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# Norwich to Tilbury

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Proposed Changes to Connection at Tilbury

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nationalgrid



**The Great Grid Upgrade**

Norwich to Tilbury

# Design Development Report

Addendum for Proposed Changes to Connection at Tilbury

March 2025

**nationalgrid**

AENC-NG-CNS-REP-0165



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**Appendix A – Consideration of National Policy Statements April 2024**

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## Abbreviations

AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
CNP	Critical National Priority
CSE	Cable Sealing End
DCO	Development Consent Order
EACN	East Anglia Connection Node
GIS	Gas Insulated Switchgear
GW	Gigawatt
kV	Kilovolt
Km	Kilometre
LCA	Landscape Character Area
LTC	Lower Thames Crossing
LWS	Local Wildlife Site
M	Metres
NESO	National Energy System Operator
NGET	National Grid Electricity Transmission
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
PRoW	Public Right of Way
SSSI	Site of Special Scientific Interest
SPA	Special Protection Areas

# Executive summary

National Grid Electricity Transmission plc (NGET) referred to as National Grid in this report is developing proposals to reinforce the high voltage power network in East Anglia. It is National Grid that is developing plans for Norwich to Tilbury (the 'Project'). The Project would support the UK's net zero target through the connection in East Anglia of new low carbon energy generation, and by reinforcing the transmission network.

In spring 2022, a non-statutory public consultation was held for a period of eight weeks, between April 2022 and June 2022. This consultation introduced the Project, explained how National Grid had developed its proposals, and sought the views of the public and stakeholders.

In summer 2023, an additional non-statutory public consultation was held for a period of eight weeks, between June 2023 and August 2023. The 2023 non-statutory consultation presented a preferred draft alignment which showed potential positions for overhead line and associated pylons, centreline for the underground cable sections, Cable Sealing End (CSE) compounds and connection substations. Changes to the proposed plans, both inside and outside of the 2022 preferred draft corridor were presented as part of this.

In summer 2024, a statutory public consultation was held between April to July 2024. The Project presented at the summer 2024 statutory consultation comprised:

- a new 400 kilovolt ("kV") electricity transmission connection of approximately 184 kilometres ("km") overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation comprising:
  - approximately 159 km of new overhead line supported on approximately 510 steel lattice pylons (approximately 50 m in height) some of which are gantries (typically up to 15m in height) within proposed CSE compounds, or existing or proposed substations; and
  - approximately 25 km of 400 kV underground cabling (some of which is located through the Dedham Vale National Landscape (an AONB);
- six new CSE compounds, each with a permanent access, to connect the overhead lines to the underground cables;
- a new 400 kV East Anglia Connection Node (EACN) substation, with a new permanent access, on the Tendring Peninsula. This is proposed to be an Air Insulated Switchgear (AIS) substation;
- substation extension works at the existing Norwich Main, and Bramford substations and works within the existing Tilbury Substation to connect and support operation of the new transmission connection; and
- temporary works associated with construction of the Project.

Third party utilities diversions and / or modifications would also be required to facilitate the construction of the Project.

An option was also considered for undergrounding at the Waveney Valley.

The feedback received during the 2024 statutory consultation has been carefully reviewed and considered, alongside the findings of environmental and engineering studies. We have also backchecked and reviewed previous studies.

Following each non-statutory consultation, a Design Development Report (DDR) has been prepared to explain the changes that have been made to the Project. In our 2024 Design Development Report we explained the 2024 preferred draft alignment and how feedback on the 2023 preferred draft alignment has influenced the proposals which were the subject of the 2024 statutory consultation.

This DDR addendum has been prepared to explain the proposed changes to connection at Tilbury. During the previous non-statutory and statutory consultations, the preferred final connection point into Tilbury has been the existing Tilbury substation site.

In response to formal feedback received from The Port of Tilbury (a statutory body) and various other parties on the 2024 statutory consultation alongside further technical reviews and engagement, a new means of connecting to Tilbury substation is proposed. This is by establishing a new substation in the location where the CSE Compound to the south of Orsett Golf Course was previously consulted on during the statutory consultation in summer 2024 with the necessary connection to Tilbury substation made by connecting the new substation to an existing 400kV overhead line. This proposed change would result in the removal of around 4.5 km of 400kV underground cable. And removes any interface with important economic growth drivers in The Port of Tilbury and adjacent Freeport.

The proposed changes to the connection at Tilbury comprise the following principal elements:

- a new 400 kV Tilbury North Substation to the south of Orsett Golf Course in Thurrock with access options. This is proposed to be a Gas Insulated Switchgear (GIS) substation; and
- modifications to the proposed and existing National Grid Electricity Transmission overhead lines into and out of the new 400 kV Tilbury North Substation, including two new CSE compounds and access options.

The proposed change does not result in a new project or constitute a different kind of infrastructure project from that which has already been consulted on at the summer 2024 statutory consultation. The Project still comprises, an electricity transmission connection that will extend from Norwich Main substation and will connect electrically into the existing Tilbury substation via Bramford substation as previously described in the summer 2024 statutory consultation. The proposed change is focused on a small section of connection at Tilbury - *Section H Thurrock*.

The proposed changes result in the following amended project description:

- a new 400 kilovolt (“kV”) electricity transmission connection of approximately 180 kilometres (“km”) in overall length from Norwich Main Substation via Bramford Substation and a new Tilbury North Substation, into Tilbury Substation comprising:
  - approximately 159 km of new overhead line supported on approximately 510 steel lattice pylons (approximately 50 metres (“m”) in height) some of which are gantries (typically up to 15 m in height) within proposed Cable Sealing End (“CSE”) compounds, or existing or proposed substations; and
  - approximately 22 km of 400 kV underground cabling some of which is located through the Dedham Vale National Landscape (formerly known as Dedham Vale AONB);

- seven new CSE compounds, each with a permanent access, to connect the overhead lines to the underground cables;
- a new 400 kV East Anglia Connection Node (“EACN”) substation, with a new permanent access, on the Tendring Peninsula. This is proposed to be an Air Insulated Switchgear (“AIS”) substation;
- a new 400 kV Tilbury North Substation to the south of Orsett Golf Course in Thurrock with access options. This is proposed to be a Gas Insulated Switchgear (GIS) substation;
- modifications to the existing National Grid Electricity Transmission overhead lines, including into and out of the new 400 kV Tilbury North Substation and access options;
- substation extension works at the existing Norwich Main and Bramford substations to connect and support operation of the new transmission connection;
- temporary works associated with the construction of the Project.

Third party utilities diversions and / or modifications would also be required to facilitate the construction of the Project.

The proposed changes are presented on the Consultation Plans available on the Project website.

The Horlock Rules requires consideration to be given to the land use effects of the proposal when planning the siting of substations or extensions. In March 2023 the Thames Freeport received final government approval including up to £25 million seed funding from the government and potentially hundreds of millions in locally retained business rates to drive growth in the UK’s advanced manufacturing, biomanufacturing, logistics, and low carbon industries<sup>1</sup>. Whilst we had originally considered that opportunities for co-existence with the Freeport would be available, it has become apparent following the formal feedback received on the 2024 statutory consultation, that the land use restrictions and technical challenges presented at the Freeport site, an alternative means of connecting into Tilbury would be preferred.

This opportunity arises because of the uncertainty over design requirements at the Port. With development being progressed by individual applicants (within the bounds of a broader masterplan) it is not possible to conclude that there will be no effect and up to 10% of the site may be restricted in terms of future land uses. In summary the following benefits of change are encouraged:

- Supports achievement of the Clean Power 2030 target and realises the significant benefits this would deliver
- Avoids impacts on future development opportunities at the Thames Freeport that seeks to support economic growth, job creation and productivity of local, regional and national importance
- The removal of around 4.5 km of underground cable and modifications to the existing Tilbury Substation from the Project, would remove construction activity out of the zone of influence of the Thames Estuary and Marshes SPA and Ramsar site

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<sup>1</sup> <https://www.gov.uk/government/news/jobs-and-investment-boost-for-thames-region-as-freeport-gets-green-light>

- The removal of around 4.5 km of underground cable would also reduce significant negative effects to archaeological remains
- Includes the removal of direct landscape effects on Landscape Character Areas (LCA) Chadwell Escarpment Urban Fringe and Tilbury Marshes and a reduction of effects on West Tilbury Urban Fringe



# 1. Design Development Report – Addendum for Proposed Changes to Connection at Tilbury

## 1.1 Purpose of this addendum

- 1.1.1 The purpose of this addendum to the 2024 DDR is to provide an explanation of the proposed change to the connection into Tilbury which is the subject of further targeted statutory consultation. The consultation is on a draft proposal established around a proposed new Tilbury North Substation (with access options) located to the south of Orsett Golf Course in Thurrock that would be connected into the existing overhead line Transmission network.
- 1.1.2 This addendum focuses on those changes. The content of this addendum follows the criteria set out under Paragraph 20 of the Planning Act 2008: Pre-application Guidance<sup>2</sup> which has guided our assessment as to whether there has been a material and substantial change:
- the degree of change as compared to proposals previously consulted upon as a whole
  - the number of materially worse environmental effects as compared to what has been subject of previous consultations
  - the level of public interest, and the likelihood that such interest would merit further consideration in the context of that change.
  - For any material change to a part of the proposed application where the project as a whole is not fundamentally changed, for example in the case of linear aspects where new information leads to a new alignment for a particular section of the proposal, a bespoke and targeted approach to further consultation can be adopted, which can address the specific consultation obligations arising proportionately.
- 1.1.3 With regards to the degree of change, the Project as a whole has not fundamentally changed. This is explained further in Section 1.3 of this addendum, however, in summary, the Project still comprises an electricity transmission connection that will extend from Norwich Main Substation and will connect electrically into the existing Tilbury Substation via Bramford Substation as previously described in the summer 2024 statutory consultation. This addendum summarises the proposed changes to the proposal at Tilbury, including a short summary of the materiality of the change in the context of the Project as a whole and the surrounding area see Section 1.2 of this addendum. Only amendments to

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<sup>2</sup> Planning Act 2008: Pre-application stage for Nationally Significant Infrastructure Projects, issued in April 2024 by the Department for Levelling Up, Housing and Communities (now Ministry of Housing, Communities and Local Government)

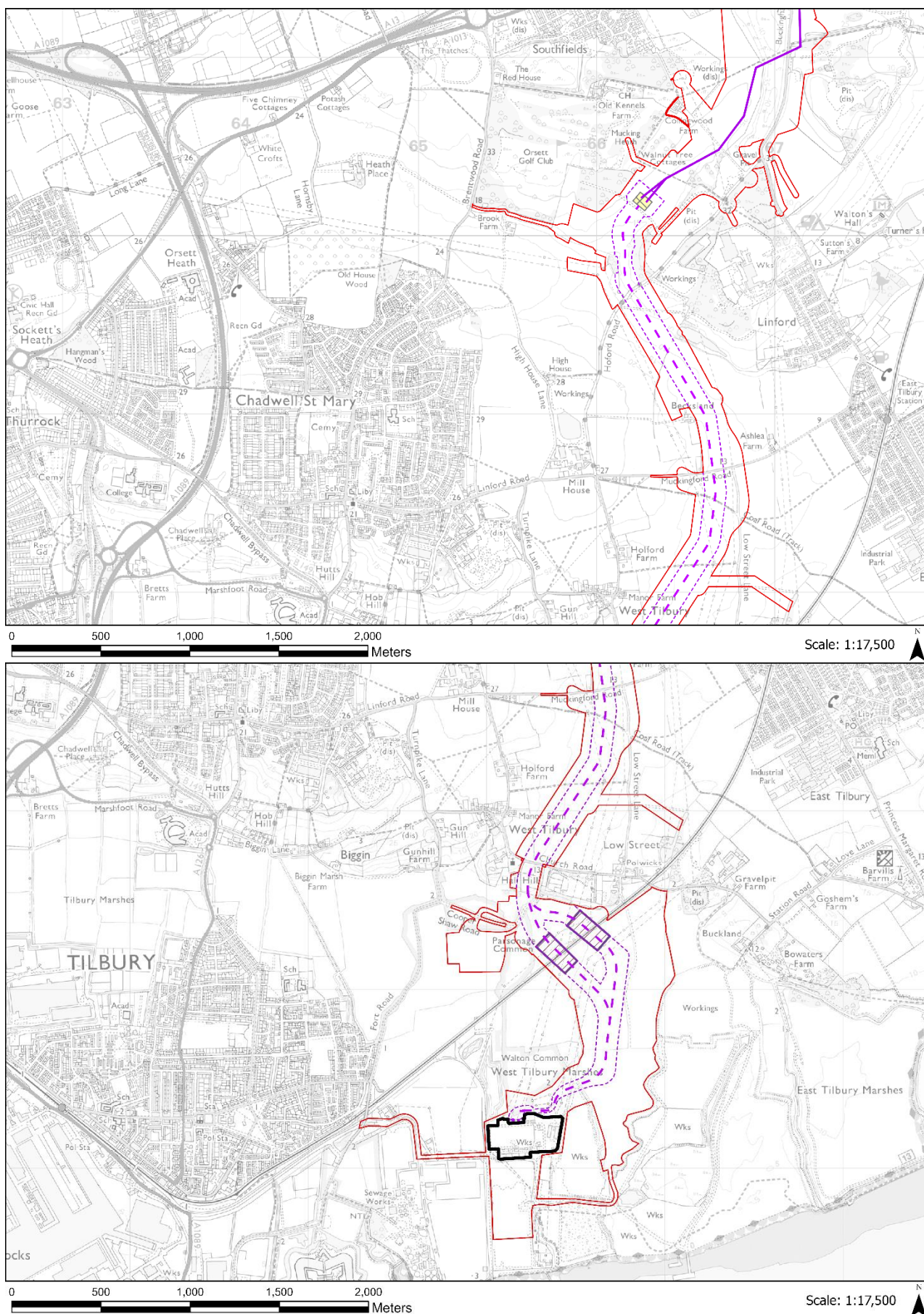
the draft proposal description of development for this small section of the Project are addressed.

- 1.1.4 The DDR addendum also provides an explanation of the reasons why a new substation in the location where the Cable Sealing End Compound to the south of Orsett Golf Course is now proposed for targeted consultation, the alternatives considered and the main reasons for those alternatives not being progressed.

## 1.2 Overview & summary of proposed changes at Tilbury

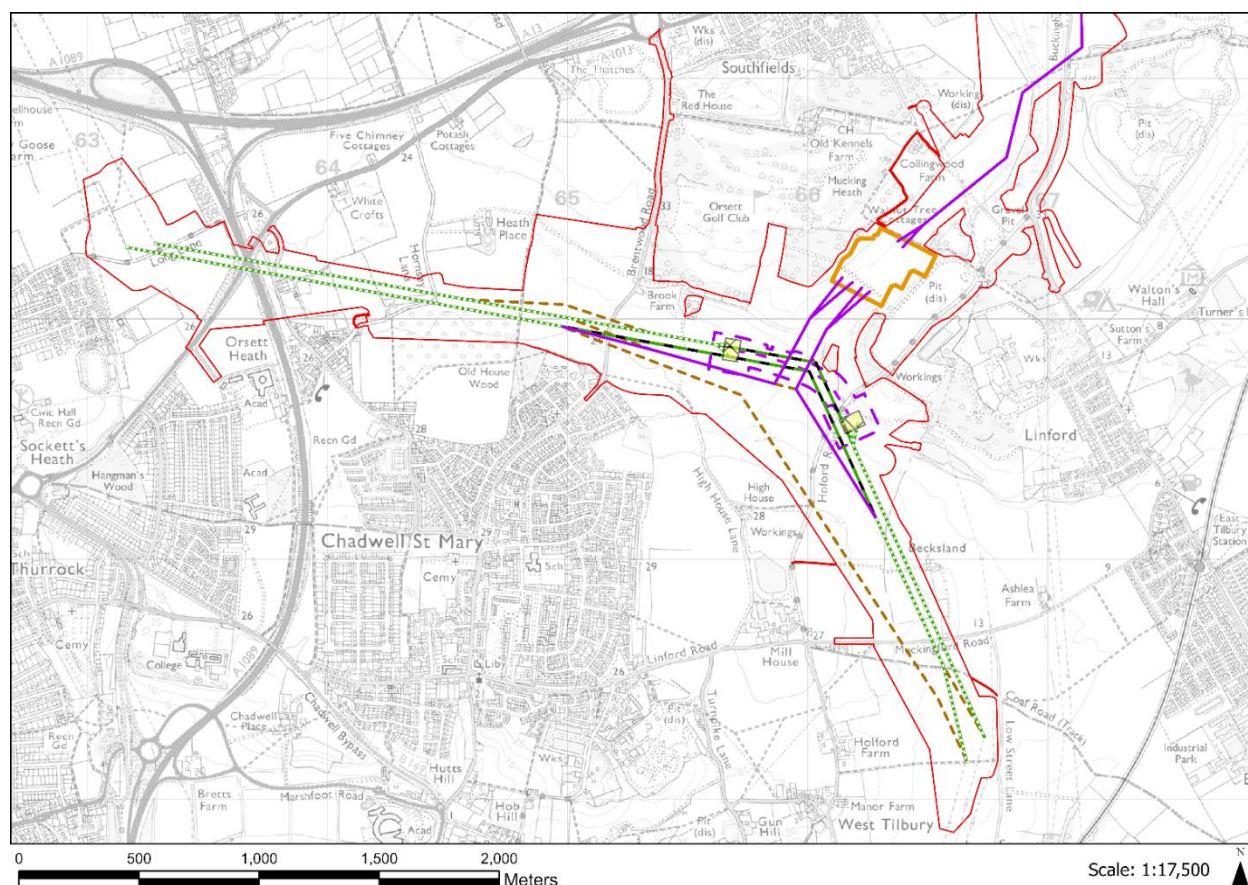
- 1.2.1 National Grid Electricity Transmission plc (NGET) referred to as National Grid in this report is developing proposals to reinforce the high voltage power network in East Anglia. It is National Grid that is developing plans for Norwich to Tilbury (the 'Project'). The Project would support the UK's net zero target through the connection in East Anglia of new low carbon energy generation, and by reinforcing the transmission network.
- 1.2.2 The Project comprises a new double circuit connection from Norwich Main Substation via Bramford Substation to Tilbury Substation integrated with connecting new customers at the East Anglia Connection Node Substation on the Tendring Peninsula. Development of the Project detail is ongoing and is responding to the findings of environmental studies, technical assessment and in response to feedback from consultation.
- 1.2.3 In spring 2022, a non-statutory public consultation was held for a period of eight weeks, between April 2022 and June 2022. This consultation introduced the Project, explained how National Grid had developed its proposals, and sought the views of the public and stakeholders. In summer 2023, an additional non-statutory public consultation was held for a period of eight weeks, between June 2023 and August 2023. The 2023 non-statutory consultation presented a preferred draft alignment which showed potential positions for overhead line and associated pylons, centreline for the underground cable sections, CSE compounds and connection substations. In summer 2024, a statutory consultation was undertaken between April and July 2024.
- 1.2.4 Following consideration of the feedback to the statutory consultation and further continued engagement with the Port of Tilbury (statutory body) including further technical assessment, it has become apparent that an alternative connection point into Tilbury would be preferred. The proposed change removes the cable sealing end compound and approximately 4.5km of underground cables from the CSE to the existing Tilbury Substation. The proposed change connects into a new standalone substation, in the location of the previously proposed CSE compound to the south of Orsett Golf Course. This is proposed to be connected to an existing 400kV line to complete the electrical connection to Tilbury Substation.
- 1.2.5 Plans showing the general arrangements of the connection into Tilbury at statutory consultation are shown below (Figure 1). A summary of the main changes follows (Figure 2).

**Figure 1 - Plans showing the general arrangements of the connection into Tilbury at statutory consultation in summer 2024**





**Figure 2 - Plan showing the proposed amended change of connection at Tilbury**



1.2.6 The main changes proposed are as follows:

- Change to the Connection arrangement for the Norwich to Tilbury Project, changing it from the installation of a cable sealing end compound and new cable connection to Tilbury Substation to a new substation and connection into, and use of, the existing overhead lines to the south of Orsett golf course to achieve the connection to Tilbury Substation. Change associated with:
  - change to proposed Order Limits including flexibility to reduce potential effects if Lower Thames Crossing project delayed or cancelled
- Removal from the Project of:

1.2.7 a CSE compound to the south of Orsett golf course

- 4.5 km of underground cable from the CSE south of Orsett golf course to Tilbury Substation
- Any remaining interaction and potential restriction to key economic growth centres at Port of Tilbury and Freeport amongst others
- Addition to the Project of:
  - a new substation referred to as Tilbury North to the south of Orsett golf course on the location of the removed CSE
  - Two CSEs to underground around 600m of the more easterly of the existing overhead lines



- Diversions to the south (by up to 100m) of the more westerly of the existing overhead lines along with new overhead line to connect to Tilbury North Substation
- Replacement of around 600m of the ZB overhead line with underground cable requiring two CSEs.
- Modification to the existing network for the purposes of connecting electrically into the existing Tilbury Substation:
  - the location of the overhead line crossing of Orsett golf course.
  - The arrangements to cross the proposed Lower Thames Crossing project from underground cable to overhead line
- Temporary use of land:
  - for temporary diversions of overhead line to maintain connections
  - to facilitate installation work e.g. green lines for re-stringing with no change to permanent assets
  - for construction access arrangements

1.2.8 The degree of change can be summarised as follows:

- The proposed Tilbury North Substation requires a larger permanent footprint than the CSE compound. Nevertheless, the change in footprint remains limited to the existing parcel of land in-between the surrounding quarry, golf course and local wildlife site.
- Increased density of built form resulting from the additional plant, equipment and ancillary infrastructure associated with a new GIS substation compared to CSE compound.
- Further ancillary modifications to existing electricity lines including two new proposed CSE compounds, which would replace a CSE compound and the works associated with the installation of around 4.5km of underground cable and development around the existing Tilbury Substation.
- The overhead line continues to cross the golf course

1.2.9 The impact caused by the degree of change to the surrounding environment is provided in the Environmental Implications of Change – Proposed Changes to Connection at Tilbury document (March, 2025) available on the Project website. There are new environmental effects both positive and negative caused by the proposed changes. And there is potential for more substantial environmental implications of the proposed changes in the following environmental topics:

- Ecology and Biodiversity
- Historic Environment
- Hydrology, Land Drainage and Flood Risk
- Landscape and Visual

1.2.10 However, these more substantial environmental implications are not materially significant to what has been the subject of previous consultations.

- 1.2.11 The change results in an amended draft proposal description for this small, amended section of the Project:
- a new 400 kilovolt (“kV”) electricity transmission connection of approximately 180 kilometres (“km”) in overall length from Norwich Main Substation via Bramford Substation and a new Tilbury North Substation, into Tilbury Substation comprising:
    - approximately 159 km of new overhead line supported on approximately 510 steel lattice pylons (approximately 50 metres (“m”) in height) some of which are gantries (typically up to 15 m in height) within proposed Cable Sealing End (“CSE”) compounds, or existing or proposed substations; and
    - approximately 22 km of 400 kV underground cabling some of which is located through the Dedham Vale National Landscape (formerly known as Dedham Vale AONB);
  - seven new CSE compounds, each with a permanent access, to connect the overhead lines to the underground cables;
  - a new 400 kV East Anglia Connection Node (“EACN”) substation, with a new permanent access, on the Tendring Peninsula. This is proposed to be an Air Insulated Switchgear (“AIS”) substation;
  - a new 400 kV Tilbury North Substation to the south of Orsett Golf Course in Thurrock with access options. This is proposed to be a Gas Insulated Switchgear (GIS) substation;
  - modifications to the existing National Grid Electricity Transmission overhead lines, including into and out of the new 400 kV Tilbury North Substation and access options;
  - substation extension works at the existing Norwich Main and Bramford substations to connect and support operation of the new transmission connection;
  - temporary works associated with the construction of the Project.
- 1.2.12 Third party utilities diversions and / or modifications would also be required to facilitate the construction of the Project.
- 1.2.13 Overall, the proposed change from a CSE compound to a new substation and associated modifications to the proposed and existing lines, as described above, are not considered to result in a fundamental change to the Project as a whole. The proposed changes may affect communities, residents and landowners in the vicinity of the area that have not been consulted before, hence the design changes form part of a targeted statutory consultation.
- 1.2.14 Following a review and consideration of feedback, the main changes taken forward within the updated project design are set out below.

Pylon ref	Overview of proposed change
TB264	New Tilbury North Substation and associated modifications to form connection to the existing YYJ overhead line

## 1.3 Change to Tilbury connection & alternatives considered

### Reason for proposed draft change

- 1.3.1 National Grid has followed a structured project development process that has considered a wide range of factors influencing the evolving narrowing down to a project design. Part of this evolution has been to respond to new information, the findings from surveys and feedback from non-statutory and statutory consultation.
- 1.3.2 Informed by feedback and ongoing technical review, National Grid is proposing a change to the means of connecting at Tilbury. This proposed change comprises a new substation (referred to as Tilbury North) connected to Tilbury Substation via a modification to the 400kV YYJ line (an existing overhead line connection to Tilbury Substation). This achieves the same system reinforcement outcome as if connecting directly to Tilbury Substation with some enhanced system performance in some demand conditions. It avoids the need for around 4.5km of cable (from south of Orsett golf course to Tilbury Substation) presented at the 2024 statutory consultation, removes interaction with various existing and proposed developments and interaction with elements of infrastructure at the existing Tilbury Substation. The basis for the decision to consult on this proposed change is set out below.
- 1.3.3 We originally considered that the Project could have co-existed with the Thames Freeport (designated as a Freeport Zone on December 15th, 2021), through engagement and detailed design work. The proposed 400kV underground cables could potentially have followed the route of access roads, carparks, lorry parks and similar, albeit noting that the detailed layout proposals for the Freeport are not available at this stage. The specific requirements would be influenced by individual developers coming forwards and progressing individual planning applications within the Freeport area. As such there remains a high level of uncertainty about the detailed routeing of the overhead line and underground cables.
- 1.3.4 The Project could have progressed the identification of an appropriate route but, with no certainty over potential interaction with the Freeport, it would have been necessary to restrict future land-use over the cable swathe to prevent the erection of buildings and to control land uses so that they would not affect cable performance or restrict access for occasional maintenance. Some constraint to Freeport development activities would therefore have been unavoidable.
- 1.3.5 Based on the proposed use of underground cables for the route into Tilbury Substation (as set out most recently in the 2024 statutory consultation and subject to any final design) National Grid estimated that use of between 6% and 10% of the 100 acre Freeport development area may have been subject to restrictions due to the existence of the 400kV cables. The impact on economic growth is difficult to estimate given the potential for co-existence with some land uses, however, in light of the feedback received and the implications of uncertainty, it is acknowledged that there is the potential for some impact. In its response to the 2024 statutory consultation, the Port of Tilbury (statutory body) consider the potential for restriction to Freeport development, and its substantial potential to drive economic growth, to be unacceptable and consider that only designs, such

as the use of a tunnel, that do not impose land use restrictions should be considered and be National Grid's preferred approach.

- 1.3.6 Utilising a tunnel for the entry to the existing Tilbury Substation to avoid the interactions with the Freeport area, would have added considerable cost (based on other similar schemes, the additional cost is conservatively estimated to add in excess of £100m). It would have required a headhouse at the existing substation, where space is restricted and is also likely to have required a head house to be sited within a flood storage area or adjacent to the grade II\* listed Church of St James at West Tilbury. It would generate significant construction traffic movements at locations such as 'the Asda roundabout' that may be difficult to resolve without restrictions on movements that may impact construction programme. These factors, when considered together, led to a conclusion that a tunnel alternative was much less preferred and did not provide an appropriate basis for the project to progress.

## Alternative connection solutions

### The concept of a change to the connection to Tilbury

- 1.3.7 Given the challenges to taking a connection directly to Tilbury Substation an alternative arrangement was identified. This change proposes the establishment of a new substation connected into the existing YYJ 400kV overhead line that runs northwards from the existing Tilbury Substation.
- 1.3.8 Establishing a new substation is not generally favoured in such close proximity to existing substations with re-build or extension of sites the typically preferred solution. In this case various factors combine to create challenge to successful delivery of a connection into the existing Tilbury Substation and the alternative is preferred.
- 1.3.9 The new arrangement achieves the necessary connection to Tilbury Substation and provides the same system reinforcement outcome as if connecting directly to Tilbury Substation. It delivers some enhanced system performance in some demand conditions and avoids the main challenges present at and in the vicinity of the existing Tilbury Substation.

### The preferred solution

- 1.3.10 The identified option, to connect into the existing overhead line to the north (known as the YYJ line), meets the network reinforcement requirements and would avoid the need for interactions with the Freeport area allowing it to reach its full economic growth potential, avoid the area of focus for the potential Thames Estuary Marshes SSSI designation and allow for the crossing of the proposed Lower Thames Crossing (LTC) development by overhead line rather than underground cable. It would also remove around 4.5 km of proposed 400kV underground cable which includes multiple challenging construction sections requiring the use of trenchless techniques to cross under railways, pipelines and existing overhead lines.
- 1.3.11 A Gas Insulated Switchgear (GIS) substation, as opposed to an Air Insulated Switchgear (AIS) substation, technological solution has been adopted for the new substations. Both AIS and GIS substations contain the same compartments and components as each other; the main difference lies with the means of insulation.



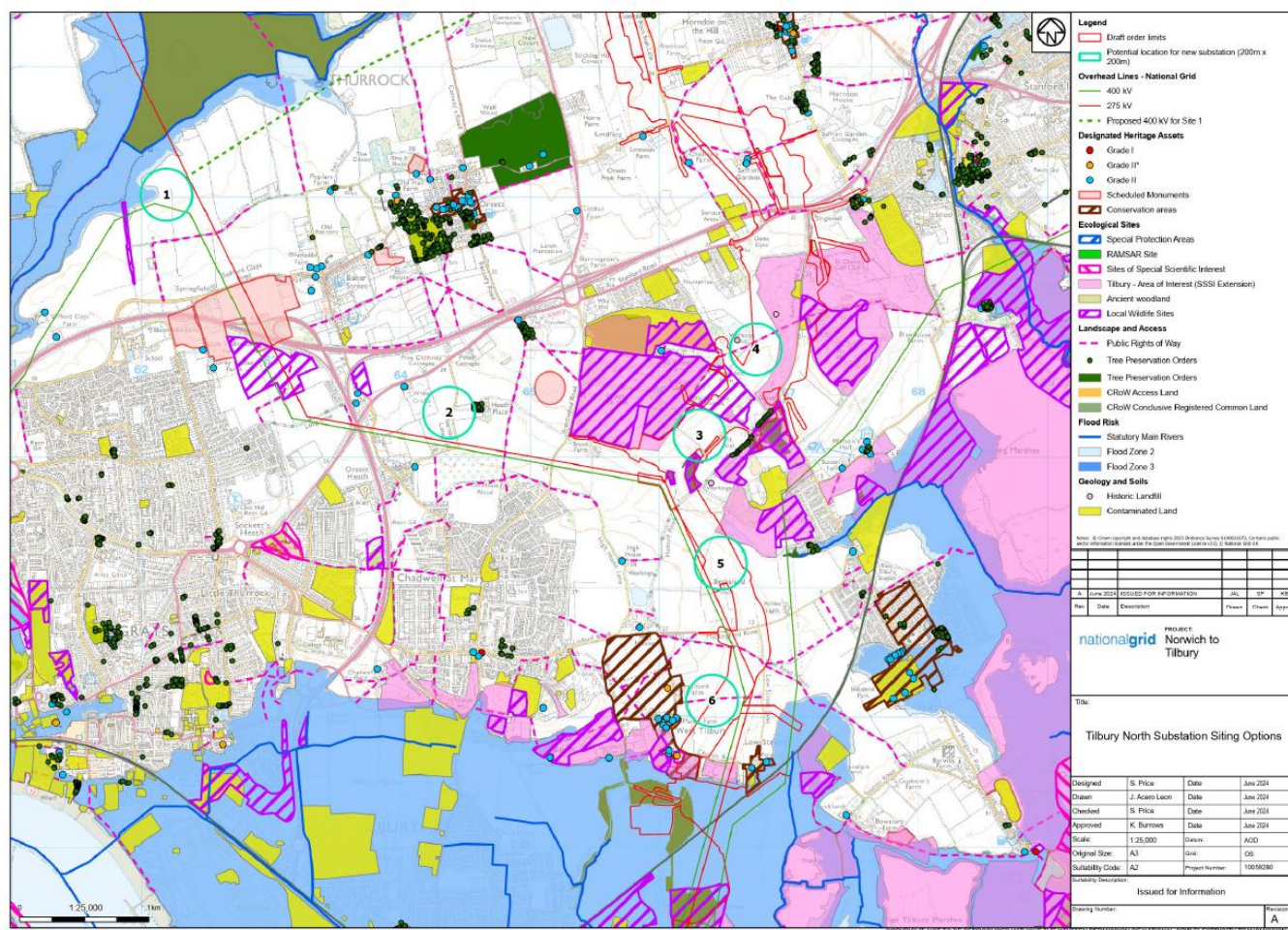
An AIS system largely utilises air as an insulator between electrical conductors and earth whilst GIS substations are self-contained systems that largely use a gas with much better insulating properties than air as an insulator. GIS solutions allow the high voltage equipment to be much closer to each other, enabling the substation to have a much smaller footprint than an AIS solution, reducing its potential environmental impacts. Key design features of GIS substations are the compact design, higher reliability, greater resilience and minimal maintenance.

- 1.3.12 The basis for identification and selection of a preferred change followed consideration of potential alternative arrangements and is the best performing through a balanced decision making process in comparison to alternatives that were identified and considered.
- 1.3.13 A staged process was adopted covering the following:
- Identification of potential strategic sites within study area;
    - Based on a high level review of available mapped data potential sites of sufficient scale to accommodate the required substation are taken forward.
  - Definition of key characteristics, risks and opportunities
    - In identifying potential sites, recording characteristics and factors that have the potential for influence over the site selection process.
  - Confirmation that site can meet the need case requirement
    - The Norwich to Tilbury Project has been identified as a critical national priority project that must facilitate new connections by the end of 2030 (see Clean Power 2030 <https://www.neso.energy/publications/clean-power-2030>). As such and as set out in NPS EN1 paragraphs 4.3.22 and 4.3.23, any alternative site, not capable of meeting the power transfer requirement or supporting the delivery of the connection within the 2030 programmes does not meet the project need requirement and cannot be taken forwards.
  - Application of benefit review
    - To aid efficiency an initial benefit review was completed to establish whether particular sites could be filtered out from subsequent more detailed comparisons to aid efficiency. This was focussed on those alternative sites in a broadly similar location where a substantive disadvantage for one of the alternatives may allow it to be parked from detailed consideration.
  - Comparative appraisal
    - Site selection and a comparative appraisal is informed by technical, environmental, socio-economic, programme and cost factors and evaluated in the context of guidance from the Holford and Horlock Rules.

## Identification of potential arrangements and sites

- 1.3.14 Locations both to the north-west (up to where the existing YYJ and ZB overhead lines diverge just north of the A13), to the south (through to Tilbury Substation) or to the north along the Norwich to Tilbury Project alignment were identified and considered. Indicative locations are shown on the image below (shown as numbered in turquoise coloured circles):

**Figure 3 – Tilbury North Substation Options**



## Consideration of alternative sites

- 1.3.15 The Norwich to Tilbury Project has been identified as a Critical National Priority project with a clear need case (see Clean Power 2030 <https://www.neso.energy/publications/clean-power-2030>). This need case is based on meeting at least a 6GW power transfer capability and a programme requiring it to be available for connections by the end of 2030. Having identified, following feedback to the 2024 statutory consultation, that the original connection point may not be deliverable, it is reasonable (and in accordance with NPS EN1 para 4.3.23), not to progress alternatives that are not capable of meeting the same need case.
- 1.3.16 On this basis, Site 1 is scoped out of further consideration as the need to acquire survey data on various environmental and technical topics to inform design and necessary environmental assessment leads to an expected programme delay estimated to be in the order of 2 years, leading to an in service date beyond 2030 that would trigger high constraint cost payments. This fails to meet the minimum need case requirement and therefore Site 1 is not progressed.
- 1.3.17 Site 2 has major transport infrastructure to the north and potentially LTC to the west. The location has residential properties, listed buildings and scheduled monuments (near to Heath Place) to all sides. With any overhead line connection routes also having insufficient spacing between residential properties. These constraints alone may scope this site out as a preferred option but even if less constrained this site would, like Site 1, be scoped out because of the additional

programme implications of securing land rights and completing necessary surveys because of the distance from the surveyed corridor.

- 1.3.18 All other sites are considered capable of meeting the need case requirement, but are also subject to benefit filter review.
- 1.3.19 Site 4 is assessed to lead to extra effects and costs compared with Site 3. These are expected to include similar effects on the housing allocation at Chadwell St Mary due to similar diversion requirements of the YYJ and ZB, but with additional effects, affecting a similar area of potential housing, on the Southfields opportunity area. The crossing of Orsett golf course would increase effects as a result of the crossing by two overhead lines. For these reasons Site 4 performs less well than Site 3 so Site 4 is not taken forwards.
- 1.3.20 Site 6, whilst potentially providing an alternative to Site 5, requires the additional cost of longer cables to reach the site including the additional complexity of an additional trenchless crossing under Muckingford Road. It potentially avoids effects on housing at Chadwell St Mary though does route through an area that may provide green space for that development. It is also considered to be a less economic solution than Site 5.
- 1.3.21 Following the above site identification and initial down-selection review, Sites 3 and 5 were taken forward for more detailed consideration.

## Balanced Decision

- 1.3.22 The preferred Tilbury North Substation location is at Site 3. It presents some different technical risks due to the need for system outages, but these are within the scope of normal system management risks. In cost terms, compared with the design published in the 2024 statutory consultation, this change is expected to be broadly cost neutral. However, there is some uncertainty on such comparisons regarding the costs associated with securing necessary rights through the Freeport area (influencing the base case of the 2024 statutory consultation proposals) and Chadwell St Mary housing area if allocated (influencing the Site 3 costs). Additionally, the proposal does have technical benefit by virtue of the substation works being a substantially off-line build (unlike the 2024 statutory consultation proposals which are within an existing substation and requiring some decommission of operational assets) and overall presents less technical risk to delivery and to programme.
- 1.3.23 Site 3 offers other additional benefits in terms of a reduced extent of effects from temporary construction activities (through avoidance of the need for underground cabling). These benefits are most notably during construction, as well as avoiding the long-term loss of trees which could not be replanted over the underground cables. The reduced extent of works would also reduce the direct landscape effects on Landscape Character Areas (LCA) Chadwell Escarpment Urban Fringe and Tilbury Marshes and a reduction of effects on West Tilbury Urban Fringe.
- 1.3.24 Site 5 offers some of the same benefits as Site 3, though the removal of a reduced length of underground cable reduces them somewhat. The location at Site 5 would incur the additional cost and effects (over and above the substation cost) of a CSE compound (as per the statutory consultation proposal and located to the south of Orsett golf course) as well as the additional underground cable to follow the 2024 preferred draft alignment to the proposed location.



- 1.3.25 It is possible that the same interface with the potential housing allocation occurs for Site 5 as for Site 3. This arises from the challenge of limited space between the existing overhead lines and the proposed LTC infrastructure. Much depends on the extent of overlap of permanent and temporary works for LTC and is further influenced by the housing option that progresses. Diversion of the existing overhead lines to make the connection has potential to impact the potential housing allocation, to a reduced extent for Site 5 compared with Site 3 which may be further reduced if one of the allocation alternatives is progressed. For system resilience in the future, it is important to note that the Site 5 location has very restricted potential to support future connections given that there are no readily available connection paths for further generation capacity.
- 1.3.26 The preferred site for the proposed Tilbury North Substation avoids the interactions around Tilbury Port, the Freeport and their environs. It does however have potential to reduce the area potentially available for housing on land to the east of Chadwell St Mary (as a result of how the connection to the YYJ line would need to be made) which is currently the subject of consultation for potential allocation in the local plan. Due to the layout of existing overhead lines, the ZB line (275kV) needs to be replaced, in part, by a short section of cable between new cable sealing end compounds. In the case of LTC progressing to construction, the space required for the CSE compounds, along with the constraints of the works associated with Lower Thames Crossing, requires an approximately 1,500m section of the YYJ to be diverted to the south and west deviating by up to approximately 100m from the existing YYJ alignment. The scale of interface may potentially reduce the development area by up to 8 hectares (within an estimated total allocation area of up to around 90 hectares) though this can only be confirmed once detailed design is completed and a reduced extent may well be achieved within Limits of Deviation. There may also be opportunities to position non-built and greenfield uses in the area between overhead lines and CSE compounds.
- 1.3.27 The proposed Tilbury North Substation site does present some different technical risks due to the need for system outages, but these are within the scope of normal system management risks. In cost terms, compared with the design published in the 2024 statutory consultation, this change is expected to be broadly cost neutral. However, there is some uncertainty regarding the costs associated with securing necessary rights through the Freeport area and Chadwell St Mary housing area, which, if allocated may change this. The Tilbury North Substation has some technical benefit by virtue of the substation works being a substantially off-line build (unlike the 2024 statutory consultation proposals which are within an existing substation and requiring some decommission of operational assets), overall presents less technical risk to programme.
- 1.3.28 The site offers benefits in terms of reduced temporary construction effects through avoidance of the need for the underground cable to Tilbury Substation. It would also avoid the long-term loss of trees which could not be replanted over the underground cables. There would also be the removal of direct landscape effects on Landscape Character Areas (LCA) Chadwell Escarpment Urban Fringe and Tilbury Marshes and a reduction of effects on West Tilbury Urban Fringe. Additionally, National Grid considers that there remain opportunities for the housing developer(s) to further reduce effects at detailed design stage, for example by utilising land under the YYJ and ZB as part of the greenspace provision.



- 1.3.29 In conclusion, the preferred site for the proposed Tilbury North Substation is Site 3. This avoids the interactions around Tilbury Port, Freeport and their environs. It does however have potential to reduce the area potentially available for housing (as a result of how the connection to the YYJ line would need to be made) on land to the east of Chadwell St Mary being consulted upon for potential allocation in the local plan. Due to the layout of existing overhead lines, the ZB line (275kV) needs to be replaced, in part, by a short section of cable between new cable sealing end compounds. In the case of LTC progressing to construction, the space required for the CSE compounds, along with the constraints of the works associated with Lower Thames Crossing, will require a section of the YYJ to be diverted to the south and west deviating by up to approximately 100m from the existing YYJ alignment. The scale of interface may potentially reduce the development area by up to 8 hectares (within an estimated total allocation area of up to around 90 hectares) though this extent will only be confirmed once detailed design is completed and a reduced extent may well be achieved within Limits of Deviation. Even then it is anticipated that site masterplanning would further reduce the loss of housing land by repositioning of some land uses.
- 1.3.30 A GIS substation design is proposed, in line with National Grid guidance for substations less than 5km from saline / marine environments, as the Thames Estuary is located around 3.1km to the east of the site. The alternative AIS substation design, which would provide a lower cost option with more resilience and flexibility to future and additional system requirements, would not be consistent with this policy, unless protected within a large and tall building. AIS has a much greater land requirement and would encroach substantially onto adjacent land uses. This would potentially be exacerbated by the connections into the substation where effects may be increased by the more limited flexibility.
- 1.3.31 Depending on orientation, affected land uses would include: a working aggregates processing / closed landfill site; Orsett Golf Course, areas of woodland including ancient woodland (an irreplaceable habitat), replacement ancient woodland mitigation areas associated with the LTC proposals, and a local wildlife site. It is also possible that the use of Special Parliamentary Procedures would be required for some areas (leading to potential for up to 2 years delay) to secure the necessary land rights.
- 1.3.32 Whilst it may be possible to relocate the quarry processing activities and address some of the ground conditions after restoration, it is unlikely that an adequate solution for the likely impact of an AIS substation and potentially multiple oversails of a number of holes of the golf course would be found and closure of the aggregate processing facility may be unavoidable. Orsett Golf Course was established in 1899 and holds regional qualifying rounds of the Open championship. Whilst some aspects of the potential effects may be capable of being addressed through compensation, it is recognised that the closure of a high-profile golf course would have a substantial community effect and is not considered acceptable in this case when an alternative technology is available. The GIS substation minimises these interactions and is proposed as the preferred technology.
- 1.3.33 The LTC project has not yet secured consent. If it does not progress there may be an opportunity to reduce the potential interface with the potential housing allocation by completing the modifications to the existing ZB and YYJ overhead lines to the north and east, though this is only possible if the LTC route is not safeguarded. An approach has been taken forward that has an initial design based

on diverting the YYJ line to the south and west but with flexibility to also retain wider order limits if LTC does not progress and its route is not safeguarded. In that case, the design change necessary to divert the ZB and connect into the YYJ could be achieved with reduced effect on the housing allocation by positioning the new CSE compounds on, or to the north of, the ZB line and the diversions on the YYJ on the existing alignment or slightly to the north and east of the existing route alignments.

## Connecting Norwich to Tilbury into the proposed changed connection arrangements

- 1.3.34 Feedback in this area also indicated a preference for alternative routes to avoid or reduce effects on Orsett Golf Course. There was particular concern about the 2024 preferred draft alignment relative to particular tee positions. The expressed preference was to pass to the south of the golf course routeing over the adjacent secondary aggregate processing facility with other alternatives being to follow the boundary between the golf course and secondary aggregate site or if these were not possible to move the alignment to oversail a landing area further from the Tee position. The implications of the changed connection arrangement have been considered in the context of these preferences.
- 1.3.35 For the alignment to be routed to the south of the golf course, one design response would require two pylons to be positioned within the quarry area to the southeast of TB262 (one to the north and one to the south of the PRoW) in order to avoid the majority of trees in the golf course. However, this presents unacceptable technical risk with the land to the south of the PRoW being 'made ground' having been landfilled and this alternative therefore cannot be progressed. A further design response would be to position a pylon on the more northern of the aggregate facility parcels of land. This would be an angle pylon with a large change of direction and is therefore less consistent with Holford Rule 3 than the 2024 preferred draft alignment. It would also lead to cessation of the activities of the aggregate recycling business. It is noted that this site is the subject of a time-limited permission, although it has previously been extended with a further extension a reasonably foreseeable possibility. This design response would also require the removal of a relatively more extensive area of trees and woodland in the golf course around the Tee and Green as a result of the oversail by the overhead line. It is therefore less consistent with Holford Rule 2 and overall is not preferred.
- 1.3.36 A modification to the 2024 preferred draft alignment was also considered incorporating an alternative route to cross the golf course to reduce effects. Information on typical ball flights and carry distances was sourced, from a reference identified by the golf course, and based on this data the potential for a reduction in effects from a slight realignment to the north was identified. It is acknowledged that the overhead line continues to cross the golf course and requires the positioning of a pylon at the northeastern edge of the practice ground but is straighter with reduced requirement for vegetation loss (and therefore more consistent with Holford Rule 3 and 2 respectively) and avoids the potential for closure of the aggregates processing facility. It does have potential to reduce the development area at the adjacent Southfields opportunity area (subject to consultation at present) as a result of the alignment moving out of the gas pipeline safety zone albeit some potential for mitigation through masterplanning may be possible. Taking into account other factors and changes set out below, moving the

overhead line alignment for the crossing of Orsett golf course slightly to the northwest has been taken forward as an integral part of the change to the connection arrangement at Tilbury.

## 1.4 Consideration of National Policy Statements and other relevant National Planning Policy

### National Planning Policy Context

#### National Planning Policy

1.4.1 In deciding an application for development consent, Section 104 of the Planning Act 2008 requires the SoS to have regard to any NPS which applies to the application, except in a limited number of specified circumstances. Since the Strategic Proposal including the connection points were originally defined during the 'Options Identification and Selection' stage and the early rounds of non-statutory consultation in 2022 and 2023, the following new National Policy Statements have come into effect:

- National Policy Statement for Energy EN-1
- National Policy Statement for Electricity Network Infrastructure EN-5
- National Policy Statement for Renewable Energy Infrastructure EN-3

1.4.2 There has been no change to the above National Policy Statements since the 2024 Design Development Report was issued for statutory consultation therefore **Appendix A – Consideration of National Policy Statements April 2024** still remains applicable (attached to this addendum as Appendix A).

#### Other relevant national planning policy

1.4.3 Whilst the application must be determined in accordance with the relevant NPS, under section 104 of the PA 2008 [1], regard must also be had to any other matters of importance and relevance, which may include relevant policies in the National Planning Policy Framework (NPPF, 2024).

1.4.4 Since the statutory consultation was undertaken a revised NPPF<sup>1</sup> was published in December 2024. The revised NPPF (December 2024) sets out government's planning policies for England and how these are expected to be applied.

1.4.5 Economic growth is the focus of the revised NPPF as reflected in Section 6 - Building a strong, competitive economy. Paragraph 85 states that '*Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future. This is particularly important where Britain can be a global leader in driving innovation, and in areas with high levels of productivity, which should be able to capitalise on their performance and potential*'.

1.4.6 Freeports are all about securing the economic future of the UK, by reorienting regional economies towards innovative, low-carbon sectors like renewables and advanced manufacturing, including building new clusters in industrial sectors of

the future and creating long-term high-quality jobs for local people<sup>3</sup>. By offering tax reliefs and more flexible customs rules on a small number of designated sites, Freeports seek to:

- Promote regeneration and job creation;
- Become established as national hubs for global trade and investment; and
- Create hotbeds for innovation.

- 1.4.7 By moving the connection away from the Freeport, this proposed change avoids impacts on economic growth and productivity of local, regional and national importance.
- 1.4.8 The revised NPPF also states that local authorities should support planning applications for all forms of renewable and low carbon development, giving significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future (paragraph 168).
- 1.4.9 The Project is identified as critical to delivering a network which supports the clean power pathways for 2030 delivery. There is a need for the Project to be delivered at pace to achieve the Clean Power 2030 target for the benefits to be realised and in doing so significant weight should be added to the proposed change in accordance with paragraph 168 of the NPPF.

## 1.5 Next Steps

- 1.5.1 National Grid is undertaking statutory targeted consultation on the proposed changes to the connection at Tilbury.
- 1.5.2 During the coming months further detailed assessments and studies will continue including environmental and other site-based surveys. These will further inform and refine the location and design of the connection point into Tilbury.
- 1.5.3 Feedback from the statutory targeted consultation will also inform this more detailed work. The Project continues to be the subject of environmental impact assessments and there will be on-going consultation with stakeholders, interested parties and members of the public.
- 1.5.4 As with previous stages our decisions will be back checked in the light of feedback to the targeted statutory consultation, the findings of these further studies and assessments and new material information. The outcome will be the design that is submitted to the Planning Inspectorate with the application for a Development Consent Order.
- 1.5.5 National Grid expects to apply to the Planning Inspectorate for a DCO in late summer 2025.

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<sup>3</sup> <https://ukfreeports.campaign.gov.uk/>



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