of this, ETRE underwent a rigorous development process, aimed at assessing all technically feasible options that could meet the needs case. The development steps included:

1. Discover
    - Gather data (e.g. project need, other drivers, existing assets, dependencies), draft longlist of options, engage stakeholders, and assess data gaps
2. Option development
    - Develop and assess long list of options, and shortlist them, identify uncertainties and risks
3. Options selection / Technical scope
    - Assess shortlisted options and reach a preferred strategic option for the need case
    - Build on technical scope of preferred strategic option. Remove uncertainties to deliverability
4. Cost and Schedule
    - Finalise cost and schedule estimates, including quantifying risks and mitigations
    - Determine delivery strategy based on findings of previous steps
5. Gate Deliverables
    - Develop deliverables for gate submission at agreed level of detail

The next stage of development moves to detailed design, where FEED contractors will be onboarded and environmental surveys will be undertaken where appropriate. The chronology and expected timeline for ETRE, since project identification is shown below in Figure 1.

The below timeline is based on [redacted] Therefore, it gives a [redacted] and a view of the phasing of different activities, [redacted] t this stage of the project lifecycle [redacted] nstead, it is appropriate to consider [redacted]

[redacted]

[redacted]

2.2.2. Regional & Network context

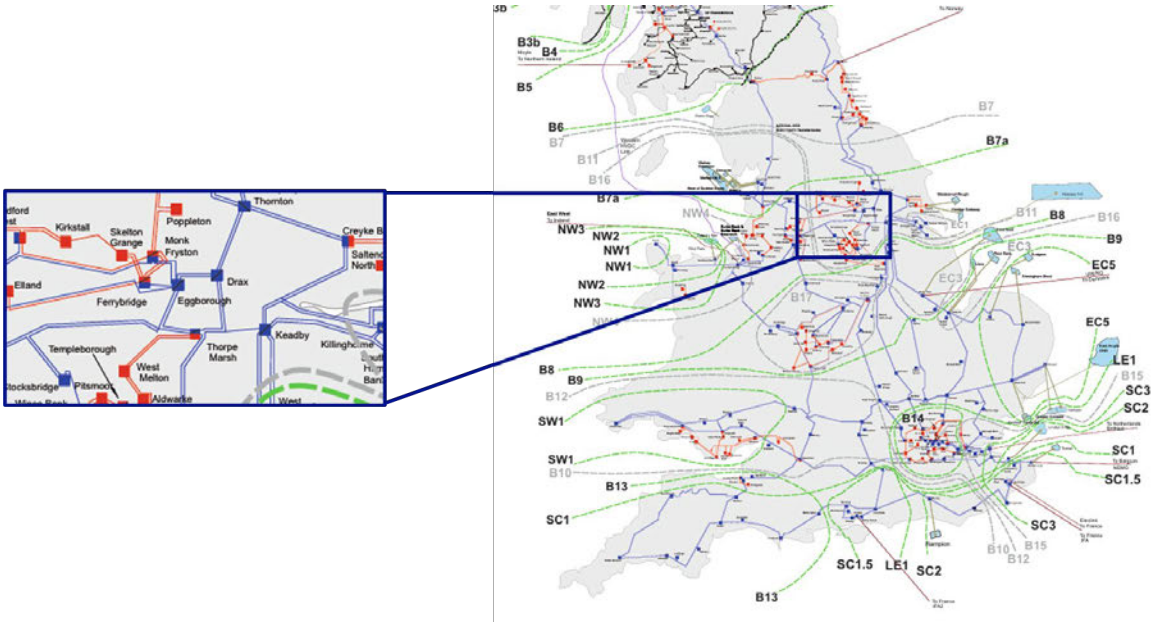
ETRE refers to the reconductoring works on the single circuit between Eggborough and Thorpe Marsh and spans across Yorkshire and the Humber, located within the North of England electricity transmission network. [redacted] alongside ETRE, other schemes will need to be delivered as part of an optimal pathway[6], as detailed in Section 2.2.2.1- Interactive Projects below.

The electricity network in Yorkshire and the Humber is well-developed due to its coal-producing history. Once known for coal mining, steel manufacturing, and fishing, the region now leads in manufacturing and renewable energy. With most coal power stations closed and Drax converted to biomass, the region has quickly adopted offshore wind, hosting two of the world's largest wind farms, while planning more projects. Additionally, the region is at the forefront of innovative energy trials, focusing on technologies such as Carbon Capture and Storage (CCS), hydrogen production and more offshore wind farms.

To support its growing renewable energy sector and industrial needs, the transmission network in Yorkshire and the Humber requires upgrades to its existing infrastructure and changes in network configuration. These measures will reduce, but not fully eliminate, the need for new infrastructure, ensuring sufficient capacity to meet the region's evolving economy and future energy demands.

[6] Optimal pathway based on tCSNP2 NESO studies

Figure 2 – Location of ETRE on NGET's network



[redacted]

2.2.2.1. Interactive projects

To achieve the required [redacted] several projects are needed, as seen from the tCSNP2 modelling analysis, some of which are in close geographical proximity to ETRE. The sequencing and timing of these projects is crucial to achieve the required uplift and thus should be considered when planning.

ETRE's project interdependencies are summarised in Table 2 below. The critical outcomes of the interdependencies are:

[redacted]

Table 2: Project interdependencies

Area	Specific projects	What are the dependencies and impact?
[redacted]	[redacted]	ETRE is [redacted]
Reinforcement of the B8 boundary[7]	JTHW	Projects required to be delivered alongside ETRE [redacted]
	TMPC	
	EDN3 Element 1	
	EDN3 Element 2	
	TMCF	
	[redacted]	
	PSNC	
Interacting Project	[redacted]	[redacted]
Interacting Project	TMCF	As well as contributing [redacted] boundary uplift, close coordination is required between ETRE and TMCF where works for the TMCF reconfiguration occur prior to 2030. Where possible opportunities for outage coordination should also be explored
[redacted]	[redacted]	There are [redacted] This could [redacted]

2.2.3. Site Background

The ETRE route runs between the existing Eggborough and Thorpe Marsh substations. The project aims to increase the capacity on the circuit and apart from the cable replacement leading to Eggborough, no other major works will be completed on the substations.

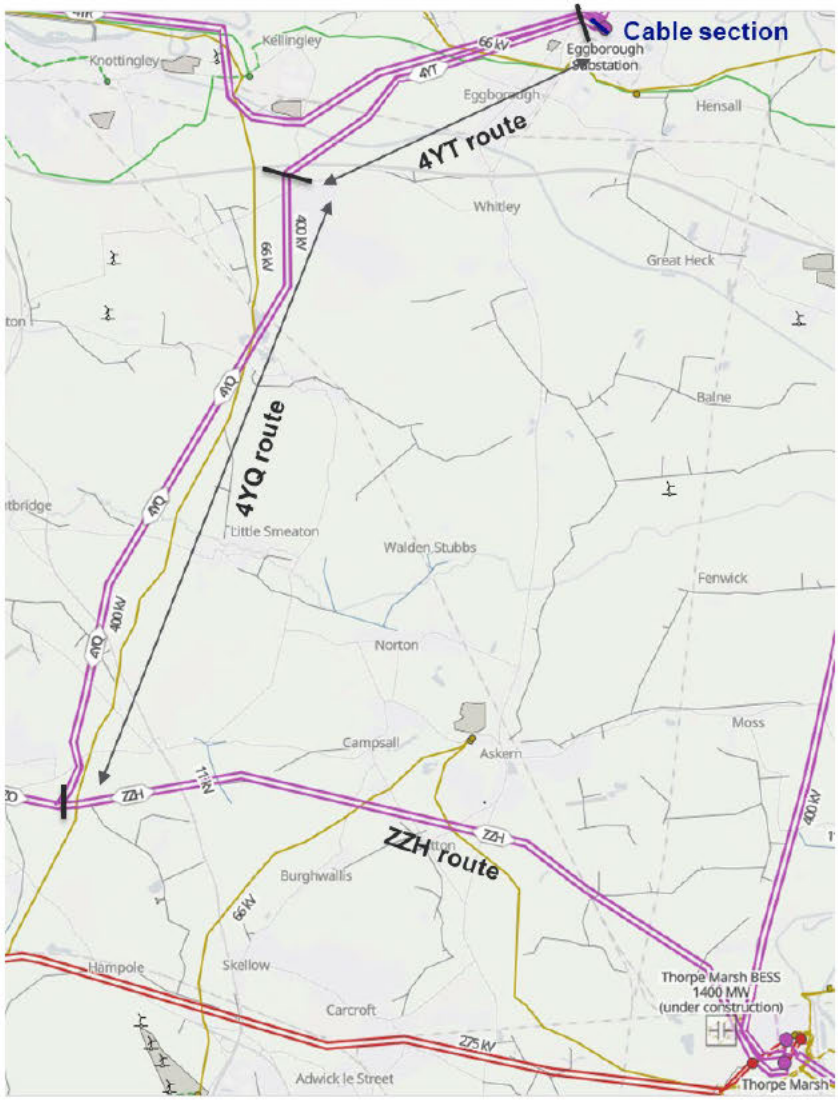
Figure 5 provides a satellite view of the route and also includes close-up satellite images of Eggborough 400 kV and Thorpe Marsh 400 kV substations. This connection is positioned [redacted] as illustrated in the single line diagram in the previous section.

[7] As per tCSNP2 NESO studies (2024)

The circuit from Eggborough – Thorpe Marsh represents a combination of 4 assets (see Figure 6):

- [redacted] YT route – Single circuit, [redacted] km length
- [redacted] 4YQ route – Single circuit, [redacted] km length
- ZZH route – Single circuit: [redacted] km length
- Cable Section – [redacted] km length

Figure 6 – Physical overview of ETRE routes



Identified site constraints along the existing circuit route include:

- Very limited space around the existing cable route (due to constraints between the existing cable sealing end and tower foundation of other circuits), which may affect any scope associated with the cable and possibly land rights.

[redacted] Existing [redacted] which may affect [redacted]

- Activity around Eggborough [redacted] Therefore, early engagement with third parties is essential to better understand their programme of works and close contact throughout the project should be maintained to ensure alignment.

Following an initial assessment of the ETRE works and existing route, the following high-level environmental designations have been identified in Table 3.

Table 3: High Level Assessment of Environmental Designations

Category	Environmental Designations
Cultural Heritage / Areas of Archaeological Interest	• Roman fort 600m west of Roall Hall – scheduled monument identified 0.6m from the substation site. • Interactions in close proximity to SMs unlikely to be a risk unless work includes intrusive works/tower foundation improvements. In which case, the potential need for a secondary consent should be checked with the Consents Team. Mitigation not considered necessary in respect to preserving the setting of conservation areas or listed structures due to the nature of the works. • A secondary consent in this instance would comprise application for a Scheduled Monument Consent to Historic England. A SMC is not likely to be granted if transecting a SM designation.
Ecology & Priority Habitats	• Line sits within the impact zones of SSSIs for its majority. • Line runs through Shirley Pool SSSI (between towers ZZH016 & ZZH015). • Line runs through Brockadale SSSI (between towers 4YQ034 & 4YQ036). • SSSI Assents required
Flood Risk	• Line passes through flood zones 2 and 3 between: Thorpe Marsh substation & tower ZZH021, and between towers 4YQ035 & 4YQ034, 4YQ030 & 4YQ028, 4YQ020 & 4YT13, and 4YT008 & 4YT006.
Highways (Bridges / Major Roads)	• Line crosses A19 straight out of Eggborough substation. • Line crosses A465 between towers 4YT007 & 4YT009. • Line crosses M62 between towers 4YT016 & 4YQ018. • Line crosses A1 between towers 4YQ039 & 4YQ040. • Line crosses A639 between towers 4YQ042 & 4YQ043. • Line crosses A6201 between towers 4YQ045 & 4YQ046. • Line crosses A1 between towers ZZH033 & ZZH032. • Line crosses A19 between towers ZZH019 & ZZH018. • Line crosses railway line between Knottingley and Whitley Bridge between towers 4YT012 and 4YT13. • Line crosses railway line between Knottingley and Doncaster between towers 4YQ024 & 4YQ025 and ZZH014 & ZZH013. • Line crosses railway line between Selby and Doncaster between towers ZZH011 & ZZH010. • Line crosses railway between Hatfield and Stainforth and Adwick-le-Street between towers ZZH007 & ZZH006. • Line crosses Thorpe Marsh drain between towers ZZH005 & ZZH004. • Line crosses over Knottingley and Goole canal between towers 4YT014 & 4YT015.
TPOs/ Conservation Areas/ Hedgerows	• N/A unless scheme includes intrusive works/ tree removal.
Contamination (LPA Contaminated Land Register)	• N/A unless work includes intrusive works/tower foundation improvements.
Groundwater / SPZs	• N/A unless work includes intrusive works/tower foundation improvements.

The consenting approach has been considered based on the scope of the preferred option. The proposed OHL refurbishment works are not considered as 'development' and therefore do not require primary consent in the form of planning permission or use of Permitted Development rights.

Planning permission for access improvements could be required if these are included within the proposed works, where a new bellmouth or access would be formed onto a classified road. These requirements will be determined during the FEED.

As noted in Table 3 above, ETRE passes through rural land which may contain watercourses, highway and railway routes, as a result, secondary consents will likely be required prior to commencement of works in these areas. However, a full suite of environmental surveys covering the whole wayleave will be undertaken in line with the OHL Environmental Guidance document, to fully understand potential impacts as a result of the works and confirm secondary consents that are required.

It is probable that the cable replacement can be completed under permitted development (PD) rights afforded to National Grid as a statutory undertaker. However, a PD checklist would be completed at later stages to confirm this position; any aspect of the development deemed not to constitute permitted development would require a Town and Country Planning Act application.

2.2.4. Historical funding

ETRE is an in-flight, NESO confirmed CP2030 project. In line with the [redacted] as a result of its [redacted] ETRE was [redacted]

In terms of regulatory route, ETRE was included in the tCSNP2 "Small and Medium Delivery Track" in Ofgem's December 2024 tCSNP2 funding decision, as it has an expected project cost below £60 million in 2018 values at the point of submission in the tCSNP2 in 2023. As a result, it did not receive regulatory funding in that decision, despite being a CP2030 project.

[redacted]

Aside from [redacted] his funding relates to [redacted] This was accessed through [redacted]

3. Drivers & Needs Case

[redacted]

NESO develops the future energy scenarios (FES), published annually, to aid in electricity network planning. These scenarios help decide future transmission capabilities and inform the Electricity Ten Year Statement (ETYS), which outlines future transmission needs, capacity requirements, and necessary reinforcements.

Part of the ETYS review involves determining the system boundary limitations leading to the "Beyond 2030" NESO publication (March 2024). This report recommended resolving the thermal overload on the circuit between Eggborough and Thorpe Marsh with the ETRE project.

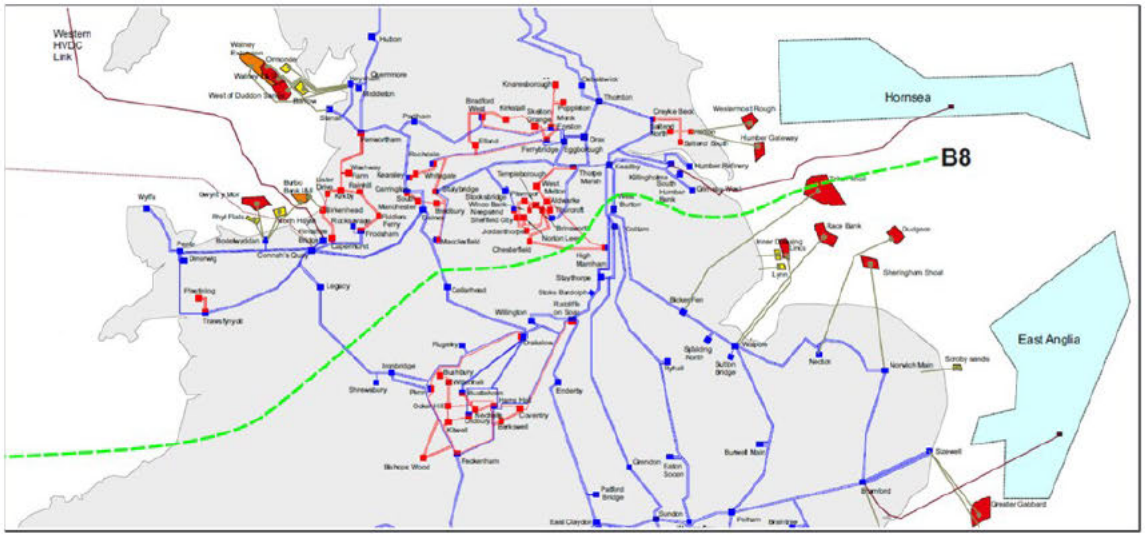
[redacted]

[redacted]

[redacted] However, following [redacted]

As part of the tCSNP2 assessment and as seen in the "Beyond 2030" report published in March 2024, NESO signalled ETRE as Proceed -Critical. The need case for ETRE was then further validated as part of the Clean Power 2030 assessment conducted by NESO (2024). Finally, as indicated in [redacted] ETRE will [redacted]

Figure 7: Network Map Showing B8 Boundary



Other driver considerations include customer connections and asset health:

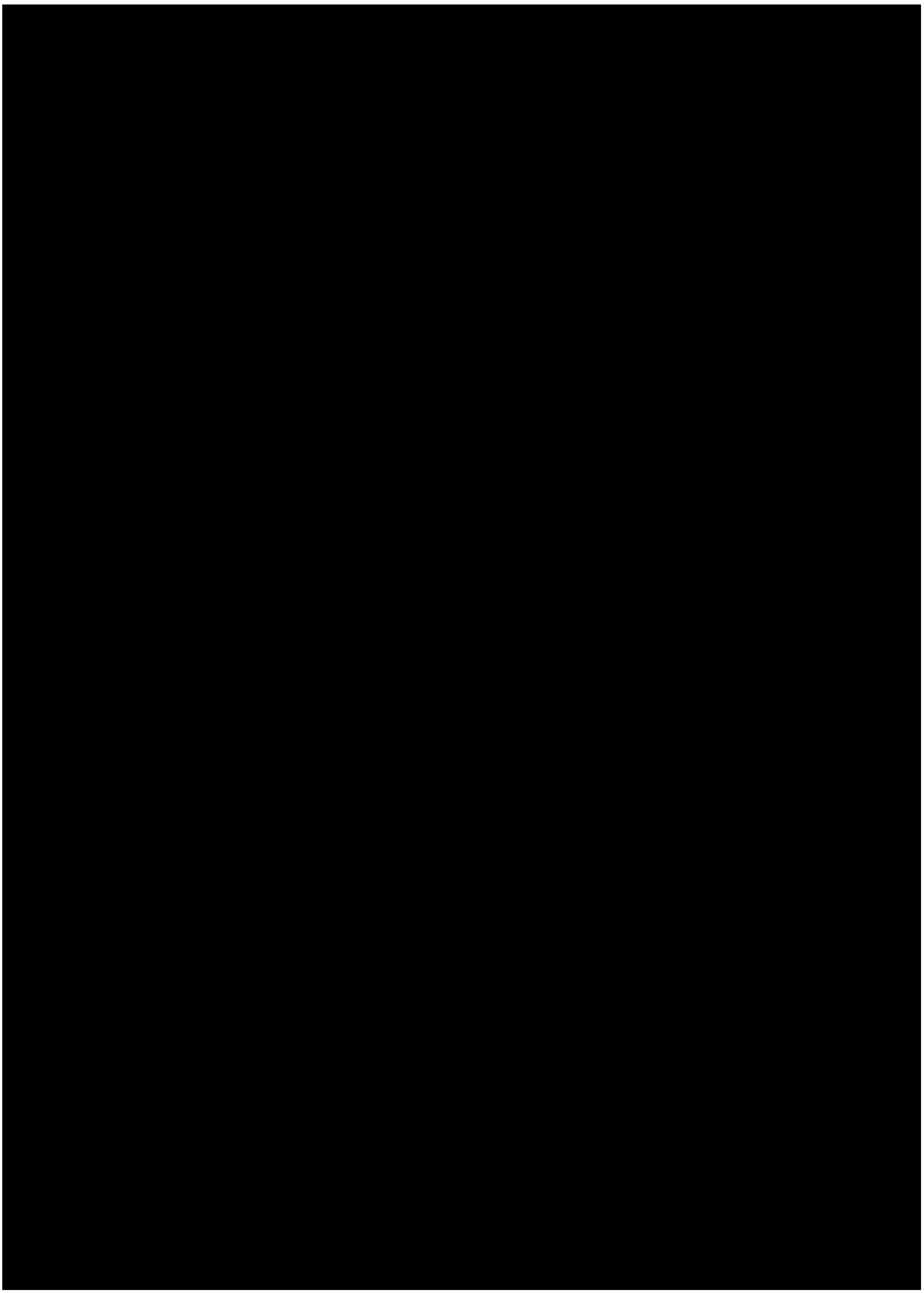
Potential [redacted] owever [redacted] information on customer connections is presented and discussed in Section 4.1.1 - Influence of customers or other parties on credible options and Section 2.2.2.1– Interactive Projects, [redacted]

Whilst there are no [redacted] lease refer to the following Section 3.1 for more detailed information.

3.1. Asset Health Information

The primary focus of the ETRE investment is to increase network capacity. [redacted]

[redacted]



The reconductoring project has been scoped to address asset health considerations where feasible, alongside the delivery of the capacity reinforcement.

4. Optioneering

A high-level options appraisal has been undertaken to determine a preferred strategic option at this Early Development Stage. The aim of the appraisal is to inform the selection of the strategic option that achieves the best balance between National Grid's statutory and non-statutory duties, and to enable subsequent engagement with core stakeholders.

A structured appraisal process was employed to progress from longlist definition to shortlist identification through the Critical Success Factors (CSF) and the Strengths, Weakness, Opportunities, and Threats (SWOT) analyses, as well as a cost-benefit assessment (CBA) to determine value for money.

4.1. Strategic Options

A comprehensive range of potential development options for the project was identified, regardless of their viability. This resulted in a long list of six possible options for ETRE. These are presented in Table 5 below.

Table 5 - Summary of long list options

#	Option	Description
1	**Do nothing**	Maintain current asset with only maintenance activities considered
2	**Power flow control**	Appropriate power flow control solution to manage the flow
3	**Hotwiring**	Operate at higher temperature to manage high flows
4	**Hybrid: Reconductor & replace cable**	Reconductor [redacted] existing [redacted], replace existing [redacted] cable at [redacted]
5	**New OHL**	A new OHL circuit

For each of the options outlined in the long list, a SWOT analysis was carried out. A SWOT analysis evaluates the strengths, weaknesses, opportunities, and threats of different options to help make informed decisions. The details for each of the options can be found in Appendix A – SWOT analysis.

The long list of options was assessed against a set of criteria (environmental, socio-economic, boundary and economic studies) including evaluating their ability to meet the project driver(s). Each option is assessed or described against these criteria, with supporting evidence and professional judgement documented.

[redacted]

Following the SWOT and CSF analysis, Table 6 below provides a rationale for de-selecting or taking forward each option.

As it can be seen from Table 6, the do nothing, power flow control and hotwiring options do not meet the system need, therefore have not been selected. The option to construct a new overhead line has also been de-selected at this stage as the system need can be met by upgrading existing parts of the network.

Table 6 - Option Justification for longlist of options

#	Options	Decision	Rationale for rejecting or taking forward the option
1	Do nothing	Not selected	Not feasible –required capacity cannot be achieved
2	Power flow control	Not selected	Not feasible - required capacity cannot be achieved
3	Hotwiring	Not selected	Not feasible - required capacity cannot be achieved
4	Hybrid: reconductor & replace cable	Shortlisted	• Achieves the required capacity by the EODD (Earliest Optimal Delivery Date). • Cost to implement is lower compared to constructing a new OHL [redacted]
5	New OHL	Not selected	• Can achieve the required capacity while futureproofing the network, but has a significantly longer duration compared to other options • Would be the highest cost option due to significant infrastructure and construction required • Higher impact on local communities and the environment compared to upgrading existing infrastructure

4.1.1. Influence of customers or other parties on credible options

While the need for ETRE and optioneering have not been impacted by customers, the outcome of Connections Reform should be reviewed. Led by NESO, Connections Reform represents a major overhaul of the UK electricity grid. However, Connections Reform would not impact the needs case to build the current ETRE selected option, which is driven by the NESO's wider strategic plan. It would only trigger discussions and assessments on whether and how ETRE remains a customer-enabling work.

4.2. Shortlisted Options

4.2.1. Description of the Shortlisted option

Following the long list analysis, the options were narrowed down to a viable delivery option. Option 4 is the only option that delivered the required uplift and achieved the EODD, therefore the shortlisted option is:

- Option 4: Hybrid: reconductor & replace cable

4.2.2. Further analysis of the Shortlisted option

The selected option "Hybrid: reconductor & replace cable" was then assessed in more detail. A Conductor Assessment was undertaken to determine the optimal conductor that can be used for the reconductoring of the 4YT, 4YQ, and ZZH routes. This was followed by determining the preferred method for replacing the cable.

The circuit from Eggborough – Thorpe Marsh represents a combination of 4 assets:

[redacted]4YT route – Single circuit, [redacted]km length

- 4YQ route – Single circuit, [redacted]km length

[redacted]ZZH route – Single circuit: [redacted]km length

- Cable Section – [redacted]km length

It should be also noted that L6 towers are installed in all three routes, and the preferred option is the combination of reconductoring of 4YT route, 4YQ route, along with the replacement of the cable section.

Assessment of Conductors

Following the shortlisting of Option 4, an assessment of all possible conductors was carried out to determine the best fit for each route. In total, [redacted]

During the assessment, it was noted that the [redacted]

[redacted]It was also identified that [redacted]as the preferred choice[redacted]

Considering the above factors [redacted]It should also be noted that the [redacted]based on current NGET guidelines[redacted]

To note, even though [redacted] does not future proof the network or bring a cost saving compared to [redacted]

Cable Section

The cable section is to be installed [redacted]he works can be carried out under Permitted Development as

it is a private road and not considered a major highway. The total length of the cable is [redacted]

A new cable route is required as there is very limited space around the existing route. Figure 8 shows constraints between the existing cable sealing end and tower foundation of other circuits; therefore, the existing cable route cannot be widened to fit the new cables.

[redacted]

Option 4.1 Hybrid: reconductor & replace cable [redacted] is the preferred option for ETRE due to its ability to meet all the functional and technical requirements of ETRE. [redacted]

[redacted]

Option 4.2 Hybrid: reconductor & replace cable ([redacted] was also considered. However, this option would not be preferred for the cable installation as explained above. Therefore, it was de-selected from further consideration at this stage of development.

Refined preferred option:

Option 4.1 Hybrid: reconductor & replace cable [redacted]

Below is a summary of the justification for the preferred option.

To validate the construction method for the cable replacement a FEED study is required. This will be conducted in the next phase of development. Furthermore, detailed studies will also be conducted to determine the most suitable cable technology. [redacted]

Table 7: Detailed justification the preferred option

	Option 4.1 Rationale
Grid Capacity	[redacted] & a cable replacement will meet the capacity increase required on this circuit – ensuring maximum uplift utilising existing infrastructure
SE Impact	Lower impact compared to building a new OHL as tower structures remain. The section requiring cable replacement is small and predominantly on NG Land in the vicinity of the substation
Operability	Helps to address current issues on the circuit, [redacted]
Safety	Moderate risk will be encountered; this will be managed and mitigated in advance of each stage of works – Working at heights and cable lay
Cost	Moderate implementation costs
Schedule	[redacted]
Stakeholder Engagement	Requires secondary consent for reconductoring, assuming no major consents. Would require stakeholder engagement concerning access/egress
Technical Feasibility	Some risks identified however these will be managed through existing NGET processes
[redacted]	[redacted]
Market Capability	[redacted]

[9] As calculated at this stage of development

[redacted]	There are still high levels of supply chain uncertainty and a step change in European and global demand for equipment, materials and resource.

[redacted]

4.2.3. PASE

The preferred strategic option is PASE compliant as it employs the highest rated conductors/ fittings to the highest voltage permissible.

4.3. Detailed Quantitative Analysis of Shortlisted Options

4.3.1. Cost estimates of shortlisted options

Project cost estimates have been produced with a bottom-up analysis to be refined to supplement this as the project progresses. Capex has been estimated based on benchmarking against costs from comparator projects (with appropriate adjustments for project specifics e.g. cable distance).

Once the scope of a preferred option was [redacted] his exercise was then validated [redacted] For non-EPC (Engineering, Procurement & Construction) costs, [redacted] to ensure appropriate consistency across projects, [redacted]

[redacted]

Cost phasing is then applied as a final step to align with proposed schedule dates and allow for the calculation of future inflation costs and supply chain uplifts to complete the cost stack.

Option 4.1 Hybrid: reconductor & replace cable, [redacted]

The current estimated view of capex in 23/24 price base is [redacted]

Option 4.2 Hybrid: reconductor & replace cable, [redacted]

The current estimated view of capex in 23/24 price base is [redacted]

[redacted]

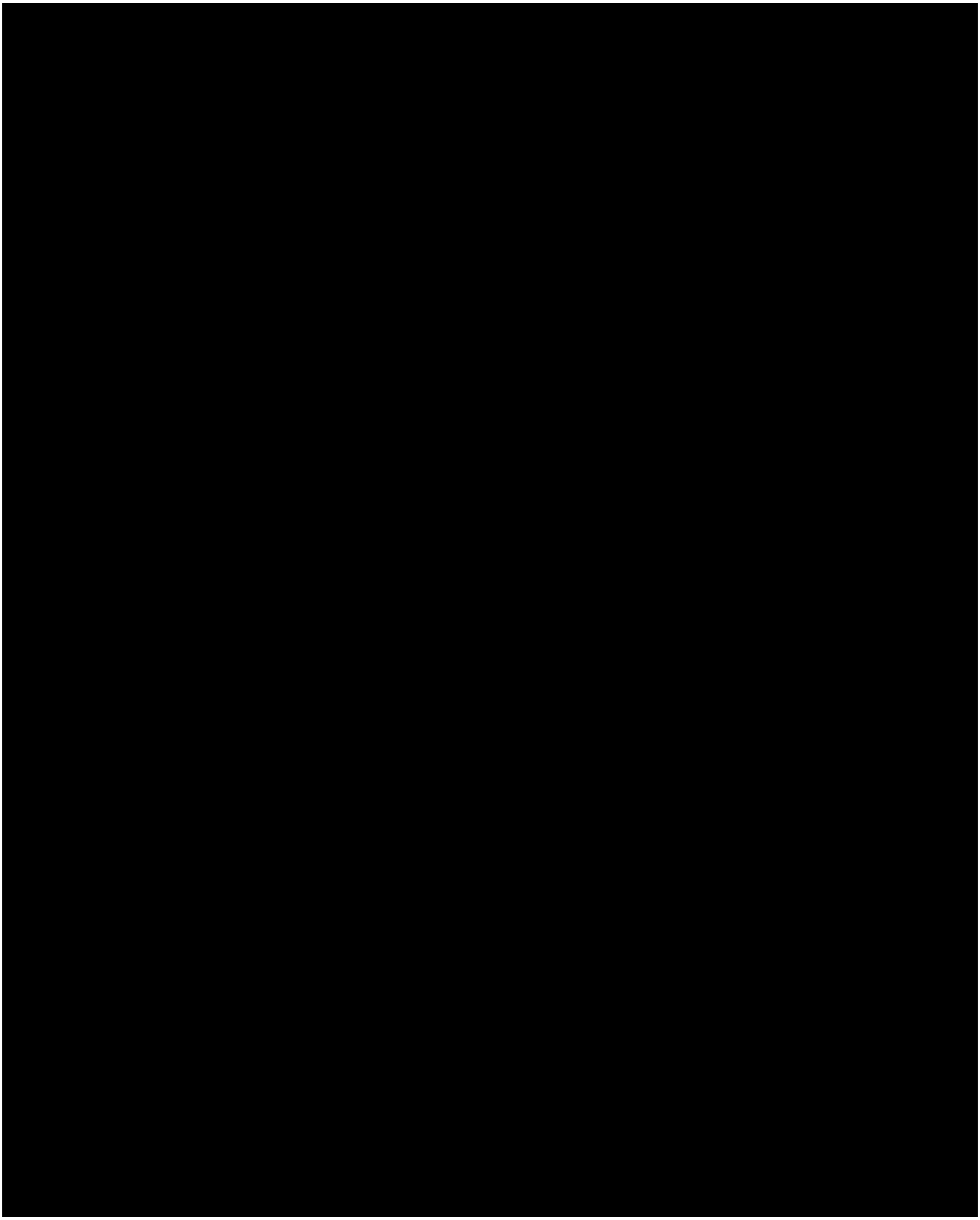
As described in Section 4.2.2 the two options have marginally different costs driven by the different construction methods.

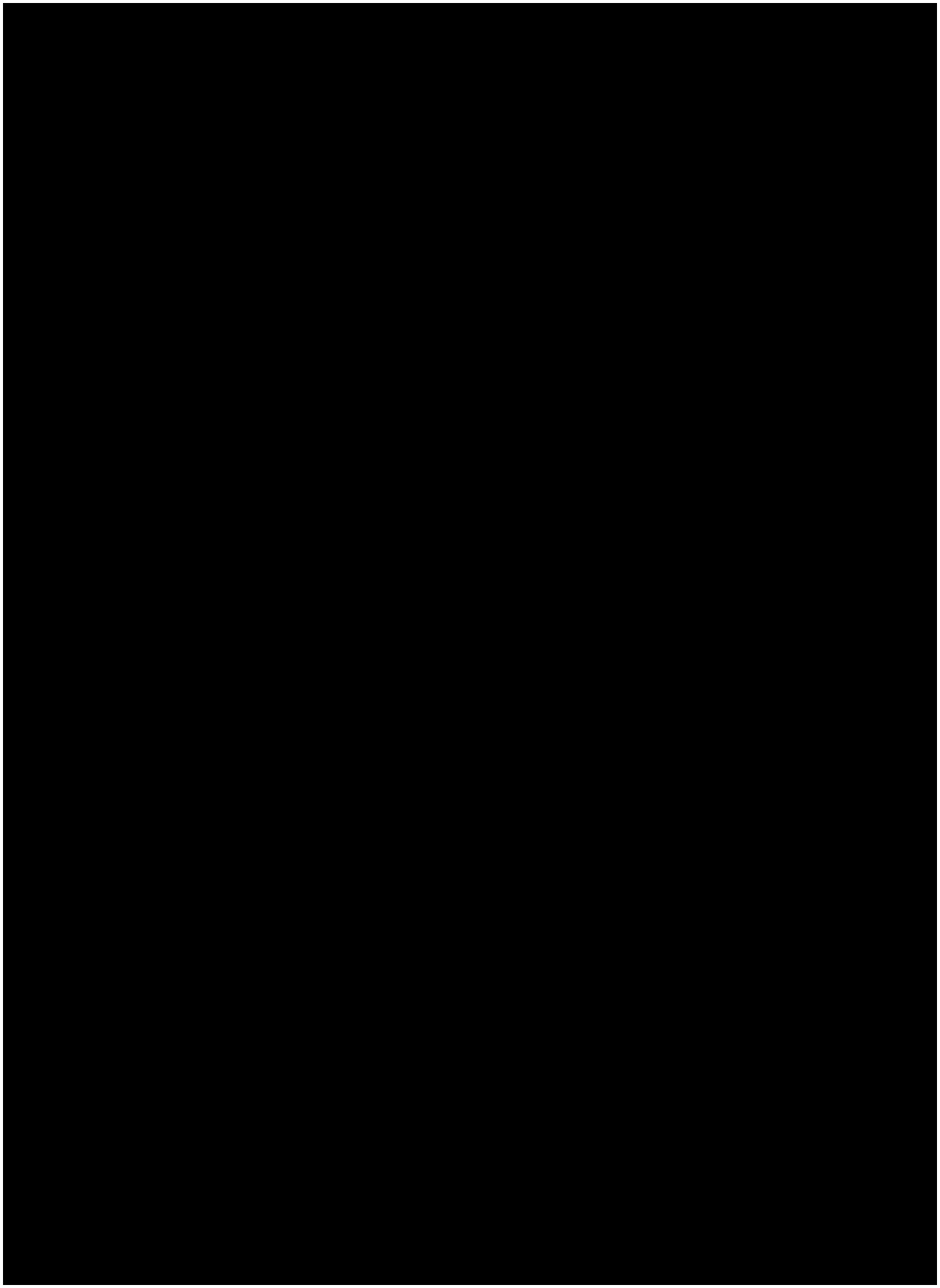
4.3.1.1. Cost Drivers

The project's cost estimates are based on current market conditions, with ongoing work to refine requirements. The baseline funding request is supported by high-cost confidence and robust EUL (Estimating Units Lines) assessments. Using the cost book, the main factors driving the costs for the shortlisted options are:

- Cable and OHL lengths across all options
- Overall civil input and asset quantities

[redacted]





4.4. Preferred Solution

Based on the outputs of our optioneering and [redacted] the preferred option for ETRE is: [redacted] Option 4.1 Hybrid: reconductor & replace cable [redacted]

This option accommodates the project driver and meets the needs case. Additionally, this option: [redacted]

- Exceeds future energy demand requirements
- Is feasible to deliver by optimal delivery date.
- Protects against a double circuit fault
- Offers a less complex consenting process compared to constructing a new OHL
- Supports future growth in customer demand and generation

The specific outputs are in Table 12 below.

Table 12: Preferred option outputs

Output	
Infrastructure Delivered	The preferred option will deliver [redacted] of new conductor [redacted] and [redacted] of new cabling [redacted] - both replace assets along an existing route. [redacted]
System Benefits	Increases [redacted] Increases the capacity of the existing Eggborough – Thorpe Marsh circuit Protects against a double circuit fault

4.4.1. Project Benefits, Outputs & Deliverables

The preferred option is to reconductor the Thorpe Marsh-Eggborough 400 kV single circuit with [redacted] and replace the existing cable [redacted]). The [redacted]

ETRE, signalled as Proceed-Critical in the "Beyond 2030" report (March 2024), will provide an uplift [redacted]. Reconductoring of the single circuit Eggborough - Thorpe Marsh 400 kV circuit will increase the capacity of this line to help increase the power transfer across the [redacted]

ETRE is part of the "Beyond 2030" NESO publication which aims to reshape and future-proof Great Britain's electricity grid. As the UK progresses towards a fully decarbonised power system by 2035, the increasing reliance on renewable energy sources and growing electrification of heat and transport, necessitate a fundamental transformation in our electricity networks. It is also identified as a Clean Power 2030 (CP2030[10]) signalled project, aligning with the UK Government's strategic commitment to delivering clean power across the grid by 2030 while maintaining security of supply.

ETRE's objectives were developed in line with the Government's policy to achieve NZ emissions by 2050.

- **Increase Energy Security**: develop options for long term reform to improve the electricity transmission network and bring electricity consumer benefits.
- **Deliver Value for the Portfolio:** strategic delivery to support NZ policy ambitions.
- **Maximise Capacity:** a co-ordinated, long-life, network upgrade at the highest capacity, to future proof the network.

[redacted]

4.4.2. How has future proofing been considered in the proposed investment?

As mentioned, ETRE was identified in the "Beyond 2030" NESO publication in 2024 with a "Proceed -critical" signal and as such ETRE is part of the works that would be needed to reshape and future-proof Great Britain's electricity grid. It is also identified as a Clean Power 2030 (CP2030) project,

[10] Clean Power 2030 Action Plan: A new era of clean electricity, UK Government, December 2024 https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf

aligning with the UK Government's strategic commitment to delivering clean power across the grid by 2030 while maintaining security of supply.

Option 4.1 improves network transmission and reduces bottlenecks while contributing to the identified [redacted] ETRE will efficiently support in transferring offshore wind energy to high-demand areas, reducing constraint costs, enhancing energy security, thus enhancing grid stability and supporting the path to realising the Clean Power 2030 and Beyond 2030 ambitions.

[redacted]

5. Project Delivery

A summary of the schedule is shown in Figure 9. [redacted]

The deterministic schedule has been developed using the bottom-up planning method and is based on the defined scope. Primavera P6 planning software has been adopted, following a standard Work Breakdown Structure (WBS), breaking down the scope into hierarchical, manageable components covering the full lifecycle from Development to Construction, Commissioning and Project closure. The scheduled activities are fully logic linked, with limited use of constraints, so that a robust Critical Path can be represented and Float evaluated.

Individual activity durations, and durations between key milestones, have been matched to the scope and assured using a combination of, productivity tools to calculate reconductoring construction rates, subject matter expert inputs and benchmarking of in-flight and past projects.

The schedule has been thoroughly reviewed and approved by internal stakeholders ensuring that it remains deterministic and any risk provision is not duplicated.

Key assumptions are:

- Outages in the deterministic schedule are planned in the outage season between clock changes. It is assumed that an outage will be approved for each circuit aligned with the Circuit works forecast in the schedule.
- Interdependencies with other projects and wider system access constraints are not considered in the schedule.
- The project schedule has been developed based on access to sufficient and timely regulatory decision-making and funding. This includes assuming that all appropriate mechanisms are in place under RIIO-ET3 to allow for all early procurement to happen as per the schedule. Should there be any challenges in how these mechanisms and funding ultimately support necessary early procurement, this could impact timelines and project schedules.

[redacted]

[redacted]

5.2. Risk & Risk Management

The preferred option does still present some risks, refer to the high-level risk assessment and associated mitigation in Table 14 below.

Table 14: Risks

#	Name	Description	Mitigation
1	Procurement Delays	Currently, the lead time for cable [redacted]. Therefore, if delayed, it could delay the completion of ETRE.	Agree procurement strategy for cable section early. [redacted]

#	Name	Description	Mitigation
			[redacted]
2	Damage to 3rd party Assets	[redacted]	[redacted]
3	Environmental Ecology	The impact of the project on the surrounding environment needs to be further assessed as it may result to additional costs and requirement for secondary consents.	A comprehensive ecological survey of all work sites and access routes should be carried out to allow early engagement of environmental agencies and jointly agree on a plan of works that limits habitat/species displacement.
4	Longer than Expected Outage Duration	Any project delays during outages, arising from poor planning, workforce shortage, materials shortage, weather conditions, network issues, faults and or delays in other planned works etc., could lead to an impact on the outages for ETRE. Furthermore, insufficient communication with stakeholders and customers regarding outage status and expected resolution time could lead to disputes and delays.	Ensuring that the supply chain & contractors are engaged early enough to be ready for deployment upon FSA is critica[redacted]
5	Outages not approved or cancelled	Outages are not available to meet planned project schedule or cancelled at short notice, impacting timelines of planned works	Ensuring that the required project outages are booked and approved well in advance, and coordinated with any outages in the region, will enable works to be commence and be carried out within the target timeline, thus avoiding delays and additional costs.
6	Interfacing projects (internal)	Changes in the timeline of the interdependent projects can have an impact on the timeline and cost and works.	Engagement with other NGET projects in the area and taking a regional approach
7	Engagement with 3rd parties for crossings	Engagement required for crossings with National Highways, Network Rail, Canals and rivers trust, EA,	Ensuring that the details on the consenting approach and crossover with all 3rd parties are explored in detail at the next stage of the project;

#	Name	Description	Mitigation
		local landowners, Northern PowerGrid. National Highways – approval period – 6 months, Network Rail – approval period – 3 months. A basic asset protection agreement to be drafted during delivery stage, Northern PowerGrid – 24 months approval period	with an outlook to integrate into the programme
8	Pipe laying under ground	Method of pipe laying to be established later in project development, and the method of pipe laying may encounter unknown risks	Further site investigation before the method is selected
9	Decommissioning of cable	[redacted]	Method of removal to be determined following a study

6. Conclusion

This Load Reopener outlines the investment needs case for ETRE: the reconductoring of Eggborough-Thorpe Marsh 400 kV single circuit and describes the outputs from the optioneering [redacted] that led to the identification of the preferred solution. The drivers for this investment are to contribute in uplifting the [redacted], of which ETRE will provide [redacted]

It is a Clean Power 2030 (CP2030) project, aligning with the UK Government's strategic commitment to delivering clean power across the grid by 2030 while maintaining security of supply.

The proposed solution is option 4.1: reconductor [redacted] & replace cable – [redacted]. This option is the most economical solution overall and will enable NGET to meet the needs of ETRE, whilst also futureproofing the network.

There are known risks associated with Option 4.1 that have been captured in this Load Reopener, such as supply chain and outage requirements. To ensure our successful delivery of this project, collaboration with all stakeholders involved in the proposed investment is critical.

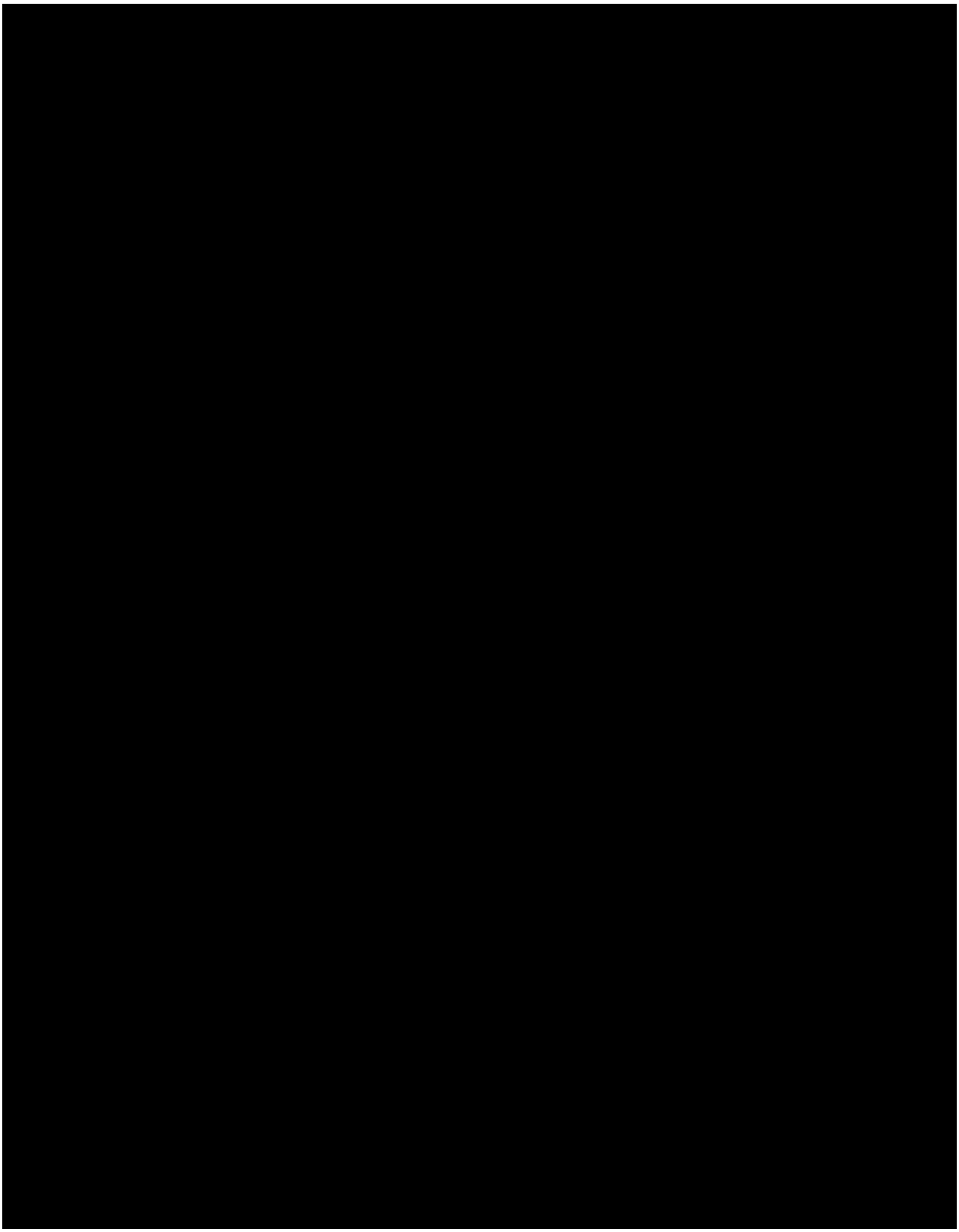
This LR is requesting approval for preconstruction funding for ETRE. The Price Control Deliverable (£m) associated with this investment proposal is as follows:

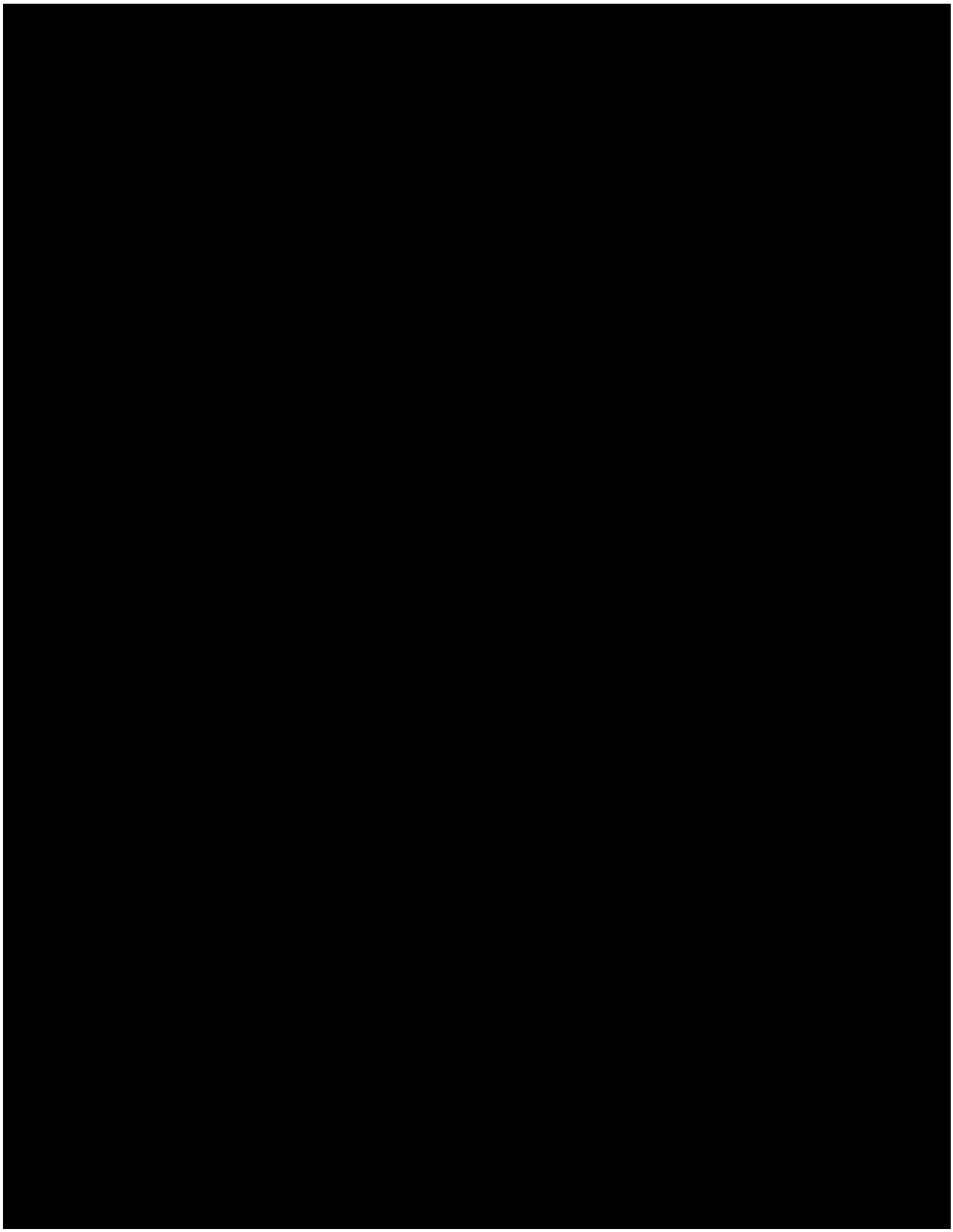
Table 15: Price control deliverables (£m)

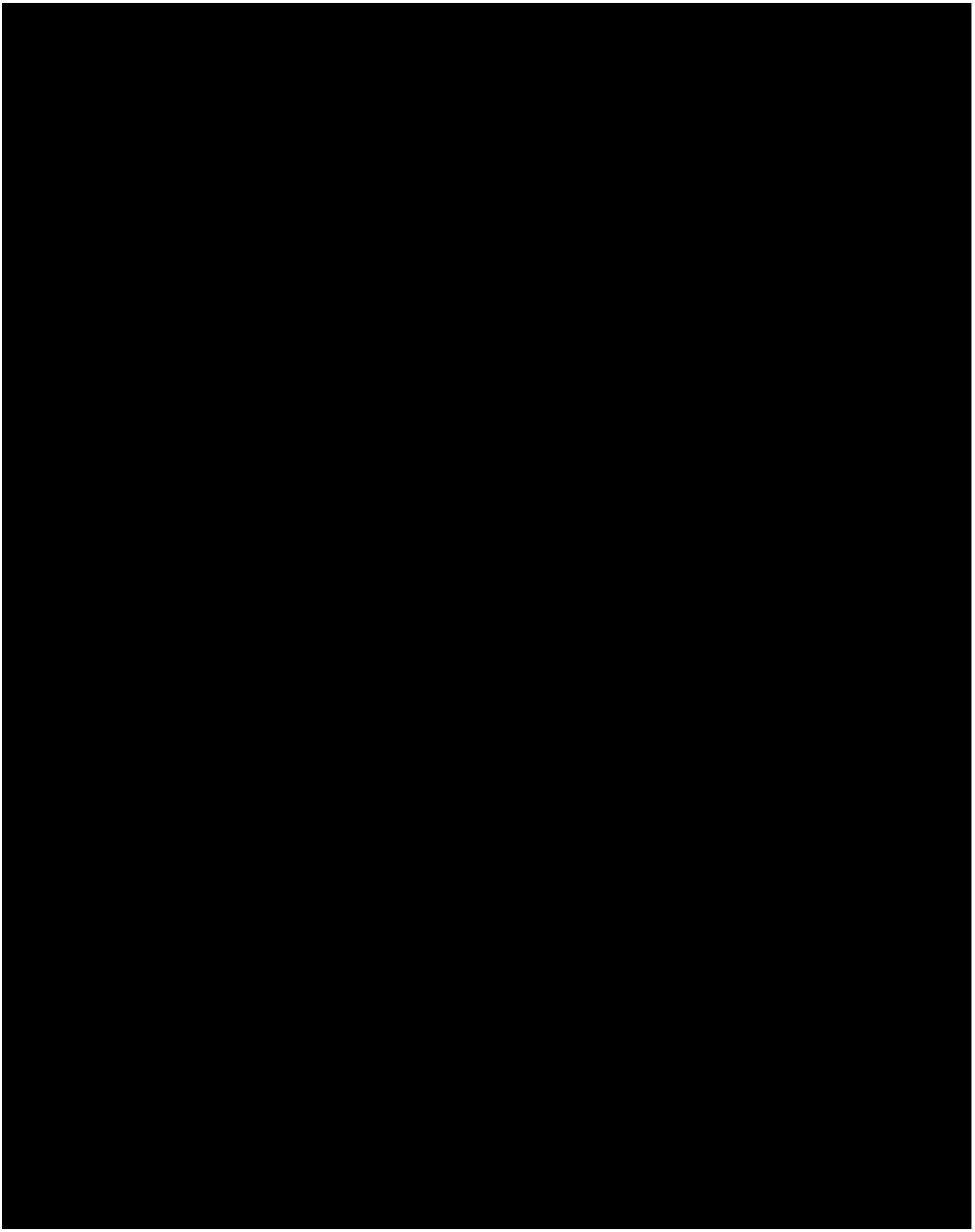
Main Drivers	Assist in [redacted] Identified as a Clean Power 2030 (CP2030) project, aligning with the UK Government's strategic commitment to delivering clean power across the grid by 2030 while maintaining security of supply. [redacted]
Selected Option	Option 4.1: reconductor [redacted] & replace cable - [redacted]
Estimated Cost & Timing	The current estimated view of capex in 23/24 price base is [redacted] The [redacted] delivery date in July 2030.
Outputs	This funding request will contribute to the delivery of pre-construction activities to support the development of ETRE. The output of baseline and pipeline funding will enable the following final construction outputs, aligned to the following pillars of our ambition for RIIO-ET3. · Deliver the grid of tomorrow · Do the right thing for our consumers, communities and the environment.

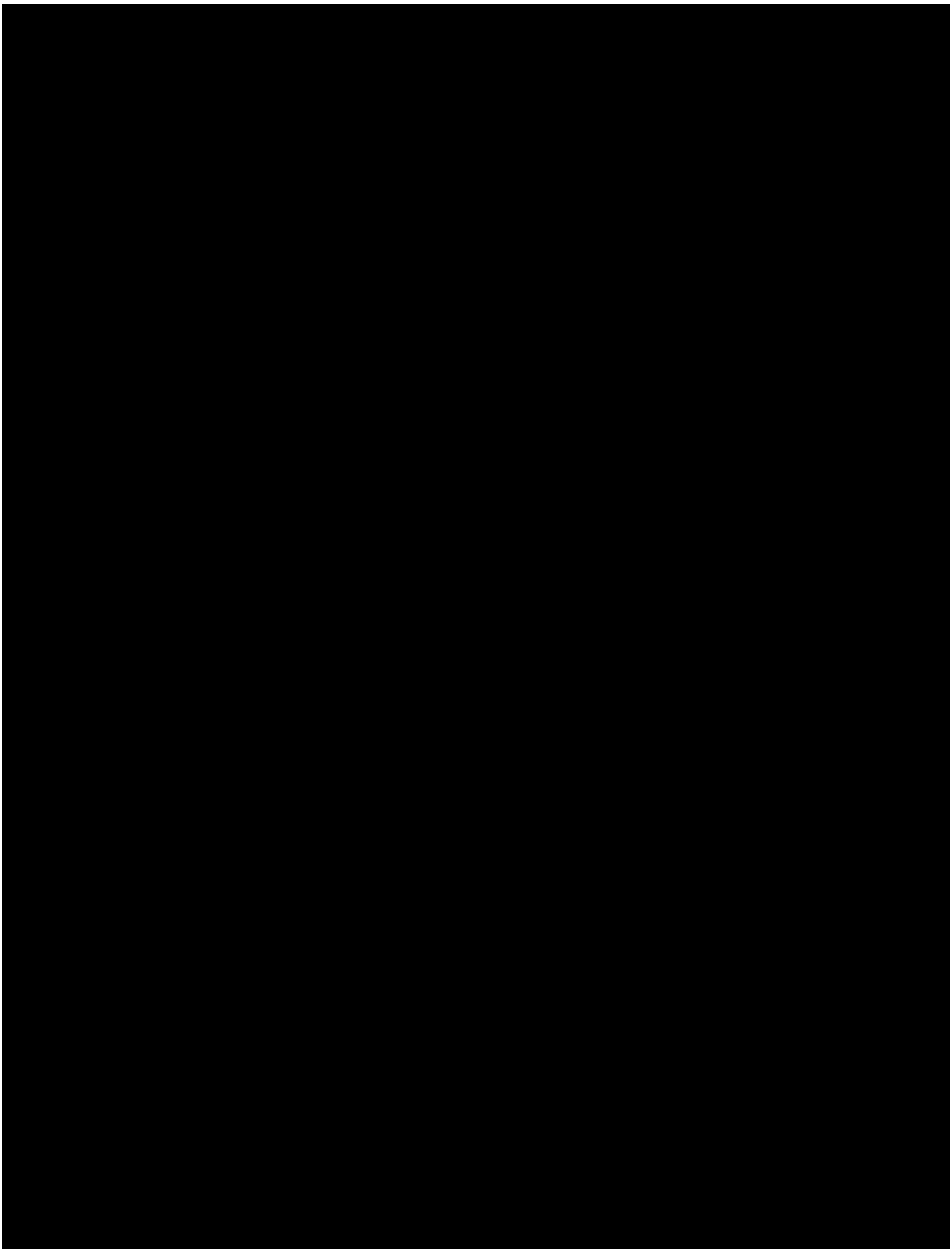
This submission outlines a preferred solution to satisfy the investment drivers. It seeks confirmation of eligibility under Special Condition 3.18, confirmation of eligibility for PCF under Special Condition 3.15, confirmation of re-opener Track 2 EL and formal approval of the preferred option

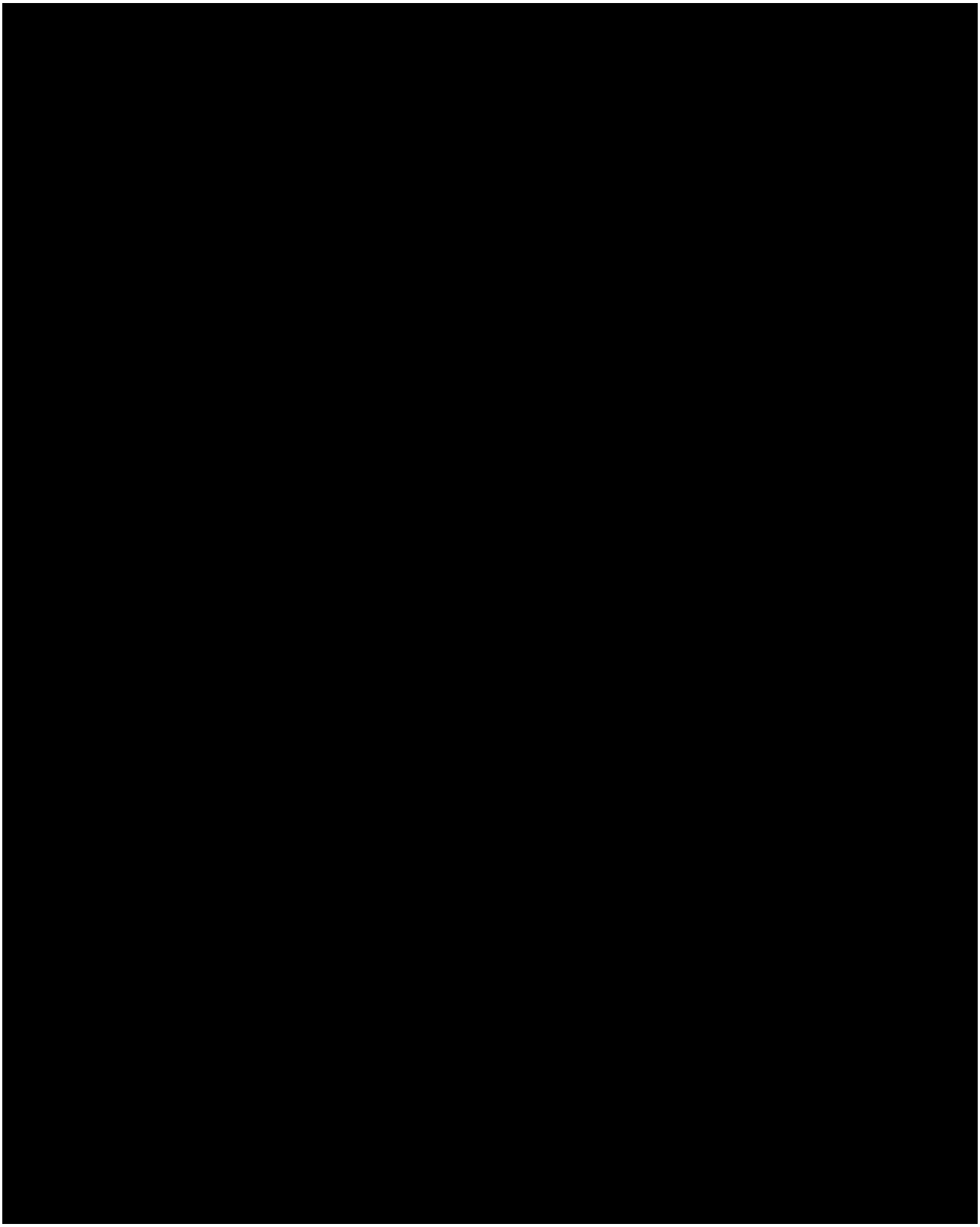
7. Appendix











Appendix E: Glossary

Abbreviation	Description
ACL	Available For Commercial Load
AIS	Air Insulated Switchgear
APM	Advanced Procurement Mechanism
BESS	Battery Energy Storage System
BPDT	Business Plan Data Template
CBA	Cost Benefit Analysis
CP2030	Clean Power 2030
DNO	Distribution Network Operator
ECC	Estimated Cost of Construction
EISD	Earliest In Service Date
EJP	Engineering Justification Paper
EoL	End Of Life
EODD	Earliest Optimal Delivery Date
[redacted]	[redacted]
ETRE	Eggborough–Thorpe Marsh Reconductoring
ETYS	Electricity Ten Year Statement
EUL	Estimating Units Lines
FEED	Front End Engineering Design
FES	Future Energy Scenarios
FY	Financial Year
GIS	Gas Insulated Switchgear
GW	Giga Watt
HV	High Voltage
LR	Load Related Reopener
MVA	Megavolt-Amperes
MW	Mega Watt
NARM	Network Asset Management
NESO	National Energy System Operator
NG	National Grid
NGET	National Grid Electricity Transmission
NOA	Network Options Assessment
NPV	Net Present Value

Abbreviation	Description
NZ	Net Zero
OHL	Overhead Line
PASE	Pre-Approval of Solution Engineering
PCF	Pre-Construction Funding
PMO	Project Management Office
RCF	Reference Class Forecast
SDS	System Design Specification
SF6	Sulfur Hexafluoride
SGT	Super Grid Transformer
SSSI	Site of Special Scientific Interest
TBC	To Be Confirmed
tCSNP2	Transitional Centralised Strategic Network Plan
UK	United Kingdom

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com