

BT-NG-020621-545-0058

# Bramford to Twinstead Reinforcement

Volume 6: Environmental Information

Document 6.2.11: Environmental Statement: Main Report Chapter 11 –  
Agriculture and Soils

Final Issue A  
April 2023

Planning Inspectorate Reference: EN020002

Infrastructure Planning (Applications: Prescribed Forms and  
Procedure) Regulations 2009 Regulation 5(2)(a)



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# 11. Agriculture and Soils

## 11.1 Introduction

- 11.1.1 This Environmental Statement (ES) chapter details the likely significant effects of the project on Agriculture and Soils. Agriculture and soil receptors include best and most versatile (BMV) land (as defined by the Agricultural Land Classification (ALC) system) and land holdings in agricultural use.
- 11.1.2 During both construction and operation, the project would affect agriculture and soils due to land being taken out of agricultural production, either temporarily during construction or in terms of the land required permanently for the operation of the project. This would affect land holdings through introducing potential fragmentation, biosecurity risks and impacts on any land under agri-environmental, woodland or forestry schemes. There would also be disturbance to soils, either through direct stripping of the soil resource to enable construction works or through surface activity (for example compaction from vehicle movement across the surface), which can affect soil quality and associated soil functions.
- 11.1.3 This chapter has links with other chapters, in particular: ES Chapter 7: Biodiversity (**application document 6.2.7**), which assesses the effects on habitats that rely on certain soil types and characteristics; ES Chapter 9: Water Environment (**application document 6.2.9**) which assesses the effects on land drainage; and ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**) which assesses the effects on land quality (including potential contaminated land).
- 11.1.4 Cumulative effects between the project and other proposed developments as well as receptors affected by more than one source of direct environmental impact resulting from the same development are considered in ES Chapter 15: Cumulative Effects Assessment (**application document 6.2.15**).
- 11.1.5 This chapter is supported by the following appendix:
- Appendix 11.1: ALC Survey (**application document 6.3.11.1**).
- 11.1.6 This chapter is also supported by the following figures, which can be found in the ES Volume 6.4: Figures (**application document 6.4**):
- Figure 11.1: Soilscales Mapping;
  - Figure 11.2: Provisional Agricultural Classification Mapping;
  - Figure 11.3: Detailed ALC Mapping;
  - Figure 11.4: Agri-Environment Schemes; and
  - Figure 11.5: Forestry Schemes.

## 11.2 Regulatory and Planning Policy Context

### National Policy Statement

- 11.2.1 ES Chapter 2: Regulatory and Planning Policy Context (**application document 6.2.2**) sets out the overarching policy relevant to the project including the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a). This is supported by NPS for Electricity Networks (EN-5) (DECC, 2011b).
- 11.2.2 EN-1 states that energy projects could have adverse effects on agriculture and soils. Paragraph 5.10.8 of EN-1 states that *‘Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed’*.
- 11.2.3 Paragraph 5.10.15 of EN-1 states that the Planning Inspectorate should *‘ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. It should give little weight to the loss of poorer quality agricultural land (in grades 3b, 4 and 5), except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy’*.
- 11.2.4 EN-1 is supported by EN-5 (DECC, 2011b), with paragraph 1.7.5, which states that, in relation to a presumption that electricity lines should be put underground, *‘effects on soil, water, ecology and archaeology are likely to be negative, at least in the short term, requiring significant mitigation, but there is uncertainty around long term effects depending on the specific location and sensitivity of the receiving environment’*. This is reiterated in paragraph 2.8.9.
- 11.2.5 The consultation draft EN-1 (Department for Business, Energy and Industrial Strategy (BEIS), 2021a) has similar text to noted above. The consultation draft of EN-5 (BEIS, 2021b) states in paragraph 2.11.14, that projects should include a commitment for appropriate handling of soil, backfilling, and return of the land to the baseline ALC, to ensure no loss or degradation of agricultural land. It also states that such a commitment should be based on soil and ALC surveys in line with the 1988 ALC criteria and due consideration of the Defra Construction Code.
- 11.2.6 Full consideration of the NPS can be found in the Planning Statement (**application document 7.1**).

### Other Relevant Policy and Guidance

- 11.2.7 ES Appendix 2.1: Legislation, Policy and Guidance (**application document 6.3.2.1**) includes legislation and national policy relevant to agriculture and soils. It also outlines key guidance documents that have been referenced when writing this chapter.
- 11.2.8 ES Appendix 2.2: Local Planning Policy (**application document 6.3.2.2**) lists the local policy potentially relevant to agriculture and soils. The emerging Babergh and Mid Suffolk Joint Local Plan (2020) Policy SP09 requires development to support and enhance geodiversity, which includes soils.

- 11.2.9 The Mid Suffolk District Local Plan (1998) contains saved policy CL11: Retaining high quality agricultural land encourages the conservation of agricultural land, with particular protection to be afforded to the BMV agricultural land (ALC grades 1, 2 and 3a).
- 11.2.10 The adopted Braintree District Council Local Plan (2022) includes policy LPP 70 – Protecting and Enhancing Natural Resources, Minimising Pollution and Safeguarding from Hazards. This requires that soil quality must be protected during development to protect good quality land and to protect the ability of soil to allow water penetration by avoiding compaction.

### 11.3 Scope of the Assessment

- 11.3.1 ES Appendix 5.1: Scope of the Assessment (**application document 6.3.5.1**) outlines the scope of the assessment for agriculture and soils. This has been informed by the Scoping Opinion provided by the Planning Inspectorate (**application document 6.6**) on behalf of the Secretary of State, following the submission of the Scoping Report (**application document 6.5.1**).
- 11.3.2 The scope has also been informed through engagement with relevant consultees as summarised in ES Appendix 5.2: Response to Consultation Feedback (**application document 6.3.5.2**).
- 11.3.3 Permanent disturbance to soils and loss of agricultural land (operational phase), were conditionally scoped out subject to the results of the ALC surveys (see ID 4.6.2 in ES Appendix 5.1: Scope of the Assessment (**application document 6.3.5.1**)). The ALC surveys have confirmed the presence of BMV land and therefore that BMV land could be permanently affected and as such this has been scoped back into the assessment presented in this chapter.
- 11.3.4 Effects of Electric and Magnetic Fields (EMF) on receptors was scoped out of the assessment on the basis that the project would be compliant with the guidelines and policies relating to electromagnetic fields stated in EN-5 (which states that '*there is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequences*'), including the International Commission on Non-Ionizing Radiation Protection guidelines (1998) (see ID 4.6.6 in ES Appendix 5.1: Scope of the Assessment (**application document 6.3.5.1**)). The Electric and Magnetic Field Compliance Report can be found in Volume 5 (**application document 5.2**).
- 11.3.5 Economic effects on landowners due to fragmentation of land holdings during construction was initially scoped out of the assessment. The Planning Inspectorate did not consider there was sufficient evidence to do this and requested that the ES should identify where fragmentation would affect the viability of agricultural land holdings during construction and operation and include an assessment where significant effects are likely to occur, see ID 4.6.7 in ES Appendix 5.1: Scope of the Assessment (**application document 6.3.5.1**). The potential effects of fragmentation are noted in the assessment and any that arise would be addressed through the landowner discussions and through the compensation payments as part of meeting this request.
- 11.3.6 Some land has been identified for enhancements, in line with National Grid's commitment to deliver net gain of least 10% or greater in environmental value (including biodiversity) on all construction projects by 2026. This is not assessed within the ES but is covered separately within the Environmental Gain Report (**application document 7.4**).

- 11.3.7 In addition, the following matters were also raised in the Scoping Opinion:
- The ES should also be informed by the Met Office UK Climate Projections (UKCP18) in order that forecasts of long-term changing climatic conditions can be taken into account. UKCP18 has been reviewed to provide an overview of likely climate change scenarios. A qualitative assessment of the potential implications for agriculture and soils has been set out;
  - The ES should include a description of the good practice measures that would be in place to control maintenance effects. Operational effects to soil are anticipated to be limited due to the use of a ducted method which would allow some maintenance of the underground cables without disturbing the soil. However, any maintenance activities requiring excavation of soil would be subject to standard good practice soil measures defined in existing National Grid processes; and
  - The Inspectorate noted that there is no reference to potential effects on agricultural land, soils, or agricultural businesses of the proposed removal of the 132kV overhead line, nor evidence to show whether, for example, this land would be returned to agricultural production. The Inspectorate considers that the potential effects associated with the removal of the current 132kV route should be addressed within the ES. Agricultural businesses currently operate beneath the existing 132kV overhead line, and it is assumed that these activities would continue once the existing 132kV overhead line is removed. Therefore, no further assessment is provided within this chapter.
- 11.3.8 The specific aspects that are scoped into the agriculture and soils assessment in accordance with the Scoping Opinion are:
- Soils: Impacts on soil quality and associated ecosystem services;
  - BMV agricultural land; and
  - Agricultural activities and operation / viability of landholdings.

## Project Engagement

- 11.3.9 National Grid has held meetings with relevant organisations, including Natural England. These discussions included a discussion of the scope of soil surveys and the methodology to be employed. The feedback from these meetings has influenced the scope and extent of the soil surveys, for example extending the soil surveys beyond the permanent footprint to include the temporary footprint of the underground cable sections.
- 11.3.10 Further details on how consultation responses have informed the assessment can be found in ES Appendix 5.2: Response to Consultation Feedback (**application document 6.3.5.2**).

## 11.4 Approach and Methods

- 11.4.1 This section describes the methodology used to establish the baseline environment and the adopted approach to assessing the significance of potential effects on agriculture and soils. A desk study has been undertaken as well as detailed ALC site surveys across the land areas associated with the grid supply point (GSP) substation, the four cable sealing end (CSE) compounds and the underground cable sections.

## Data Sources

- 11.4.2 The baseline has been informed by a desk study which has drawn on the following key information sources:
- Ordnance Survey (OS) mapping and aerial photography (Google, 2022) to establish land use and settlement patterns;
  - Soilscape mapping showing the distribution of main soil types using the Land Information System (LandIS) website (Cranfield University and Defra, 2021);
  - Provisional ALC mapping from the MAGIC website (Defra, 2022b);
  - Climatic data and LandIS Soil Site Report (National Soil Resources Institute, 2021 a-d);
  - Agri-environmental and Forestry schemes (Defra, 2022b); and
  - Information gathered from discussions with landowners and land managers.
- 11.4.3 All of the information received has been incorporated into the baseline environment description presented in Section 11.5 or within ES Appendix 11.1: ALC Survey (**application document 6.3.11.1**) and used to inform the assessment.

## Study Area

- 11.4.4 The study area for soils and ALC comprises the land which would be directly affected by the project (through disturbance or temporary covering of the soils). This is based on the Order Limits and is shown on ES Figures 11.1 to 11.5 (**application document 6.4**).
- 11.4.5 In relation to the farm businesses, the study area comprised the agricultural land which is likely to be directly affected by the project (through, for example, disturbance, temporary covering of the ground or access restrictions) and was extended where required to provide context to the businesses affected.

## Site Survey

- 11.4.6 No detailed existing ALC information was available from the desk study for areas within the Order Limits. Therefore, an initial site survey was undertaken in December 2021 to identify the ALC grade at the locations where there is anticipated to be the greatest disturbance to soil during construction and areas of permanent land take, comprising the CSE compounds and GSP substation. These surveys were undertaken in accordance with the published guidelines (Ministry of Agriculture, Fisheries and Food, 1988) in November 2021 and October 2022 once the crops had been harvested. The site surveys are also in line with the consultation draft of EN-5 (BEIS, 2021b) which states the assessment should be based on soil and ALC surveys in line with the 1988 ALC criteria.
- 11.4.7 Further surveys were undertaken on parts of the underground cable sections in October 2022. Whilst it had been anticipated that the full length of undergrounding sections would be surveyed, the outbreak of Avian influenza (with confirmed cases in the region) resulted in severely restricted access and a limit on the areas that could be surveyed. It had also been planned that a number of soil pits would be dug at the end of the auger survey. The access restrictions meant this activity also could not be undertaken. Where soil surveys could not be completed, the assessment has assumed a reasonable worst case, that BMV land is present within the Order Limits.



- 11.4.8 Soil surveys have not been undertaken in the overhead line sections, as the working footprint of these areas would be limited, for example to the pylon bases and the temporary access routes. In addition, the location of these features could move within the parameters set by the Limits of Deviation. See ES Chapter 4: Project Description (**application document 6.2.4**) for further details.

## Assessment Methodology

- 11.4.9 This section sets out the methodology used for assessing the effects on agriculture and soils for those aspects scoped into the assessment, as set out within Chapter 11 of the Scoping Report (**application document 6.5.1**). Published guidance relating to soils and land grade (as defined by the ALC system) is limited and therefore the approach set out in the Scoping Report was based on technical knowledge and previous experience. This took account of highways guidance as set out in the Design Manual for Roads and Bridges LA 109 (Highways England *et al.*, 2019c) which relates to soils and land grade and promotes assessment that is proportionate to the scale and nature of the project and the likely effects on soils.
- 11.4.10 Since the submission of the Scoping Report, the Institute of Environmental Management and Assessment (IEMA) has published new guidelines in relation to how land and soil should be assessed (IEMA, 2022). This recently published guidance (and the sensitivity and magnitude tables within) is based on guidance set out in the LA 109 (Highways England *et al.*, 2019c).
- 11.4.11 The IEMA guidance (IEMA, 2022) seeks to move practice away from a narrow focus on quantifying and financially compensating impacts on agricultural land and advocates a new and wider approach to assessing the soil functions, ecosystem services and natural capital provided by land and soils. The assessment presented in this chapter takes account of the wider role soils play, noting that some of the areas discussed in the guidance are already covered in other ES chapters and therefore are not duplicated here.

## Value/Sensitivity

- 11.4.12 Agriculture and soil receptors have been identified within the study area and the attributes and the services that these provide have been characterised using the baseline data collected during the desk study and ALC survey. This information has been used to assign to receptors one of the value (sensitivity) categories defined in ES Appendix 5.4: Assessment Criteria (**application document 6.3.5.4**). These values are based on Table 3.11 of LA 109 (Highways England *et al.*, 2019b).
- 11.4.13 This chapter does not cover some of the receptors listed within Table 3.11 of LA 109 to avoid double counting of impacts, for example ecological habitat and soil biodiversity is covered within ES Chapter 7: Biodiversity (**application document 6.2.7**), soils with an archaeological interest are covered within ES Chapter 8: Historic Environment (**application document 6.2.8**) and sterilisation of mineral reserves is covered within ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**).

## Impact Magnitude

- 11.4.14 The criteria for assigning impact magnitude, defined in ES Appendix 5.4: Assessment Criteria (**application document 6.3.5.4**), is based on Table 3.12 of LA 109 (Highways England *et al.*, 2019b). These consider the scale/extent of the predicted change and the nature and duration of the impact, with examples of each category of impact magnitude provided in the guidance.

## Significance

- 11.4.15 Likely significant effects have been assessed using professional judgement considering the sensitivity (or value) of the agriculture and soil receptors within the study area, and the magnitude of change (impact) likely to be caused by project activities. These factors are combined to give an overall significance of effect.
- 11.4.16 Significance has been derived using the matrix set out in Illustration 5.1 in Chapter 5: Environmental Impact Assessment (EIA) Approach and Method (**application document 6.2.5**). This has been supplemented by professional judgement, which where applicable, has been explained to give the rationale behind the values assigned. Likely significant effects, in the context of the Infrastructure Planning (EIA) 2017, are effects of moderate or greater significance.
- 11.4.17 Overall significance is also concluded for each receptor, taking into consideration the potential for the project to affect more than one attribute of a particular receptor.

## Limitations of Assessment

- 11.4.18 No particular limitations have been noted that would affect the assessment. Limitations associated with the soil surveys are described in ES Appendix 11.1: ALC Survey (**application document 6.3.11.1**).

## Key Parameters for Assessment and Assumptions

- 11.4.19 This section describes the key parameters and assumptions that have been used when undertaking the assessment presented within this ES Chapter. The assumptions are based on information presented within ES Chapter 4: Project Description (**application document 6.2.4**) and are listed below:
- Ducting: It is assumed that a ducted system would result in quicker reinstatement of subsoil when compared to an approach where the trench would remain open for the duration of the works;
  - Land drainage: It has been assumed that in accordance with good practice measure W16, where appropriate, pre-construction field drainage would be installed within the working area to help prevent possible water-logging of the working area and therefore the need for temporary dewatering during construction. This would also enable current drainage systems to continue working throughout the period of construction. It is also assumed that in accordance with GG06, that land used temporarily would be reinstated to its pre-construction condition and use, including surface and sub-surface drainage systems where present, so that there is no increase in ground wetness or surface flooding post-construction;
  - Soil stripping: It is assumed within the overhead line sections that soil stripping would be limited to the pylon bases, crane pad (where used) and temporary access routes.

It is assumed that soil stripping would be required for the whole footprint of the CSE compounds and GSP substation. It is also assumed that soil stripping would generally be required for 80m of the 100m wide Order Limits within underground cable sections (excluding compound/storage area requirements) unless a specific commitment has been made otherwise. Topsoil and subsoil would be separated and stored locally *in situ* unless there was a commitment made otherwise, for example EM-G05, where the Order Limits have been widened to accommodate soil storage outside of the River Stour floodplain to avoid blocking floodplain flow paths;

- Permanent land take would be associated with the CSE compounds, the GSP substation (including the permanent access routes) and the pylon bases. In total, this is approximately 11.6ha of permanent land take based on the Proposed Alignment shown on the ES Figure 4.1: The Project (**application document 6.4**);
- Trenchless crossings: It is assumed that no soil stripping is required beneath the trenchless crossings outside of the drill pits and the temporary access routes; and
- Operation and maintenance: It is assumed that any activities required to operate and maintain the reinforcement that involve soil stripping would be undertaken in accordance with standard National Grid processes and good practice soil handling measures.

## Embedded and Good Practice Measures

- 11.4.20 This section outlines the relevant embedded and good practice measures that have been embedded into the design of the project and therefore the assessment has been undertaken on the assumption that these measures would be carried out. All assessment work has applied a precautionary principle, in that where limited information is available (in terms of the project design), a realistic worst-case scenario is assessed.

### Relevant Embedded Measures

- 11.4.21 Given the extent of BMV land in this region (Natural England, 2014b), for example 61% is mapped as Grade 2, it is not practicable to select a route corridor or alignment which avoids BMV land.
- 11.4.22 An embedded measure (EM-E03) has been identified which commits to using suitable methods to protect orchard trees when lowering and removing the 132kV overhead line, which would help reduce effects on the areas of orchard within the Order Limits.

### Good Practice Measures

- 11.4.23 The Code of Construction Practice (CoCP) (**application document 7.5.1**) sets out the standard good practice measures that would be undertaken during construction of the project if it is granted consent. These are further expanded on within the Construction Environmental Management Plan (CEMP) (**application document 7.5**). The measures detailed in the CoCP include those to protect the quality of soils when they are stripped, stockpiled and restored and measures to reduce the disruption to agricultural activities and include:
- W16: Where appropriate, pre-construction field drainage would be installed within the working area to help prevent possible water-logging of the working area and therefore the need for temporary dewatering during construction. This would also enable current drainage systems to continue working throughout the period of construction;



- AS02: Where land is being returned to agricultural use, the appropriate soil conditions (for example through the replacement of stripped layers and the removal of any compaction) would be recreated. This would be achieved to a depth of 1.2m (or the maximum natural soil depth if this is shallower) except over buried cables where the reinstated soil depth would be approximately 0.9m;
- AS03: Access to and from residential, commercial, community and agricultural land uses would be maintained throughout the construction period or as agreed through the landowner discussions. The latter may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels would be communicated to affected parties in advance of any change being implemented;
- AS09: Soil excavated from the project would be reused on site through the backfilling of trenches and for landscaping where practicable and where soil is suitable for reuse (for example, not contaminated and giving consideration to land holdings and applicable biosecurity measures). It is intended that all soil would be reused on site, however if it arises that excess spoil cannot be reused on site, this soil would be taken off site in accordance with measures outlined within the Materials and Waste Management Plan; and
- AS10: Pre-construction soil surveys would be undertaken in areas of underground cable at suitable spacings where soil stripping is proposed and no existing soil survey data is available. This would support the development of detailed soil management measures and would provide soil information to inform the handling, movement and reinstatement of soil during construction.

11.4.24 The temporary nature of many construction activities and the subsequent restoration of the land is likely to result in the avoidance of long-term effects on agricultural and soil receptors.

## 11.5 Baseline Environment

### Existing Baseline

#### Soils

11.5.1 A range of soil types are present within the Order Limits as shown on ES Figure 11.1: Soils Mapping (**application document 6.4**). The variation is in part a reflection of the underlying geology, both the solid geology and overlying drift deposits (see ES Chapter 10: Geology and Hydrogeology (**application document 6.2.10**) for details).

11.5.2 Five main soil associations (representing a group of soil series (soil types) which are typically found occurring together in the landscape) have been identified within the study area (National Soil Resources Institute, 2021a-d):

- Hornbeam 3: deep fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy over clayey soils. Calcareous subsoils in places. The major land use on this association is defined as cereals and other arable crops;

- Beccles 3: slowly permeable seasonally waterlogged fine loamy over clayey soils and similar soils with only slight seasonal waterlogging. The major land use on this association is defined as winter cereals with some short-term grassland;
- Hanslope: slowly permeable calcareous clayey soils. The major land use on this association is defined as winter cereals with some other arable crops and some grassland;
- Ludford: deep well drained fine loamy, coarse loamy and sandy soils, locally flinty and in places over gravel. The major land use on this association is defined as cereals, sugar beet and other arable crops with some fruit and horticultural crops; and
- Thames: stoneless mainly calcareous clayey soils affected by groundwater. The major land use on this association is defined as permanent grassland with some cereal crops.

## Agricultural Land Classification

- 11.5.3 Provisional ALC mapping shows that the Order Limits comprise a mix of Grade 2 and 3 land. There are small areas of Grade 4 land, for example north of Alphamstone associated with steeper topography and wetter ground, which supports priority grassland habitats. This mapping, at a scale of 1:250,000, does not distinguish between Grades 3a and 3b but provides an indication of the likely land classification (see ES Figure 11.2: Provisional Agricultural Land Classification Mapping (**application document 6.4**)).
- 11.5.4 There is no published detailed ALC mapping available for the study area. A small area of detailed mapping lies just outside the study area to the south-east of Polstead Heath, where land in Grades 2 and 3a has been confirmed. Natural England (2014b) presents details of the extent of each land grade in the South Suffolk and North Essex Clayland National Character Area, highlighting the extent of BMV land in this region (61% mapped as Grade 2 and 33% mapped as Grade 3).
- 11.5.5 Climatic data interpolated for a point within the study area (TL 985,399) are presented in Table 11.1.

Table 11.1 – Climatic Data

Parameter	Data
Altitude (m)	60
Average annual rainfall AAR (mm)	597
Accumulated temperature AT0 (day degrees)	1,397
Moisture deficit for wheat (mm)	117
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

- 11.5.6 Climate does not impose an overall limitation on ALC grade in relation to the criteria set out in the ALC Guidelines (Ministry of Agriculture, Fisheries and Food, 1988). Climate does, however, have an important influence on the interactive limitations of soil wetness and soil droughtiness, which is the balance between rainfall and water losses from the soil. The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

- 11.5.7 Overall, there are approximately 644ha of agricultural land within the Order Limits. Of this approximately 244ha is mapped (Provisional mapping) as Grade 2 and approximately 340ha is mapped as Grade 3. At least a proportion of the Grade 3 land would be Grade 3a which, along with the Grade 2 land, is considered to be BMV land.
- 11.5.8 The ALC site surveys undertaken for the project have confirmed the presence of BMV land within the Order Limits, as shown on ES Figure 11.3: Detailed Agricultural Land Classification Mapping (**application document 6.4**). Within the 40ha of land surveyed, 88% of the land is BMV land in Grades 1, 2 and 3a. Full details of the ALC survey results are presented in ES Appendix 11.1: ALC Survey (**application document 6.3.11.1**).

## Land Use

- 11.5.9 The land use is principally arable, with small woodland blocks and some pasture, often associated with river corridors. There are some areas of fruit trees, on the land east and west of Brick Kiln Lane and north of the B1068, south of Boxford.
- 11.5.10 There are areas of land within entry level plus higher level agri-environment schemes (environmental stewardship) within the study area (Defra, 2022b), in particular south of Hadleigh, south of Boxford and west of the River Stour. There are also extensive areas of land under Middle Tier Countryside Stewardship. These are shown on ES Figure 11.4: Agri-environment Schemes and ES Figure 11.5: Forestry Schemes (**application document 6.4**).
- 11.5.11 Environmental stewardship schemes aim, through payments, to secure widespread environmental benefits. Entry level agreements cover the whole farm, delivering simple yet effective environmental management to improve water quality, reduce soil erosion, improve conditions for farmland wildlife, maintain landscape character and protect the historic environment. Higher level agreements have similar aims but focus on more complex forms of land management.
- 11.5.12 Mid-Tier Countryside Stewardship agreements aim, through payments, to provide a range of options and capital items that together help to deliver a broad range of environmental benefits, such as increasing biodiversity, water quality and air quality, as well as potentially supporting increased protection against flooding, maintaining the historic environment and improving landscape character.
- 11.5.13 There are woodland areas within the English Woodland Grant Scheme or for which there are felling licences in place, these are shown on ES Figure 11.5: Forestry Schemes (**application document 6.4**).

## Future Baseline

- 11.5.14 The baseline in relation to soils and ALC grades is unlikely to change from that described over the timescales considered in the assessment. The UK Climate Projections (Met Office, 2021) provide an assessment of likely climate change trends for the 21st century, with potential changes including wetter winters and drier summers (with higher intensity rainfall), that could affect soil conditions, land grade and farming practices. However, these are unlikely to manifest as noticeable changes in land grade or land management over the time period assessed.



- 11.5.15 A report commissioned by the Welsh Government (Keay *et al.*, 2014) states that the overall long-term impact of climate change on cropping outcomes in the UK remains unclear due to the balance of potentially positive and potentially negative effects. The report suggests that the potential for adaptation and innovation within the agricultural sector, as well as the introduction of crops not usually grown in the UK, may counter the climate change effects as they emerge. As such, whilst the baseline may change over the operational timeframe, it is not considered that this would have a material impact on the outcomes from how the land is managed and used.
- 11.5.16 There could potentially be changes to land management practices and business approaches across the landowners/land managers. The Dedham Vale Area of Outstanding Beauty (AONB) and Stour Valley Project Management Plan 2021-2026 (Dedham Vale AONB and Stour Valley Partnership, 2021) seeks to ensure that the AONB and Stour Valley remains an example of the finest landscape in the country through conserving and enhancing the natural beauty of the area.

## 11.6 Likely Significant Effects During Construction (Without Mitigation)

### Introduction

- 11.6.1 This section sets out the likely significant effects of the project on agriculture and soils during construction. The assessment assumes that the relevant embedded measures and the good practice measures in the CoCP (**application document 7.5.1**) are in place, and the results of the assessment then inform the need for any additional mitigation requirements during construction (see Section 11.8).
- 11.6.2 As described in ES Chapter 4: Project Description (**application document 6.2.4**), the assessment presented within this chapter is split into the 'main project' and the 'GSP substation'. The main project includes the 132kV overhead line removal, proposed overhead line and underground cables (including the CSE compounds). The GSP substation includes works at the substation where this connects into the network and the minor works to the existing overhead lines.

### Main Project

#### Soils

- 11.6.3 There would be disturbance to soils, from construction of the temporary access routes and compound areas, soil stripping of working areas for pylon construction and the working areas for the underground cables (including cable trenches) and the CSE compounds. These impacts on soils have the potential to occur across the land within the Order Limits, adversely affecting the ecosystem services the soils provide over an area of up to approximately 644ha. This could include, for example, soil compaction due to the movement of plant across the soil surface or poor restoration of disturbed soils resulting in mixing of the soil horizons and compaction, which could reduce the infiltration rate of rainfall and result in an increase in surface runoff and consequent erosion and flood risk.

- 11.6.4 In accordance with good practice measure GG07 in the CoCP (**application document 7.5.1**), land used temporarily would be reinstated where practicable (bearing in mind any restrictions on planting and land use) to its pre-construction condition and use at the end of construction. This would include removing temporary works such as the compound areas and and temporary access routes.
- 11.6.5 In addition, the CoCP (**application document 7.5.1**) and the CEMP (**application document 7.5**) contain good practice measures for soil handling, storage, and reinstatement, which would reduce the detrimental effects on soil function, and would mean that the reinstated soils are able to provide their associated ecosystem services. With these good practice measures in place, there would be a negligible magnitude impact on soils (a receptor with varying sensitivities depending on their specific characteristics and functions, ranging from low to high), which is assessed as a **minor to neutral** effect, that is **not significant**.
- 11.6.6 Some areas of land that would be used for embedded planting and would not be returned to their pre-construction land use. These include around the CSE compounds (embedded measures EM-D01, EM-F01, EM-G03 and EM-G06). It is assumed that the embedded planting at these locations would be maintained for the life of the CSE compound. Whilst the land would be removed from agricultural use (in those locations where it currently is in agricultural use), the soils would remain capable of supporting agricultural production and the change of use from arable has the potential to enhance some functions, such as carbon storage and biodiversity support. As such, it is considered there would be no long-term effect on soil volume or function associated with these areas.

### Agricultural Land Classification

- 11.6.7 During construction there would be an impact on BMV land. Table 11.2 details the extent of each ALC grade, based on the Provisional ALC mapping, within the Order Limits associated with the underground cables and CSE compounds, and also splits this between Section E: Dedham Vale AONB and Section G: Stour Valley.

Table 11.2 – ALC Grade within the Underground Cable Sections

ALC Grade	Total Area Associated with Underground Cables and CSE Compounds		Total Area within Section E: Dedham Vale AONB		Total Area within Section G: Stour Valley	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Grade 1	0.0	0.0	0.00	0.0	0.0	0.0
Grade 2	16.9	42.0	14.0	34.6	3.0	7.4
Grade 3	22.8	56.5	8.5	21.0	14.3	35.5
Grade 4	0.0	0.0	0.0	0.0	0.0	0.0
Grade 5	0.0	0.0	0.0	0.0	0.0	0.0
Non agricultural	0.6	1.5	0.0	0.0	0.6	1.5
<b>TOTAL</b>	<b>40.3</b>	<b>100</b>	<b>22.4</b>	<b>55.6</b>	<b>17.9</b>	<b>44.4</b>

- 11.6.8 Table 11.3 details the total extent of land at each grade required for the permanent footprint of the CSE compound. Full details are presented in ES Appendix 11.1: ALC Survey (**application document 6.3.11.1**).

Table 11.3 – ALC Grade Affected by the Four CSE Compounds (Permanent Footprint)

ALC Grade	Permanent Land Take (Infrastructure, Soil Removed)	
	Area (ha)	%
Grade 1	0.56	33.3
Grade 2	0.78	46.4
Grade 3a	0.29	17.3
Grade 3b	0.05	3.0
Grade 4	0.00	0.0
Grade 5	0.00	0.0
Non agricultural	0.00	0.0
<b>TOTAL</b>	<b>1.68</b>	<b>100</b>

11.6.9 As shown in Table 11.3, the construction of the CSE compounds would result in approximately 1.63ha of Grade 1, Grade 2 and Grade 3a land (i.e. BMV land) to be required permanently, which would constitute an irreversible loss of one or more soil functions (in particular the impact on BMV land). This would be a small magnitude impact on a receptor of high sensitivity, resulting in a long term **minor** effect. This is considered to be **not significant**.

### Agricultural Operations and Viability

11.6.10 There would be a temporary disruption to agricultural operations during construction, including as a result of the temporary access route off the A131 to the Stour Valley West CSE compound. The route selection, in particular the avoidance of impacts on the fruit farming areas in Section E: Dedham Vale AONB and good practice measures set out within the CoCP (**application document 7.5.1**) would reduce the impacts from this disturbance, in particular the maintenance of access to and from residential, commercial, community and agricultural land uses throughout the construction period. However, given the linear nature of this operation this is considered to be a medium magnitude impact on a receptor of low sensitivity (predominantly arable land), resulting in a short term **minor** adverse effect which would be **not significant**.

11.6.11 Agricultural land beneath areas of the 132kV overhead line that are to be removed and not replaced by 400kV overhead line would be reinstated and would be available for future agricultural operations. This would result in a long term **minor** beneficial effect which would be **not significant**.

11.6.12 Areas of land under agri-environment and stewardship schemes would be affected temporarily. This land is considered to be a receptor of medium to high sensitivity, and the short term, temporary nature of the impact is considered to be of small magnitude, resulting in a short term **minor** adverse effect which would be **not significant**.

11.6.13 Any claims regarding compensation, including in relation to agri-environment and stewardship payments, would be addressed outside of the EIA process.



## GSP Substation

### Soils

- 11.6.14 There would be disturbance to soils associated with the construction of the GSP substation, the underground cables to connect this to the network and temporary works associated with the temporary construction compound and access routes. These impacts on soils could adversely affect the ecosystem services the soils provide. For example, soil compaction due to the movement of plant across the soil surface, or the poor restoration of disturbed soils resulting in compaction, could reduce the infiltration rate of rainfall and result in an increase in surface runoff and consequent erosion and flood risk.
- 11.6.15 The GSP footprint (including the permanent access route) totals an area of 1.5ha, and the soil would not be replaced in this location. It is assumed that these soil materials would be reused in landscaping areas around the GSP substation (EM-H04). It is assumed that all other land required temporarily required would be reinstated, in line with the good practice measures set out in the CoCP (**application document 7.5.1**), such that they would continue to be capable of providing many of the ecosystem services.
- 11.6.16 Therefore, with these measures in place, there would be a negligible magnitude impact on soils (a receptor with varying sensitivities depending on their specific characteristics and functions, ranging from low to high), which is assessed as a **minor** adverse to **neutral** effect and **not significant**.
- 11.6.17 An area of land around the GSP substation would be used for embedded planting (EM-H02) and would not be returned to its pre-construction land use. It is assumed that this would be maintained for the life of the GSP substation. Whilst the land would be removed from agricultural use, the soils would remain capable of supporting agricultural production and the change of use from arable has the potential to enhance some functions, such as carbon storage and biodiversity support. As such, it is considered there would be no long-term effect on soil volume or function associated with these areas.

### Agricultural Land Classification

- 11.6.18 During construction there would be an impact on BMV land. Table 11.4 details the extent of each ALC grade within the Order Limits associated with the substation (i.e. where soil would be removed and thus the land would be removed from agricultural use).

Table 11.4 – ALC Grade Affected by the GSP Substation (Permanent Footprint)

ALC Grade	Permanent Land Take (Infrastructure, Soil Removed)	
	Area (ha)	%
Grade 1	0.0	0.0
Grade 2	0.0	0.0
Grade 3a	1.5	100
Grade 3b	0.0	0.0
Grade 4	0.0	0.0
Grade 5	0.0	0.0
Non agricultural	0.0	0.0

ALC Grade	Permanent Land Take (Infrastructure, Soil Removed)	
	Area (ha)	%
<b>TOTAL</b>	<b>1.5</b>	<b>100</b>

11.6.19 Approximately 1.5ha of BMV land (Grade 3a) would be permanently lost. This would be a small impact on a receptor of high sensitivity, resulting in a long term **minor** effect which would be **not significant**.

### **Agricultural Operations and Viability**

11.6.20 During construction there would be a temporary loss of 6.95ha of land from arable production. This is considered to be a medium magnitude impact on a receptor of low sensitivity, resulting in a **minor** effect which would be **not significant**. Any claims regarding compensation would be addressed outside of the EIA process.

## **Summary of Construction Effects**

11.6.21 During construction, the project could impact the quality of the soils across an area of 644ha and therefore impact soil functions and the ecosystem services these drive. This includes the soils which support BMV land classifications. There are also potential impacts on agricultural operations and viability due to disruption and the loss of land from agricultural production.

11.6.22 The majority of land required would be reinstated at the end of the construction phase, following the good practice measures set out in the CoCP (**application document 7.5.1**) and as described within the CEMP (**application document 7.5**). This would reduce detrimental effects on soil function, BMV land and agricultural operations and viability.

11.6.23 The effect of construction of the project on agriculture, BMV land and soils has been assessed as not significant. It should also be noted that this region has a higher proportion of BMV land compared to England as a whole. Avoiding all BMV is therefore difficult when other constraints, such as poorer quality agricultural land which supports valuable habitats, is also taken into consideration.

## **11.7 Likely Significant Effects During Operation (Without Mitigation)**

### **Introduction**

11.7.1 This section sets out the likely significant effects of the project on agriculture and soils during operation.

11.7.2 As described in ES Chapter 4: Project Description (**application document 6.2.4**), the assessment presented within this chapter is split into the 'main project' and the 'GSP substation'. The main project includes the 132kV overhead line removal, proposed overhead line and underground cables (including the CSE compounds). The GSP substation includes works at the substation where this connects into the network and the minor works to the existing overhead lines.

## Main Project

### Soils

- 11.7.3 During operation, there would be limited effects on soils. Any maintenance or repair works required which would result in disturbance to soils would be undertaken in accordance with good practice methods. The limited extent of any such works is considered to be an impact of small magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**.

### Agricultural Land Classification

- 11.7.4 During operation, there would be limited effects on BMV land. Any maintenance or repair works required which would result in disturbance to land would be undertaken in accordance with good practice methods. The limited extent of any such works is considered to be an impact of small magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**.

### Agricultural Operations and Viability

- 11.7.5 During operation, there would be limited effects on agricultural operations and viability. There is the potential for restrictions to activities immediately over or next to buried cables; however, these would be dealt with through compensation agreements, which lie outside of the EIA process. One of the more sensitive agricultural operations are the fruit farms, but the route alignment and embedded measure EM-E03 to use suitable methods to protect orchard trees when lowering and removing the 132kV overhead line would generally avoid disturbance to these.
- 11.7.6 Any maintenance or repair works required which would result in disturbance to agricultural operations would be limited in extent and as such these works are considered to be an impact of minor magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**. Any claims regarding compensation would be addressed outside of the EIA process.

## GSP Substation

### Soils

- 11.7.7 During operation, there would be limited effects on soils. Any maintenance or repair works required which would result in disturbance to soils would be undertaken in accordance with good practice methods. The limited extent of any such works is considered to be an impact of small magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**.

### Agricultural Land Classification

- 11.7.8 During operation, there would be limited effects on BMV land. Any maintenance or repair works required which would result in disturbance to land would be undertaken in accordance with good practice methods. The limited extent of any such works is considered to be an impact of small magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**.



## Agricultural Operations and Viability

- 11.7.9 During operation, there would be limited effects on agricultural operations and viability. Any maintenance or repair works required which would result in disturbance to agricultural operations would be limited in extent and as such these works are considered to be an impact of small magnitude on a receptor of low sensitivity (predominantly arable land), resulting in a **minor** or **neutral** effect which would be **not significant**. Any claims regarding compensation would be addressed outside of the EIA process.

## Summary of Operational Effects

- 11.7.10 No likely significant effects have been identified to agriculture and soil during operation.

## 11.8 Proposed Mitigation During Construction

### Introduction

- 11.8.1 The assessment has concluded that there are no likely significant effects in relation to agriculture and soil receptors during construction. Therefore, no mitigation measures have been identified beyond the good practice measures set out in the CoCP (**application document 7.5.1**).
- 11.8.2 Biomass production, as set out in the new IEMA guidance (IEMA, 2022), is just one of a suite of soil functions which need to be considered. Therefore, the effective re-use of the soils from within the footprint of permanent infrastructure elements would enable the re-used soils to continue to provide functions in their new locations, for example in supporting landscape planting or biodiversity.

## 11.9 Proposed Mitigation During Operation

- 11.9.1 The assessment has concluded that there are no likely significant effects in relation to agriculture and soils during operation. Therefore, no mitigation measures have been identified.

## 11.10 Residual Significant Effects (With Mitigation)

- 11.10.1 The assessment has concluded that there are no likely significant effects in relation to agriculture and soils during construction or operation.

## 11.11 Sensitivity Testing

### Introduction

- 11.11.1 This section outlines alternative approaches to the baseline assessment presented in Sections 11.6 to 11.10. It considers the alternative construction schedule, which is described in ES Appendix 4.2: Construction Schedule (**application document 6.3.4.2**) and also flexibility between the design and method set out within ES Chapter 4: Project Description (**application document 6.2.4**) and the Proposed Alignment shown on ES Figure 4.1: The Project (**application document 6.4**). Further details on the flexibility assumptions are outlined in Section 4.2 of ES Chapter 4: Project Description (**application document 6.2.4**).

## Assessment of Alternative Construction Schedule

- 11.11.2 This chapter assumes the baseline construction schedule described in ES Appendix 4.2: Construction Schedule (**application document 6.3.4.2**) for the purposes of the assessment. Sensitivity testing considering the alternative scenario, which has a later start date due to the GSP substation being delivered pursuant to the Development Consent Order, has shown that there would be no new or different likely significant effects to those identified in the baseline construction schedule assessed in Sections 11.6 to 11.10 of this chapter.

## Flexibility in Design

### Flexibility in Trenchless Crossings

- 11.11.3 Flexibility in method for the trenchless crossings would not result in any new or different significant effects on agriculture and soils to those presented in Sections 11.6 to 11.10.

### Flexibility in Construction Method

- 11.11.4 The ES assumes a worst case that piling is required at all pylon locations. If the piling was not required at all locations, then this would not affect the assessment presented in Sections 11.6 to 11.10 for agriculture and soil, as it would have a minor reduction in the soil stripping but not enough to change the effect.

### Flexibility within the Order Limits

- 11.11.5 The assessment presented within Sections 11.6 to 11.10 has assumed the Proposed Alignment, including pylon locations shown on ES Figure 4.1: The Project (**application document 6.4**). It should be noted that as described in ES Chapter 4: Project Description (**application document 6.2.4**), the Proposed Alignment is not fixed and could be subject to change within the defined Limits of Deviation within the parameters shown on the Works Plans (**application document 2.5**).
- 11.11.6 It is likely that the overall extent of land required and soils disturbed would remain approximately the same under alternative alignments. In addition, the operations required would be unlikely to differ as a result from those assessed in this chapter. As such, this sensitivity testing has shown that there would be no new or different likely significant effects as a result of project infrastructure being placed in a different location.

## 11.12 Conclusion

- 11.12.1 The good practice measures set out in the CoCP (**application document 7.5.1**) and the CEMP (**application document 7.5**) would reduce the potential for impacts to agriculture and soils. In addition, the sustainable re-use of soils generated from within the footprint of permanent infrastructure elements of the project would also allow these soils to continue to provide a range of functions in their new location.
- 11.12.2 The assessment has concluded that there are no likely significant residual effects in relation to agriculture and soils during construction or operation. Although there is a small permanent loss of BMV land as a result of the construction of the CSE compounds and the GSP substation, this is not considered to be significant in the context of the available BMV land within the region. As such, the requirements of the NPS EN-1 are met.

11.12.3 It is noted that the consultation draft of EN-5 (BEIS, 2021b) states in paragraph 2.11.14, that projects should include a commitment for appropriate handling of soil, backfilling, and return of the land to the baseline ALC, to ensure no loss or degradation of agricultural land. These good practice measures have been included within the CoCP (application document 7.5.1) and the CEMP (**application document 7.5**).

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