YG-DCO-040

Yorkshire Green Energy Enablement (GREEN) Project

Volume 5

Document 5.2.11 ES Chapter 11: Agriculture and Soils

Final Issue A

November 2022

Planning Inspectorate Reference: EN020024

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

nationalgrid

Page intentionally blank

Contents

Version history			
Date	**Version**	**Status**	**Description/changes**
01/11/2022	A	Final	First Issue

Page intentionally blank

11. Agriculture and Soils

nationalgrid

Page intentionally blank

11. Agriculture and Soils

11.1 Introduction

11.1.1 This chapter presents the assessment of the likely significant effects of Yorkshire Green Energy Enablement (GREEN) Project ("the Project" or "Yorkshire GREEN") with respect to agriculture and soils. It should be read in conjunction with the Project description provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3** and with respect to relevant parts of the following chapters:

- **Chapter 8: Biodiversity, Volume 5, Document 5.2.8** for details of habitats and species occurring on the agricultural land discussed in this chapter;
- **Chapter 9: Hydrology, Volume 5, Document 5.2.9** for details of the local water environment;
- **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10** for details of the underlying geology (soil parent materials); and
- **Chapter 16: Socio-economics, Volume 5, Document 5.2.16** for details of rural and agricultural businesses.

11.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 11.2**);
- consultation and engagement that has been undertaken and how comments from consultees relating to agriculture and soils have been addressed (**Section 11.3**);
- the methods used for baseline data gathering (**Section 11.5**);
- overall baseline (**Section 11.5**);
- embedded measures relevant to agriculture and soils (**Section 11.6**);
- the scope of the assessment for agriculture and soils (**Section 11.7**);
- the methods used for the assessment (**Section 11.8**);
- the assessment of agriculture and soils effects (**Section 11.9**);
- assessment of cumulative effects (**Section 11.10**); and
- a summary of the significance conclusions (**Section 11.11**).

Project overview

11.1.3 The Project is divided into six sections for ease of reference as indicated in **Figure 1.2, Volume 5, Document 5.4.1.** In summary Yorkshire GREEN comprises the following new infrastructure within the Order Limits:

- Section B (North west of York Area):
  - Shipton North and South 400kV cable sealing end compounds (CSECs) and 230m of cabling;

  - the 2.8km YN 400kV overhead line (north of proposed Overton Substation);
  - Overton 400/275kV Substation; and
  - two new sections of 275kV overhead line south of Overton Substation: the XC 275 kV overhead line to the south-west (2.1km) and the SP 275kV overhead line to the south-east (1.5km);
- Section D: Tadcaster Tee West and East 275kV CSECs; and 350m of cabling; and
- Section F: Monk Fryston 400kV Substation (adjacent to the existing substation).

11.1.4 Works to existing infrastructure within the Order Limits would comprise:

- Section A (Osbaldwick Substation): Minor works at Osbaldwick Substation comprising the installation of a new circuit breaker and isolator along with associated cabling, removal and replacement of one gantry and works to one existing pylon. All substation works would be within existing operational land.
- Section B (North west of York Area): Reconductoring of 2.4km of the 2TW/YR 400kV overhead and replacement of one pylon. A mixture of decommissioning, replacement and realignment of 5km of the existing XCP 275kV Poppleton to Monk Fryston overhead line between Moor Monkton and Skelton. To the south and south-east of Moor Monkton the existing overhead line would be realigned up to 230m south from the current overhead line and the closest pylon to Moor Monkton (340m south-east) would be permanently removed. A 2.35km section of this existing overhead line permanently removed between the East Coast Mainline (ECML) Railway and Woodhouse Farm to the north of Overton.
- Section C (Moor Monkton to Tadcaster): Works proposed to the existing 275kV Poppleton to Monk Fryston (XC) overhead line comprise replacing existing overhead line conductors, replacement of pylon fittings, strengthening of steelwork and works to pylon foundations.
- Section D (Tadcaster Area): Replacement of one pylon on the Tadcaster Tee to Knaresborough (XD) 275kV overhead line route.
- Section E (Tadcaster to Monk Fryston). Works proposed to the existing 275kV Poppleton to Monk Fryston (XC) overhead line comprise replacing existing overhead line conductors, replacement of pylon fittings, strengthening of steelwork and works to pylon foundations.
- Section F (Monk Fryston Area): Reconfiguration of the existing XC Poppleton to Monk Fryston overhead line at its southern end to connect into the new substation at Monk Fryston; Reconfiguration of the Monk Fryston to Eggborough 400kV 4YS overhead line to connect into the new substation at Monk Fryston.

11.1.5 Please refer to **Chapter 3: Description of the Project, Volume 5, Document 5.2.3** and **Figures 1.1** and **1.2, Volume 5, Document 5.4.1** for an overview of the different components of the Project.

Limitations and assumptions

11.1.6 This Environmental Statement (ES) chapter has been produced to assess the likely significant effects of the Project with respect to agriculture and soils.

11.1.7 As described at the scoping stage of the Project, the impact assessment reported in the ES has been undertaken by means of a desk study, utilising information from published sources, and primary data collected for areas of development within the Order Limits.

11.1.8 There are no limitations in the data collection, interpretation, or impact assessment relating to agriculture and soils that affect the robustness of the assessment of the potential likely significant effects of the Project.

Definitions

11.1.9 *Soil* - is the upper layers of the earth's surface, comprising a mixture of mineral and organic components that contain air, water and micro-organisms. It provides a substrate for plant growth, a habitat for animals and storage for water and carbon. Generally, soils are considered to occur to a maximum depth of 1.2m.

11.1.10 *Agricultural Land Classification (ALC)* - is a standardised method for classifying agricultural land according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using the Ministry of Agriculture, Fisheries and Food (MAFF) Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land,1988[1].

11.1.11 *Best and Most Versatile (BMV) land* - agricultural land is described in the National Planning Policy Framework, 2021 (NPPF)[2], which defines BMV agricultural land as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality. BMV land is afforded a degree of protection against development within planning policy. Moderate, poor and very poor-quality land is designated Subgrade 3b or Grades 4 and 5, respectively, and is restricted to a narrower range of agricultural uses.

11.1.12 *Soil series* - are the lowest category in the soil classification system and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour and mineralogical characteristics.

11.1.13 *Soil associations* - are groupings of related soil series.

11.2 Relevant legislation, planning policy and technical guidance

11.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to agriculture and soils. Further information on policies relevant to the Project is provided in **Chapter 5: Legislation and Policy Overview, Volume 5, Document 5.2.5**.

[1] Ministry of Agriculture, Fisheries and Food (1988). Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land. Ministry of Agriculture, Fisheries and Food; London.

[2] Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework (online) Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed October 2022).

Legislation

11.2.2 A summary of the relevant legislation is given in **Table 11.1**.

Table 11.1- Legislation relevant to the agriculture and soils assessment

Legislation	Legislative Context
The Town and Country Planning (Development Management Procedure) (England) Order 2015.[3]	Schedule 4, Part (y) requires that the local planning authority consults Natural England if the area of a proposed permanent development is 20ha or more of best and most versatile (BMV) agricultural land.
The Agriculture Act, November 2020[4]	Chapter 1 New Financial Assistance Powers. The Secretary of State may give financial assistance for, or in connection with, protecting or improving the quality of soil.

11.2.3 As the UK has now left the EU, the UK is not likely to adopt the EU Soil Strategy for 2030, however, the current government has stated its intention to match or better European environmental protection legislation and so it is likely that many of the principles of the EU Soil Strategy for 2030 will be carried forward into UK policy over time. The implications of any new legislation which may come into force during the planning stages of the Project will be fully considered where applicable.

Planning policy

11.2.4 A summary of the relevant national and local planning policy is given in **Table 11.2**, with details of how the policy has been addressed provided in the table. In September 2021, the Department of Business, Energy and Industrial Strategy (BEIS) consulted upon a review of energy National Policy Statements (NPS) with consultation closing on 29 November 2021. The energy NPS' were reviewed to reflect the policies and broader strategic approach set out in the 'Energy White Paper, Powering our net zero future' published by BEIS in December 2020, and ensure a planning framework was in place to support the infrastructure requirement for the transition to net zero. Any changes from these draft policies relevant to agricultural land and soils is provided in **Table 11.2**.

[3] UK Government (2015). Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015. (online) Available at: https://www.legislation.gov.uk/uksi/2015/595/contents/made (Accessed 2 July 2021).
[4] UK Government (2020). The Agriculture Act 2020. (online) Available at: https://www.legislation.gov.uk/ukpga/2020/21/contents/enacted (Accessed 2 July 2021).

Table 11.2 - Planning policy relevant to the agriculture and soils assessment

Policy	Policy Context
National planning policy	
Overarching National Policy Statement for Energy (EN-1)[5]	Section 5: Land use including open space, green infrastructure and Green Belt Paragraph 5.10.8 provides policy direction for development on agricultural land and protection of soil resources, as applicable to the assessment and mitigation of impacts to these receptors. Requires that impacts on BMV agricultural land are minimised and development directed towards non-agricultural land or land of poorer quality. Requires that any effects are identified and that the developer should seek to minimise impacts on soil quality taking into account any mitigation measures proposed. The spatial distribution of BMV land has been identified in **Section 11.5** of this Chapter. Potential agriculture and soil effects associated with the proposed development are assessed in **Section 11.9** of this Chapter with embedded mitigation outlined.
Draft Update to EN-1 (September 2021)[6]	*Adds that where contamination is present, applicants should consider opportunities for remediation where possible. Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination.* An Outline Soil Management Plan has been prepared and included in **Volume 5: Document 5.3.3E – Appendix 5.3.3E.**
National Policy Statement for Electricity Networks Infrastructure (EN-5)[7]	Paragraph 1.7.5 provides policy direction on the effects of development on soil resources relevant to the chapter requiring the effects on soil to be considered both in the short-term and long-term, taking into consideration the specific location and the sensitivity of the receiving environment. Paragraph 2.8.9 provides consideration of the relative impacts of underground cable as opposed to overhead lines.

[5] Department for Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed 2 July 2021).

[6] Department for Business, Energy & Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1). (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed 2 July 2021).

7 Department for Business, Energy & Industrial Strategy (2011). National Policy Statement for Electricity Networks Infrastructure (EN-5). (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf (Accessed 2 July 2021).

Policy	Policy Context
	Potential agriculture and soil effects associated with the proposed development are assessed in **Section 11.9** of this Chapter with embedded mitigation outlined.
Draft Update to EN-5 (September 2021)[8]	*Adds that developers should commit, in their ES, to mitigate the potential detrimental effects of undergrounding works on any relevant agricultural land and soils, particularly regarding BMV land. Such a commitment must guarantee appropriate handling of soil, backfilling, and return of the land to the baseline Agricultural Land Classification (ALC), thus ensuring no loss or degradation of agricultural land. 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.* The spatial distribution of BMV land has been identified in **Section 11.5** of this Chapter, including ALC surveys or areas of permanent development (where access was obtained). The Project will undertake Post-consent, Pre-construction ALC surveys of all land that will be disturbed due to the Project's activities. Potential agriculture and soil effects associated with the Project are assessed in **Section 11.9** of this Chapter with embedded outlined.
National Planning Policy Framework (NPPF)[9]	Paragraph 174 provides policy direction for development on agricultural land with respect to BMV land and ecosystem services. Paragraph 175 provides policy direction for development on agricultural land, as applicable to the assessment and mitigation of impacts to this receptor. During route selection and design evolution the agriculture and soils baseline for the route has been considered, and BMV avoided where possible.
A Green Future: Our 25 Year Plan to Improve the Environment[10]	Provides policy direction regarding the sustainable use of natural resources including protection of BMV land, restoration of peatland, and the sustainable management of soils.

[8] Department for Business, Energy & Industrial Strategy (2021). Draft National Policy Statement for Electricity Networks Infrastructure (EN-5). (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf (Accessed 2 July 2021).
[9] Ministry of Housing, Communities and Local Government (2021). The National Planning Policy Framework (NPPF). (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf (Accessed 21 July 2021).
[10] HM Government (2018). 'A Green Future: Our 25 Year Plan to Improve the Environment'. (online) Available at:

Policy	Policy Context
	During route selection and design evolution the agriculture and soils baseline for the route has been considered, and BMV avoided where possible. An Outline Soil Management Plan has been prepared and included in **Volume 5: Document 5.3.3E – Appendix 5.3.3E.**
Local planning policy	
Harrogate District Local Plan, 2014 – 2035[11]	Policy NE8: Protection of Agricultural Land Directs development towards non-agricultural land and land of lower agricultural quality (non-BMV). An overriding need for the development of BMV agricultural land must be proven. Sites of over five hectares which may affect BMV agricultural land should produce an Agricultural Land Classification (ALC) survey to determine the quality, quantity, and location of BMV agricultural land. Proposals for development should demonstrate that soil resources have been protected and used sustainably in line with best practice. The spatial distribution of BMV land has been identified in **Section 11.5** of this Chapter, including ALC surveys of areas of permanent development (where access was obtained). An Outline Soil Management Plan, outlining the best practice mitigation to follow has been prepared and included in **Volume 5: Document 5.3.3E – Appendix 5.3.3E.**
Hambleton Local Plan, 2022[12]	Policy S5: Development in the Countryside Where significant development in the countryside is demonstrated to be necessary, the loss of best and most versatile agricultural land (classed as grades 1, 2 and 3a) should be avoided wherever possible. If the benefits of the development justify the loss, areas of the lowest grade available must be used except where other sustainability considerations outweigh agricultural land quality considerations. Where agricultural land would be lost the proposal will be expected to be designed so as to retain as much soil resource as possible as well as avoiding sterilisation of other agricultural land by, for example, severing access to farmland.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf (Accessed 5 July 2021).

[11] Harrogate Borough Council (2020). Harrogate District Local Plan 2014 – 2035. (online) Available at https://www.harrogate.gov.uk/planning-policy-guidance/harrogate-district-local-plan-2014-2035. (Accessed 15 February 2021).

[12] Hambleton District Council (2022), Hambleton Local Plan (online) Available at: https://www.hambleton.gov.uk/downloads/file/2745/hambleton-local-plan-final-february-2022 (Accessed 9 September 2022).

Policy	Policy Context
	During route selection and design evolution (**Chapter 2: Project need and alternatives, Volume 5, Document 5.2.2**) the agriculture and soils baseline for the route has been considered, including the best locations for pylons to retain the most land in agricultural use, and BMV avoided where possible.
Saved Policies of the York Local Plan, 2005[13]	Policy GP14: Agricultural Land For development that would result in the loss of the BMV agricultural land, planning permission will only be granted if it can be clearly demonstrated that very special circumstances exist which determine that the proposal cannot be located elsewhere. The Project's location is determined by technical considerations, the location of existing infrastructure and connection points, engineering and environmental constraints. All of these have been taken into consideration when selecting the location of the Project and defining the Order Limits. As outlined in EN-5 *"the effects on soil to be considered both in the short-term and long-term, taking into consideration the specific location and the sensitivity of the receiving environment",* this has been addressed by: assessing the spatial distribution of BMV land (**Section 11.5** of this Chapter); including ALC surveys of areas of permanent development (where access was obtained); and the potential agriculture and soil effects associated with the Project are assessed in **Section 11.9** of this Chapter with embedded and proposed mitigation outlined.
City of York draft Local Plan – Publication Draft, 2018[14]	Reference is made to protection of agricultural land throughout the Local Plan, however no specific Policies for the protection of BMV agricultural land or soil resources are included. During route selection and design evolution the agriculture and soils baseline for the route has been considered and BMV avoided where possible.
Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016 - 2036[15]	Neighbourhood Plan and Policy PNP 8B

[13] City of York Council (2005). Local Plan Incorporating the 4th Set of Changes (April 2005). (online) Available at: https://www.york.gov.uk/downloads/file/2822/the-local-plan-2005-development-control-local-plan-full-document-and-appendices (Accessed 15 February 2021).
[14] City of York Council (2018). Local Plan – Publication Draft. (online) Available at: https://www.york.gov.uk/downloads/file/1314/cd001-city-of-york-local-plan-publication-draft-regulation-19-consultation-february-2018- {Accessed 15 February 2021).
[15] City of York Council (2017). Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016 – 2036. (online) Available at: https://www.york.gov.uk/downloads/file/2832/upper-and-

Policy	Policy Context
	Promote the development of brownfield sites as a priority over any greenfield site particularly those impacting BMV agricultural land. Due to the nature of the Project, avoidance of agricultural land was unavoidable, however, to reduce impacts route selection and design evolution considered the agriculture and soils baseline, and BMV was avoided where possible.
Minerals and Waste Joint Plan[16] (North Yorkshire County Council, York City Council, North York Moors National Park Authority)	Policy D12: Protection of agricultural land and soils BMV agricultural land will be protected from unnecessary and irreversible loss. Where development is justified, protection and enhancement of soils and the long-term potential to recreate BMV agricultural land should be prioritised. Where relevant, development will be subject to aftercare requirements to ensure that a high standard of agricultural restoration can be achieved. Development proposals will be required to demonstrate that all practicable steps will be taken to conserve and manage on-site soil resources, including soils with environmental value, in a sustainable way. Development which would disturb or damage soils of high environmental value such as peat or other soil contributing to ecological connectivity or carbon storage will not be permitted. Whilst the Project is not a minerals or wate development, the Joint Plan applies to developments which will result in temporary disturbance to soils and agricultural land, such as would occur in relation to the Underground Cable and Overhead Line aspects of the Project. An Outline Soil Management Plan (SMP) has been prepared and included in **Volume 5: Document 5.3.3E – Appendix 5.3.3E.** All agricultural land subject to disturbance from the Project will be surveyed to provide a baseline for restoration. An aftercare programme will be implemented as described in the SMP. Areas where permanent loss of BMV will occur are covered in the SMP with suitable handling and reuse of soil resources.

nether-poppleton-neighbourhood-plan-submission-document-2016- (Accessed 15 February 2021).

[16] North Yorkshire County Council, York City Council, North York Moors National Park Authority (2022). Minerals and Waste Joint Plan. (online) Available at: https://www.northyorks.gov.uk/sites/default/files/fileroot/Planning%20and%20development/Minerals%20and%20waste%20planning/Examination%20Library/Adoption/LPA128%20-%20%20MWJP%20Policy%20adopted%20document%20-%20Final%2007.22.pdf (Accessed 9 September 2022).

Policy	Policy Context
Selby District Local Plan, 2005[17]	Policy EMP9: Expansion of existing employment uses in rural area Irreversible loss of BMV agricultural land will not be permitted unless there is an exceptional overriding need and there is no suitable alternative site available. Policy EMP11: Exceptional major industrial and business development Minimise the loss of BMV agricultural land The Project's location is determined by technical considerations, the location of existing infrastructure and connection points, engineering and environmental constraints. All of these have been taken into consideration when selecting the location of the Project and defining the Order Limits. As outlined in EN-5 *"the effects on soil to be considered both in the short-term and long-term, taking into consideration the specific location and the sensitivity of the receiving environment".* This has been addressed by: assessing the spatial distribution of BMV land **(Section 11.5 of this Chapter);** undertaking ALC surveys of areas of permanent development (where access was obtained); and assessing the potential effects on agriculture and soils associated with the Project **(Section 11.9 of this Chapter)** with embedded and proposed mitigation outlined.
Selby District Core Strategy Local Plan, 2013[18]	Policy SP18: Protecting and Enhancing the Environment The high quality and local distinctiveness of the natural and manmade environment will be sustained by: (7) ensuring that new development protects soil, air and water quality from all types of pollution; and (9) steering development to areas of least environmental and agricultural quality. Due to the nature of the Project, avoidance of agricultural land was unavoidable, however, to reduce impacts, route selection and design evolution considered the agriculture and soils baseline, and BMV was avoided where possible. The COCP **(Appendix 5.3.3.B, Volume 5, Document 5.3.3B)** outline pollution avoidance measures and the Outline Soil Management Plan **(Volume 5: Document 5.3.3E – Appendix 5.3.3E)** outlines the measures in place to protect soil functioning.

[17] Selby District Council (2005). Selby District Local Plan. (online) Available at: https://www.selby.gov.uk/selby-district-local-plan-sdlp-2005 (Accessed 15 February 2021).
[18] Selby District Council (2013). Selby District Core Strategy Local Plan. (online) Available at: https://www.selby.gov.uk/sites/default/files/Documents/CS_Adoption_Ver_OCT_2013_REDUCED.pdf (Accessed 15 February 2021).

Policy	Policy Context
Selby Draft Local Plan – Preferred options, 2021[19]	SG5: Development in the countryside: Avoid irreversible loss of BMV agricultural land, where possible. Where BMV agricultural land is to be developed this is to be directed at land of the lowest possible Grade. Grade 1 agricultural land to be avoided unless there are exceptional circumstances where the benefits of the proposal significantly outweigh the loss of land. Proposals for development should demonstrate that soil resources have been protected and used sustainably in line with best practice. EM4: The Rural Economy Development in rural areas will be expected to protect areas of best quality agricultural land. Due to the nature of the Project, avoidance of agricultural land was unavoidable, however, to reduce impacts route selection and design evolution considered the agriculture and soils baseline, and BMV was avoided where possible. An Outline Soil Management Plan (SMP) has been prepared and included in in **Volume 5: Document 5.3.3E – Appendix 5.3.3E.**

Technical guidance

11.2.5 A summary of the technical guidance for agriculture and soils is given in **Table 11.3**.

Table 11.3 - Technical guidance relevant to the agriculture and soils assessment

Technical guidance document	Context
HM Government (2019) Planning Practice Guidance for the Natural Environment (PPGNE)[20] Paragraphs 001 and 002	Explains the need for planning decisions to take into account the value of soils and agricultural land to enable informed choices on the future use of soil resources and agricultural land within the planning system.
Natural England (2012) Technical Information Note 049 (TIN049): Agricultural Land Classification: Protecting the Best and Most Versatile agricultural land[21]	Explains the Government Policy to protect agricultural land and the ALC system and uses.

[19] Selby District Council (2021). Selby District Council Local Plan Preferred Options Consultation 2021. (online) Available at https://www.selby.gov.uk/sites/default/files/Local_Plan_Preferred_Options_29-01-2021_%28Web%20Version%29.pdf (Accessed 15 February 2021).
[20] HM Government (2019). Planning Practice Guidance for the Natural Environment. (online) Available at: https://www.gov.uk/guidance/natural-environment (Accessed 15 February 2021).
[21] Natural England (2012). Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'. (online) (Accessed 15 February 2021).

Technical guidance document	Context
Department for the Environment, Food and Rural Affairs (DEFRA) (2009): Construction Code of Practice for the Sustainable Use of Soil on Development Site [22]	Provides relevant advice on the management of soil within construction projects.
Institute of Quarrying (2021): Good Practice Guide for Handling Soils in Mineral Workings[23]	Details the correct stripping, handling, storage, reinstatement and management of soil resources. This guidance updates and replaces the MAFF Good Practice Guide for Handling Soils (2000) and is applicable to all activities where soil is stripped, handled, stored, transported and/or replaced, such as construction of the EOS.
Ministry of Agriculture, Fisheries and Food (MAFF) (1988): Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land[24]	The Technical Guidance from MAFF provides revised guidelines and criteria for grading the quality of agricultural land.
National Grid Electricity Transmission Plc (National Grid) (2021): Construction best practice for underground cable installation[25]	Sets out National Grid's approach to good practice when we carry out work to install, maintain and operate equipment on, over, in or under land
Institute of Environmental Management and Assessment (IEMA) (2022): A New Perspective on Land and Soil in Environmental Impact assessment.	Advocates a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils.

11.3 Consultation and engagement

Overview

11.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Chapter 4: Approach to Preparing the ES, Volume 5, Document 5.2.4**.

[22] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. (online) Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf. (Accessed 15 February 2021).
[23] Institute of Quarrying (2022). Good Practice Guide for Handling Soils in Mineral Workings. (online) Available at: [redacted] (Accessed 22 June 2022).
[24] MAFF (1988). Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land. (online). (Accessed 5 July 2021).
[25] National Grid (2021). Construction best practice for underground cable installation. (online).

Scoping opinion

11.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 28 April 2021. A summary of the relevant responses received in the Scoping Opinion in relation to agriculture and soils and confirmation of how these have been addressed within the assessment to date is presented in **Table 11.4**.

Table 11.4 - Summary of EIA Scoping Opinion responses for agriculture and soils

Consultee	Consideration	How addressed in this ES
Planning Inspectorate	In addition to the Meteorological Office guidance Climatological Data for Agricultural Land Classification (1989), the ES should be informed by the Met Office UK National Climate Projections (UKCP18) in order that forecasts of long-term changing climatic conditions can be taken into account.	The ALC requires the use of the Climatological Data for Agricultural Land Classification (1989) to be used. Climate change has been discussed as it pertains to the future baseline in **Section 11.5.28 to 11.5.31.**
Planning Inspectorate	Information gathered for the agriculture and soils chapter should inform the cultural heritage assessment, e.g. in relation to potentially sensitive paleo environmental and peat deposits.	Where relevant, information will be shared between agriculture and soils and the cultural heritage assessment. Presently, there is no evidence of peat deposits or peaty soils in the available published data or identified during surveys covering the Order Limits. Should peat deposits or peaty soils be identified, data will be shared.
Planning Inspectorate	In addition to the measures outlined, the ES should consider the use of temporary ground protection mat systems for vehicle tracking across the most sensitive soils.	This has been incorporated as an embedded mitigation measure and is referred to in **Table 11.15**.
Hambleton District Council	The permanence of structures, such as haul roads, the impacts of which are assessed as being temporary structures, but which then remain in place following construction (for example to benefit of the landowner).	The ES considers where development (including access roads) is permanent, and where this is temporary. This is detailed in **Section 11.8**.
Natural England	Impacts from the development should be considered in light of the Government's policy for the protection of the best and most versatile (BMV) agricultural land as set out in paragraph 170 of the NPPF*. We also recommend that soils should be considered in the context of the sustainable use of land and the ecosystem services they	The relevant paragraph of the NPPF is referenced in **Section 11.2**. An assessment of the amount of BMV land present has been undertaken in conjunction with ALC surveys and used as the basis of impact assessment. Protection of the structure and function of soil resources (hence their ability to

Consultee	Consideration	How addressed in this ES
	provide as a natural resource, as also highlighted in paragraph 170 of the NPPF*.	provide essential ecosystem services) has been assessed and suitable mitigation provided where required.
Natural England	Soil is a finite resource that fulfils many important functions and services (ecosystem services) for society, for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution. It is therefore important that the soil resources are protected and used sustainably.	The assessment methodology considers impacts to the soil resource in terms of potential for disturbance/damage and loss. The impact assessment focusses on the protection of soil resources and their sustainable reuse.
Natural England	The applicant should consider the following issues as part of the Environmental Statement: The degree to which soils are going to be disturbed/harmed as part of this development and whether 'best and most versatile' agricultural land is involved.	The assessment methodology considers the amount of BMV land impacted by the Project and impacts to the soil resource in terms of potential for disturbance/damage and loss.
Natural England	This may require a detailed survey if one is not already available. For further information on the availability of existing agricultural land classification (ALC) information see www.magic.gov.uk. Natural England Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land also contains useful background information.	The ES details the ALC data available on magic.gov.uk and references TIN49. Detailed survey of areas of permanent infrastructure has been undertaken. A desk-based analysis is proposed for areas of temporary development, and areas of permanent development where land access was not available.
Natural England	If required, an agricultural land classification and soil survey of the land should be undertaken. This should normally be at a detailed level, e.g. one auger boring per hectare, (or more detailed for a small site) supported by pits dug in each main soil type to confirm the physical characteristics of the full depth of the soil resource, i.e. 1.2 metres.	The methodology for baseline ALC data collection proposes that areas of permanent development (substations and CSECs) are subject to detailed soil/ALC survey. Data for other areas (including pylon locations) are gathered using a desk-based methodology (with a commitment to targeted surveys being undertaken post-consent when the precise routing and placement of infrastructure are known, ensuring the surveys are targeted to areas directly impacted by the Project).

Consultee	Consideration	How addressed in this ES
Natural England	The Environmental Statement should provide details of how any adverse impacts on soils can be minimised. Further guidance is contained in the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites[26].	Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites[26] is used as the preferred referenced text for the identification of suitable soil management and mitigation measures.
Natural England	As identified in the NPPF* new sites or extensions to new sites for peat extraction should not be granted permission by Local Planning Authorities or proposed in development.	No peat extraction is planned. No peat deposits or peaty soils are identified in the available published data which fall within the Order Limits. Should peat deposits or peaty soils subsequently be identified impacts to these areas would be avoided, where practicable, in line with the requirements of other disciplines and engineering constraints. Included in Embedded Mitigation measures (**Table 11.15**) and in the Outline Soil Management Plan **Volume 5: Document 5.3.3E – Appendix 5.3.3E.**
North Yorkshire County Council	Supportive of the approach put forward at Scoping. A soil survey, assessment and management plan are needed in order to protect and manage site soils, including protection and restoration of ALC best and most versatile land where appropriate.	Primary data collection surveys have been agreed with Natural England (see paragraph 11.3.8 for further detail) for areas of permanent development (excluding pylon locations)and have be undertaken where land access permits. In all other locations a desk-based assessment will be completed to determine ALC grades. Provision of appropriate soil management measures are integral to the assessment and associated reporting. This would ensure soils are retained at a quality where restoration to pre-development ALC status is possible. Where practicable, and in line with the requirements of other disciplines and engineering factors, impact to BMV land would be minimised. An Outline Soil Management Plan has been

[26] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. (online) Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf (Accessed 30 June 2021).

Consultee	Consideration	How addressed in this ES
		produced **Volume 5: Document 5.3.3E – Appendix 5.3.3E**.

*When Natural England's scoping response was issued in April 2021 the current version of the NPPF was dated 2019; an update to the NPPF was subsequently issued in July 2021[9], as referenced in **Table 11.2**. The 2021 update made no change to policy requirements regarding soils and agricultural land, and the text remained unaltered; however, paragraph numbers were updated with paragraph 170 of the NPPF 2019 becoming paragraph 174 of the NPPF 2021 and so on.

Statutory Consultation

11.3.3 Statutory Consultation took place between 28 October until 9 December 2021 in accordance with the Planning Act 2008. Prescribed and non-prescribed consultees and members of the public were included in the consultation. Various methods of consultation and engagement were used in accordance with the SoCC including letters, website, public exhibitions, publicity and advertising in newspapers and webinar briefings.

11.3.4 National Grid prepared a Preliminary Environmental Information Report (PEIR) which was publicised at this consultation stage. National Grid sought feedback on the environmental information presented in that report. Feedback received during statutory consultation was considered by National Grid and incorporated where relevant in the design of the project and its assessment and presentation in this ES.

11.3.5 A summary of the statutory consultation representations received (relevant to EIA) and National Grid's responses is provided in **Volume 6, Document 6.1** (Consultation Report). A summary of the main statutory consultation representations received from prescribed and non-prescribed bodies in relation to the agriculture and soils assessment are presented in **Table 11.5**.

Table 11.5 – Consultee comments and responses to PEIR

Consultee	Comments and consideration	How Addressed in this ES
Natural England	Natural England notes that the current desk based assessment of ALC and soils will be supplemented by a targeted scheme of field survey, with an ALC field survey of areas of permanent infrastructure planned, with results being reported within the ES. Whilst a desk-based analysis is proposed for areas of temporary development. However, Natural England would advise that for areas subject to the temporary loss of agricultural land (including land subject to	Further clarification was sought via letter and an online meeting, this is detailed in **Section 11.3**. The desk based methodology was approved, a proportionate approach to the surveys was approved, and incorporation of detailed soil survey data into the SMP was agreed.

Consultee	Comments and consideration	How Addressed in this ES
	cabling), should also be subject to a detailed ALC survey to inform soil handling and restoration criteria, with BMV land to be returned to the same quality as far as reasonably practicable to minimise BMV losses and limit permanent impacts.	
NYCC and Selby District Council	Generally, the County Council would support the general approach in Chapter 11 Agricultural Soils. The preliminary assessment is based on a desk study. A detailed soil survey, assessment and management plan are needed for the final ES in order to best protect and manage site soils, including protection and restoration of ALC best and most versatile land where appropriate.	Survey approach was agreed with Natural England which includes the use of the desk based methodology, a proportionate approach to the detailed soil surveys and the production of an Outline Soil Management Plan (**Volume 5: Document 5.3.3E – Appendix 5.3.3E**).

Technical engagement

11.3.6 Further clarification was sought from Natural England on their PEIR response via letter, emails and one virtual meeting (23/03/2022) to clarify key points raised in the scoping opinion and to develop and discuss the technical assessment approach for Agriculture and Soils for the Project.

11.3.7 The key Issues discussed with Natural England are as follows:

- detailed ALC surveys to be undertaken in areas of permanent development (excluding pylon locations), where access is granted;
- confirmation of desk-based assessment for areas of temporary development; and
- level of detail provided in Soil Management Plans to be submitted with the ES.

11.3.8 Outcomes of the technical engagement with Natural England were:

- As part of the ALC survey, laboratory analysis for particle size distribution should be undertaken. In areas of permanent development where there is likely to be surplus soil, additional testing to inform reuse should be undertaken.
- The ALC survey areas were increased to cover temporary construction compounds, underground cabling and areas for permanent development (excluding pylon locations). The ALC surveys were conducted on a whole field approach which allows for flexibility of the design within the order limits.

The desk-based methodology was agreed with Natural England, who noted that spatial distribution of the areas likely to be BMV should be considered.

- Temporary access roads should be considered for ALC survey. It was decided that 'substantial' (long term or permanent new trackways) accesses, which predominantly fall in Section B, should be included in surveys. The distribution of these fell largely within proposed ALC survey areas at Shipton North and South CSECs and the new Overton Substation. The access location may be subject to change within the final design. As such there was no additional requirement to increase the survey areas to cover new 'substantial' accesses.

11.4 Data gathering methodology

Study Area

11.4.1 The Study Area comprises the land within the Order Limits.

Desk study

11.4.2 A summary of the organisations that have supplied data, together with the nature of this data is outlined in **Table 11.6**.

Table 11.6 - Data sources used to inform the agriculture and soils assessment

Organisation	Data source	Data provided
The Soil Survey of England and Wales	Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1[27] .	Mapped soil associations and details of soil characteristics.
MAFF (now Defra)	Provisional ALC 1:250,000 mapping Yorkshire and The Humber (ALC003) [28].	Mapped ALC distributions - agricultural land quality data.
Natural England	Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map Yorkshire and The Humber (ALC015)[29].	1:250,000 scale mapping predicting the likelihood of BMV agricultural land.
Google	Google Maps incorporating Streetview[30].	Aerial and street level imaging of the Project.

[27] Soil Survey of England and Wales (1984). Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1.
[28] MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, Yorkshire and the Humber (ALC003). (online) Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc (Accessed 30 June 2021).
[29] Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map Strategic scale map Yorkshire and The Humber (ALC015). (online) (Accessed 30 June 2021).
[30] Google (2022). Google Maps incorporating Google Streetview. (online) (Accessed 30 June 2021)

Organisation	Data source	Data provided
Department of the Environment, Farming and Rural Affairs (Defra)	The Government's geographic information website: Multi-Agency Geographical Information for the Countryside MAGIC.gov.uk [31].	Administrative area boundaries, Provisional and Post-1988 ALC data, and aerial imaging available to view digitally and overlay.
Cranfield University (Knox *et al.)*	Report: Research to develop the evidence base on soil erosion and water use in agriculture[32].	Soil erosion criteria to inform soil sensitivity classifications.
MAFF	Agricultural Land Classification detailed Post 1988 ALC survey, Ferrybridge To Hook Moor A1(M) (ALCL06390)[33]	Detailed ALC data for some land within the Study Area, in Section E.
MAFF	Agricultural Land Classification detailed Post 1988 ALC survey, Bramham, Bramham Moor (Leeds UDP) (ALCL09895)[34]	Detailed ALC data for some land within the Study Area, In Section D.
MAFF	Agricultural Land Classification detailed Post 1988 ALC survey, Shipton by Beningbrough Bypass (ALCL13391)[35]	Detailed ALC data for some land within the Study Area, in Section C.
MAFF	Agricultural Land Classification detailed Post 1988 ALC survey, Tadcaster, Smaws Farm, Selby Rural Areas LP Site 5b (ALCL02289G)[36]	Detailed ALC data for some land within the Study Area, in Section C.
Defra	Agricultural Land Classification detailed Post 1988 ALC survey, York: Poppleton, Skelton, North Of A59 To	Detailed ALC data for some land within the Study Area, in Section A.

[31] Defra (2021). Multi-Agency Geographical Information for the Countryside (MAGIC) (online). Available at: www.magic.gov.uk (Accessed 30 June 2021).
[32]Cranfield University, Knox *et al*. (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147'. (online) (Accessed 30 June 2021).
[33] MAFF (1998) 'Agricultural Land Classification detailed Post 1988 ALC survey, Ferrybridge To Hook Moor A1(M) (ALCL06390)'. (online) (Accessed 28 July 2021).
[34]MAFF (1995) 'Agricultural Land Classification detailed Post 1988 ALC survey, Bramham, Bramham Moor (Leeds UDP) (ALCL09895)'. (online) (Accessed 30 June 2021).
[35]MAFF (1991) 'Agricultural Land Classification detailed Post 1988 ALC survey, Shipton by Beningbrough Bypass' (ALCL13391). (online) (Accessed 30 June 2021).
[36] MAFF (1989) 'Agricultural Land Classification detailed Post 1988 ALC survey, Tadcaster, Smaws Farm, Selby Rural Areas LP Site 5b (ALCL02289G)' (online) (Accessed 30 June 2022)

Organisation	Data source	Data provided
	Rawcliffe (York City LP) (ALCL07698)[37]	
Cranfield University	Climatological Data for Agricultural Land Classification[38]	Agroclimatic data to inform ALC.
Cranfield University	Land Information System (LandIS) Soils Guide[39]	Detailed descriptions of soil associations.

11.4.3 As described at Scoping and PEIR, the collection of the baseline Agriculture and Soils data for the ES has been desk based. The determination of ALC grading has been undertaken following a methodology which has previously been agreed with Natural England for use on other linear Electricity Infrastructure Projects, and has been again agreed through consultation for this Project.

11.4.4 The 1:250,000 scale Provisional ALC mapping[28] is the most current and detailed published ALC data covering the entire Study Area. However, it is important to note that this data pre-dates the revised ALC methodology issued in 1988[24] and as a result, the data does not provide a distinction between ALC Subgrades 3a (BMV) and 3b (non-BMV). The Provisional ALC mapping therefore provides an indication of the land quality in the Region, but the extent and distribution of BMV agricultural land within the Study Area cannot be defined from the Provisional mapping alone.

11.4.5 There are also discrete areas covered by detailed survey data known as Post-1988 surveys[33,34,35,37]. These data post-date the revised ALC methodology, and as such provide accurate ALC grading at the field scale, including a distinction between ALC Subgrades 3a (BMV) and 3b (non-BMV). Where available, these data have been used in the determination of the ALC. Both the Post-1988 data and Provisional ALC data are available on the Government's geographic information website[31].

11.4.6 For areas where detailed Post-1988 data are not available, the Provisional ALC Mapping has been used to directly determine the proportions of ALC Grades 1, 2, 4 and 5. In a change to the methodology presented in the Scoping Report, for areas Provisionally mapped as Grade 3, the relative proportions of Subgrade 3a and 3b have been calculated using Natural England's Likelihood of BMV Agricultural Land mapping[29]; also known as Predictive ALC mapping. The methodology put forward at Scoping proposed that the Subgrade 3a/3b subdivision would be calculated based on the standard ALC methodology[24] using soil data provided by the Soil Survey of England and Wales[27] in conjunction with available agroclimatic data[38]. The Predictive ALC mapping was produced by Natural England using a methodology very similar to that

[37]Defra (2009) Agricultural Land Classification detailed Post 1988 ALC survey, York: Poppleton, Skelton, North Of A59 To Rawcliffe (York City LP) (ALCL07698). (online) (Accessed 30 June 2021).
[38]Cranfield University (2013). Climatological Data for Agricultural Land Classification. (online) Available at: https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification (Accessed 30 June 2021).
[39] Cranfield University (2022). Land Information System, Soil Association descriptions. (online) (Accessed 25 July 2022).

proposed at Scoping and therefore these universally accepted published data are used in preference to undertaking specific calculations for the Study Area.

11.4.7 The Predictive ALC data[29] spatially map the percentage chance (likelihood) of BMV land occurring within a particular area. The Predictive mapping was devised by Natural England based on soil association data from the 1:250,000 scale national soil map[27]. The methodology assessed each soil association on a regional basis using standard ALC guidelines[24]. The published ALC data used in the assessment were taken from detailed site surveys, where available, and the Provisional ALC mapping data; along with agroclimatic data[38].

11.4.8 The data provide the likely proportion of BMV agricultural land to be encountered, using the following categories:

- High Likelihood: Areas where more than 60% of the land is likely to be BMV;
- Moderate Likelihood: Areas where 20% to 60% of the land is likely to be BMV; and
- Low Likelihood: Areas where less than 20% of the land is likely to be BMV.

11.4.9 For the purpose of this assessment and to provide a robust quantification of the area of BMV land within the Study Area, land that has been subject to detailed soil survey where Post-1988 data is available has been taken as correct. Land provisionally mapped as Grade 1, Grade 2, Grade 4 and Grade 5 or non-agricultural/other have retained their grade. Where land is Provisionally mapped as Grade 3 and mapped as High Likelihood it has been considered as Subgrade 3a; whereas land which is Provisionally mapped as Grade 3 and mapped as Low Likelihood has been considered as Subgrade 3b. The land mapped as Moderate Likelihood has been split 50/50 between Subgrades 3a and 3b.

11.4.10 The combination of the areas identified as High Likelihood of BMV and 50% of the areas identified as Moderate Likelihood of BMV land[26] (mapped as Grade 3 on the Provisional mapping); and the Provisionally mapped ALC Grade 1 and 2 land, have therefore, in conjunction with the detailed Post 1988 survey data, been used to provide the total potential area of BMV within the Study Area.

11.4.11 It is noted that the relative proportions of Subgrade 3a and 3b within the Study Area could only be presented in a tabular form and not represented in a mapped format (due to the 50/50 split of the Moderate Likelihood of BMV land). The lack of spatial information does not affect the reporting or impact assessment as this considers the total permanent loss of BMV land for the Project as a whole.

11.4.12 Within the ES, the presented soils data are taken from Soil Survey of England and Wales[27] and from the soil survey data provided in the four available Post-1988 survey datasets[33,34,35,37]. Data on the erodibility of Soil Associations[32] has been used to identify potential areas of increased soil sensitivity for the impact assessment. The sensitivity data will also be used to inform the iterative design process, so that areas of high sensitivity can be avoided where practicable.

11.4.13 This methodology of applying a desk-based approach to the gathering of baseline soils and ALC data has been used in other National Grid linear projects such as Viking Link (an interconnector from Denmark with 60km underground cable through Lincolnshire). The methodology ensures that the baseline is adequately described to ensure that all potentially significant effects are identified, allowing a thorough and robust impact assessment to be undertaken.

Survey work

11.4.14 As agreed via consultation with Natural England (detailed in paragraphs 11.3.3 to 11.3.8), for areas of permanent development (excluding new and replacement pylon locations) i.e. substations, CSECs, baseline soils and ALC data has been collected through detailed survey to current guidelines[24].

11.4.15 Detailed survey data covering the following areas and the survey results have been appended to this chapter.

- Shipton North and South CSECs (**Appendix 5.3.11A**);
- Overton Substation (**Appendix 5.3.11B**);
- Tadcaster CSECs (**Appendix 5.3.11C**); and
- Monk Fryston Substation (**Appendix 5.3.11D**).

11.5 Overall baseline

Current baseline

Agricultural land

11.5.1 The Provisional ALC data identify the land within the Study Area as comprising Grade 2, Grade 3 and Grade 4 agricultural land, as well as non-agricultural and urban land classifications (as shown in **Figure 11.1, Volume 5, Document 5.4.11**). **Table 11.7** identifies the proportion per Provisional ALC Grading within the Study Area.

11.5.2 The spatial distribution of the ALC grades, shown in **Figure 11.1, Volume 5, Document 5.4.11**, identifies that Grade 2 agricultural land is located along the majority of the southern part of the Study Area from Long Marston to Monk Fryston; whereas Grade 3 agricultural land is identified in the northern part of the Study Area from north of Long Marston to Shipton, and to the east of York in the Study Area around Osbaldwick Substation. A corridor of Grade 3 agricultural land is also identified to the north of Tadcaster, running north-west to south-east, broadly following the route of the River Wharfe. Small distinct areas of Grade 4 and non-agricultural land are mapped throughout the Study Area.

Table 11.7 - Provisional ALC grading within the Study Area

ALC Grade	Area within the Study Area (ha)	Percentage within the Study Area (%)
Grade 2	236.9	44.9
Grade 3	265.4	50.32
Grade 4	24.1	4.6
Non-Agricultural	1.0	0.2
Total	**527.5**	**100.0**

11.5.3 As described above, discrete areas of the Study Area are covered by detailed survey data known as Post-1988 surveys. Both the Provisional and Post-1988 data are available on the Government's geographic information website, Magic.gov.uk[31]. In total 35.9 ha of land within the Study Area has been subject to Post-1988 survey (**Table 11.9**). The surveyed land comprises 17.4 ha of BMV (Grades 1, 2 and Subgrade 3a) and 12.4 ha of non-BMV (Subgrade 3b), with all remaining land, 6.2 ha, in the surveyed areas being classified as 'other' (non-agricultural land, for example woodland, highways, built structures and other non-agricultural development). For the Post-1988 data within the Study Area, the areas mapped as Subgrade 3a and Subgrade 3b are roughly equal (2.3% versus 2.4%).

11.5.4 The Post-1988 surveys therefore identify 21.1% of the surveyed agricultural land (i.e. discounting the non-agricultural land incorporated in the survey areas) as being of BMV quality. However, it is worth noting that these surveys are regularly targeted to areas where BMV land (rather than non-BMV land) is thought to be present in order to identify the distribution of BMV land in more detail. The locations of the surveys within the Study Area largely correspond with higher ALC graded land in the wider area as identified in the Provisional mapping. The spatial distribution of the ALC grades, based on the Provisional data supplemented with Post-1988 data, where available, is shown in **Figure 11.1, Volume 5, Document 5.4.11**. The Post-1988 survey data for the Study Area is described in the following paragraphs.

11.5.5 Post-1988 survey data collated by MAFF to inform the upgrading of the A1 between Hook Moor and Ferrybridge[33] is just clipped by the Study Area around Junction 42 with the A63, to the west of Monk Fryston (**Figure 11.1, Volume 5, Document 5.4.11**, specifically **sheet 6**). These data identify Subgrade 3b.

11.5.6 The Post-1988 survey data collated by MAFF in 1995 to inform the Leeds Unitary Development Plan (Bramham, Bramham Moor[34]) identify land within the centre of the Study Area, on a spur west of the A695, to be predominantly of BMV quality (Grade 2 and Subgrade 3a, with a very small area of Grade 1 adjacent Warren Lane). Subgrade 3b agricultural land is located to the west of this area (**Figure 11.1, Volume 5, Document 5.4.11**, specifically **sheet 4**).

11.5.7 The Post-1988 survey data collated by MAFF in 1991 to inform the development of the Shipton by Beningbrough Bypass[35], identify land within the north of the Study Area between Shipton and Skelton, as Grade 2, Subgrade 3a and Subgrade 3b agricultural land; with an area of non-agricultural land identified on aerial mapping[30] as woodland and scrub (**Figure 11.1, Volume 5, Document 5.4.11**, specifically **sheet 1**).

11.5.8 The Post-1988 survey data collated by Defra in 2009 to inform the future development of the City of York within the confines of the ringroad[37], identify the discrete section of the Study Area to the east of York as being predominantly non-agricultural land (Osbaldwick Substation) with Grade 2 agricultural land along the eastern boundary (**Figure 11.1, Volume 5, Document 5.4.11**, specifically **sheet 7**).

11.5.9 The detailed ALC surveys undertaken for the Project in 2022 have increased the area covered by Post-1988 data since the PEIR. This new survey data is shown in **Table 11.8**.

Table 11.8 – Post-1988 ALC data from the Project surveys undertaken in 2022 within the Study Area

ALC Grade	Area (ha)				Total (ha)
	Shipton North and South CSEC	New Overton Substation	Tadcaster CSEC	Monk Fryston Substation	
Grade 1	0.0	4.5	0.0	0.0	4.5
Grade 2	8.8	9.4	2.3	1.9	22.4
Subgrade 3a	10.5	23.8	10.4	22.5	67.2
Subgrade 3b	1.4	10.3	7.1	7.2	26.0
Grade 5 (very poor)	0.0	0.0	0.0	0.8	0.8
Non-Agricultural	1.3	1.9	1.22	0.24	4.7
Total	**22.0**	**49.9**	**21.0**	**32.6**	**125.6**

11.5.10 All of the Post-1988 ALC data for the Study Area are summarised in **Table 11.9**.

Table 11.9 – Post-1988 ALC within the Study Area

ALC Grade	Area within the Study Area (ha)	Percentage of the Study Area (%)
Grade 1	5.7	1.1
Grade 2	26.3	5.0
Subgrade 3a	79.5	15.1
Subgrade 3b	38.42	7.3
Grade 5	0.8	0.2
Other	10.8	2.1
Total	**161.5**	**30.6**

11.5.11 **Table 11.10** identifies the ALC grading of land within the Study Area based on a combination of the Provisional, BMV likelihood, and Post-1988 ALC data.

Table 11.10 - Provisional ALC grading supplemented with Post-1988 ALC grading within the Study Area

ALC Grade	Area within the Study Area (ha)	Percentage within the Study Area (%)
Grade 1 (Post-1988)	5.7	1.1
Grade 1 (Provisional)	0.0	0.0
Grade 2 (Post-1988)	26.3	5.0
Grade 2 (Provisional)	168.9	32.2
Grade 3a (Post-1988)	79.5	15.1
Grade 3b (Post-1988)	38.4	7.3
Grade 3 (Provisional)	171.7	32.2
Grade 4 (Provisional)	24.1	4.6
Grade 5 (post-1988)	0.8	0.2
Non Agricultural (Post-1988)	10.9	2.1
Non Agricultural (Provisional)	1	0.2
Total	527	100
(365 ha of the Study Area not subject to a Post-1988 survey)		

11.5.12 From the Provisional and Post-1988 data (and assuming a 50/50 division of the Provisionally mapped Grade 3 land onto Subgrade 3a/3b) approximately 54% of the land within the Study Area is classified as BMV agricultural land (see **Table 11.10**).

11.5.13 The Natural England BMV likelihood data[29] for the Study Area is shown in **Figure 11.2, Volume 5, Document 5.4.11** and presented in **Table 11.11**. These data show that all the agricultural land within the Study Area has a high (covering 48.5% of the Study Area) or moderate (covering 50.1% of the Study Area) likelihood of being BMV quality, with the remaining land being non-agricultural or urban/industrial.

Table 11.11 - BMV likelihood in the Study Area

ALC Grade	Area within the Study Area (ha)	Percentage within the Study Area (%)
High likelihood of BMV land (>60 % area BMV)	255.7	48.5
Moderate likelihood of BMV land (20 - 60 % area BMV)	264.4	50.1
Low likelihood of BMV land (<= 20 % area BMV	0.0	0.0

ALC Grade	Area within the Study Area (ha)	Percentage within the Study Area (%)
Non-agricultural use	0.4	0.1
Urban/Industrial	6.9	1.3
Total	**527.5**	**100.0**

11.5.14 As per the methodology set out in **Section 11.5**, the ALC gradings for the Study Area have been calculated using a combination of the available Post-1988 survey data[33,34,35,37] and the Provisional ALC dataset[28] (see **Figure 11.1, Volume 5, Document 5.4.11**) to define areas of Grade 1, 2 and 4 land; and the Predictive ALC dataset[29] to provide the Subgrade 3a:Subgrade 3b subdivision for the land Provisionally mapped as Grade 3. The calculated ALC gradings (**Table 11.12**), show that 371.0ha (70.4%) of the land within the Study Area is calculated to be BMV quality; and 147.5ha (27.8%) is calculated to be of non-BMV quality. The remaining land is considered to be under non-agricultural land uses. Therefore, it is considered that the Project would likely impact BMV agricultural land.

11.5.15 It is noted that there is a difference in the area of non-agricultural land calculated from the Provisional[28] and Post-1988 survey datasets[33,34,35,37] (see **Table 11.10**) and that calculated from these data sets in combination with the Predictive mapping[29] (see **Table 11.12**). This is due to some of the land which is Provisionally mapped[28] as Grades 2 and 3, being reclassified by Natural England as 'non-agricultural' or 'urban/industrial'[29]. This is likely a consequence of development (loss) of agricultural land which has occurred between the production of the Provisional data (prior to 1988) and the Predictive data (2017); and the fact that the Provisional data does not map changes in land use of less than 80ha, whereas the Predictive mapping is more accurate in this assessment.

Table 11.12 - Calculated ALC grading for the Study Area

ALC Grade	Area within the Study Area (ha)	Percentage within the Study Area (%)
Grade 1 (BMV)	5.7	1.1
Grade 2 (BMV)	195.2	37.0
Subgrade 3a (BMV)	165.4	31.4
Subgrade 3b (non-BMV)	124.3	23.6
Grade 4 (non-BMV)	24.1	4.6
Grade 5 (very poor)	0.8	0.2
Non-agricultural/Urban/ Industrial	10.6	2.0
Total	**527**	**100.0**
Total BMV	**366.3**	**69.4**

Soil Resources

11.5.16 The soils identified by the Soil Survey of England and Wales[27] as being present within the Study Area are listed within **Table 11.13** and shown in **Figure 11.3, Volume 5, Document 5.4.11**. Erodibility data are taken from research by Cranfield University[32].

Table 11.13 - Soils within the Study Area of the Project

Soil Association	General Description	Erodibility[32]	Soil texture and Wetness Class[39]
Osbaldwick Substation (listed north to south)			
Newport (551d)	Deep well drained sandy and coarse loamy soils. Some sandy soils affected by groundwater. Risk of wind and water erosion.	Very High Risk (Water and also wind).	Medium sandy soils. Wetness Class I.
Foggathorpe 2 (712i)	Slowly permeable seasonally waterlogged stoneless clayey and fine loamy over clayey soils. Some similar coarse loamy over clayey soils.	Very Small Risk (Water).	Clayey and fine loamy over clayey soils. Wetness Class III and IV.
North-west of York to Tadcaster Areas (listed north to south)			
Foggathorpe 2 (712i)	Slowly permeable seasonally waterlogged stoneless clayey and fine loamy over clayey soils. Some similar coarse loamy over clayey soils.	Very Small Risk (Water).	Clayey and fine loamy over clayey soils. Wetness Class III and IV.
Blackwood (821b)	Deep permeable sandy and coarse loamy soils. Groundwater controlled by ditches.	Small Risk (Wind).	Sandy and coarse loamy soils. Wetness Classes I, to IV.
Enborne (811a)	Deep stoneless fine loamy and clayey soils variably affected by groundwater. Flat land. Risk of flooding.	Very Small Risk (Water).	Fine loamy and clayey soils. Wetness Class II to IV.
Escrick 2 (571q)	Deep well drained often reddish coarse loamy soils. Some fine loamy soils with slowly	Moderate Risk	Fine loamy brown soils.

Soil Association	General Description	Erodibility[32]	Soil texture and Wetness Class[39]
	permeable subsoils and slight seasonal waterlogging.	(Water).	Wetness Classes I or II.
Bishampton 1 (572s)	Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging associated with well drained fine and coarse loamy soils in an undulating landscape.	Moderate Risk (Water).	Fine loamy soils. Wetness Classes I, to III.
Dunkeswick (711p)	Slowly permeable seasonally waterlogged fine loamy and fine loamy over clayey soils associated with similar clayey soils.	Very Small Risk (Water).	Fine loamy over clayey soils. Wetness Class III and IV.
Wharfe (561a)	Deep stoneless permeable fine loamy soils over river alluvium. Some similar soils variably affected by groundwater. Occur on flat land. Risk of flooding.	Moderate Risk (Water).	Fine loamy typical brown soils. Wetness Classes I, to IV.
Wick 1 (541r)	Deep well drained coarse loamy and sandy soils locally over gravel. Some similar soils affected by groundwater.	Moderate Risk (Water, but also wind).	Coarse loamy and sandy soils. Wetness Class I and II.
Tadcaster to Monk Fryston Areas (listed north to south)			
Aberford (511a)	Shallow, well drained calcareous fine loamy soils over limestone. Some deeper calcareous soils in colluvium	Small Risk (Water).	Fine loamy soils over limestone. Wetness Class I.

11.5.17 Within the Study Area eleven distinct soil associations are mapped[27], with the majority of soil variation along the route identified in the North-west of York to Tadcaster Areas (between Tadcaster and Moor Monkton).

11.5.18 Eight soil associations are mapped between Tadcaster and Moor Monkton[27]. The Dunkeswick, Foggathorpe 2, Enborne and Blackwood associations are all identified to be at very small to small risk of erosion from water[32]. The Bishampton, Wharfe and Escrick 2 soil associations were identified to be at moderate risk of erosion from water. The Wick 1 association was also identified to be at moderate risk of erosion from water,

and also at risk of wind erosion, albeit this association only covers a very small area (0.2ha).

11.5.19 The soil survey which accompanied the Post-1988 survey of the Shipton by Benningbrough Bypass[35] was undertaken in an area mapped as belonging to the Foggathorpe 2 association (typically clayey and fine loamy over clayey soils). The ALC report describes the surveyed soils as ranging from fine or medium sandy loams to medium and heavy clay loams – reflecting the localised (field scale) variations in soil type which are not picked up by the large-scale data. However, the majority of the soils described are consistent with the Foggathorpe 2 association.

11.5.20 One soil association, Aberford (511a) is mapped within the Study Area between Monk Fryston and Tadcaster comprising shallow fine loamy soils over limestone with a small risk of erosion from water[32]. There are two Post-1988 survey areas[33,34] located within this section of the Study Area. Both surveys identified medium textured shallow soils over limestone, largely consistent with the Aberford association classification.

11.5.21 The discrete section of the Study Area around Osbaldwick Substation is mapped as including two soil associations. The Foggathorpe 2 association is identified to the south and is classed as being at very small risk of erosion from water; the Newport association is identified to the north and is classed as being at very high risk of erosion from water and also from wind. The soil survey conducted for the Post-1988 survey of this area[37] confirmed the presence of both clay soils (akin to the Foggathorpe 2 association) and light sandy soils (akin to the Newport association), although the distribution and extent of the soil types was not mapped. However, it should be noted that all groundworks will be located on areas of existing hardstanding inside the existing Osbaldwick Substation. There will be a requirement to access the existing adjacent pylon (which is mapped as being on Newport soils), there will not be a requirement to create a new stone trackway to access this location, but if required ground protection would be utilised. The existing pylon is to be upgraded rather than replaced, therefore there will be no disturbance to the highly sensitive Newport soils.

11.5.22 The extent of each of the mapped soil associations within the Study Area is shown on **Figure 11.3, Volume 5, Document 5.4.11** and in **Table 11.14.** It is noted that 3.2ha of land is mapped as urban and no soil association data are provided. It is further noted that the figure for urban land differs from that quoted for the calculated ALC data, again this is due both to the large scale of the soils data and the development (loss) of agricultural land/soil resources which has occurred between the production of the Soils mapping[27] (1984) and the Predictive ALC dataset[29] (2017) which is more accurate in this assessment.

Table 11.14 - Percentage of Study Area covered by each soil association

Soil Association	Area (ha)	Percentage (%)	Erodibility[32]	Soil texture and Wetness Class[39]
Newport (551d)	0.9	0.2	Very High Risk (Water and also wind).	Medium sandy soils. Wetness Class I.
Escrick 2 (571q)	19.9	3.8	Moderate Risk (Water).	Fine loamy brown soils.

Soil Association	Area (ha)	Percentage (%)	Erodibility[32]	Soil texture and Wetness Class[39]
				Wetness Classes I or II.
Bishampton (572s)	25.8	4.9	Moderate Risk (Water).	Fine loamy soils. Wetness Classes I, to III.
Wick 1 (541r)	0.2	0.0	Moderate Risk (Water, but also wind).	Coarse loamy and sandy soils. Wetness Class I and II.
Wharfe (561a)	2.1	0.4	Moderate Risk (Water).	Fine loamy typical brown soils. Wetness Classes I, to IV.
Blackwood (821b)	8.0	1.5	Small Risk (Wind).	Sandy and coarse loamy soils. Wetness Classes I, to IV.
Aberford (511a)	201.4	38.4	Small Risk (Water).	Fine loamy soils over limestone. Wetness Class I.
Enborne (811a)	9.1	1.7	Very Small Risk (Water).	Fine loamy and clayey soils. Wetness Class II to IV.
Dunkeswick (711p)	12.3	2.4	Very Small Risk (Water).	Fine loamy over clayey soils. Wetness Class III and IV.
Foggathorpe 2 (712i)	244.6	46.6	Very Small Risk (Water).	Clayey and fine loamy over clayey soils. Wetness Class III and IV.
Urban	3.2	0.6	-	-
Total	**527.5**	**100.0**	n/a	n/a

11.5.23 The data show the Study Area to be dominated by two soil associations; the Foggathorpe 2 association (45.9%) which is situated to the north of the Study Area and the Aberford association (35.3%) which is situated to the south of the Study Area. These soils are at very small and small risk of erosion, respectively.

11.5.24 Soils at small and very small erosion risk cover 475.4ha (90.1%) of the Study Area; Soils at moderate erosion risk cover 48.0ha (9.1%) of the Study Area; and Soils at high and very high erosion risk cover 0.9ha (0.2%) of the Study Area. The remaining land is mapped as urban (no soils data available).

11.5.25 Impacts to soil resources (loss and damage) only occur when soils are disturbed (which may include effects such as compaction due to works on the soil surface, as well as those caused by the handling of soils."

Land use

11.5.26 An overview of the current land use and characteristics of the agricultural land present has been informed by the use of aerial and 'Streetview' imaging provided by Google[30]; soil surveys, as well as the author's knowledge and experience of land use in the Study Area.

11.5.27 The majority of the Study Area has been identified to be in arable production; this finding corroborates the ALC data presented above, as higher quality (BMV) agricultural land is more productive and better suited to arable use than land of lower quality. The arable land is interspersed with permanent pasture and some small to medium woodlands and plantations. Areas of agriculture throughout the Study Area show zones of bare ground within fields, indicating areas potentially impacted by droughtiness and/or wetness which are impacting on crop growth.

Future baseline

11.5.28 The baseline presented in this chapter has the potential to change due to other new developments within the vicinity of the Project. Developments which have been granted planning permission have been identified in consultation with the relevant Planning Authorities and are addressed via an assessment of cumulative effects within the ES.

11.5.29 Changes to the agriculture baseline as a result of natural processes and systems are slow to evolve, taking tens of years or more to develop. Therefore, there is little likelihood of such changes occurring during the construction phase of the Project.

11.5.30 However, it is acknowledged that during the predicted operational lifespan of the Project the baseline has the potential to alter due to changes in land use and farming practice. This may include, but is not limited to, the adoption or surrender of Agri-Environmental Schemes (it being noted that under the Agriculture Act 2020[4] there is an emphasis towards incentivising landowners to better protect and improve soils); shifts from arable agriculture to pasture, or *vice versa*; and implementation of field drainage schemes. Changes to the baseline may therefore be positive or negative.

11.5.31 There is the potential for long-term changes to the baseline due to climate change. These could potentially lead to alterations in agricultural land quality (ALC grade), for example through increased levels of soil wetness in the winter and increased droughtiness in the summer. This may in turn influence extent and location of BMV agricultural land. Changes in rainfall may also affect decomposition rates and soil organic matter content.

11.6 Embedded measures

11.6.1 A range of environmental measures have been embedded into the Project as outlined in **Embedded measures schedule (Appendix 5.3.3A, Volume 5, Document 5.3.3A)**.

Table 11.15 outlines how these embedded measures would influence the agriculture and soils assessment.

Table 11.15 - Summary of the embedded environmental measures

Receptor	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Construction			
Agricultural Land	Permanent loss of agricultural land including BMV. May be direct loss as a consequence of built infrastructure, or indirect through permanent change to non-agricultural use to facilitate these developments.	As part of the route design (**Chapter 2: Project need and alternatives, Volume 5, Document 5.2.2**) - the location of permanent development on non-agricultural land in preference to agricultural land; and on agricultural land of lower classification where agricultural land could not be avoided; where practicable and taking into account technical and other environmental considerations.	Works plans implemented via DCO (Article 48)
Agricultural Land	Temporary loss of agricultural land including BMV.	As part of the route design (**Chapter 2: Project need and alternatives, Volume 5, Document 5.2.2**) - the location of temporary development on non-agricultural land in preference to agricultural land; and on agricultural land of lower classification where agricultural land could not be avoided; where practicable and taking into account technical and other environmental considerations.	Works plans implemented via DCO (Article 48).
Agricultural Land	Temporary loss of agricultural land including BMV.	Where temporary land take occurs on agricultural land, land would be reinstated to the same quality (same ALC grade) or better and would be returned to agricultural use. Facilitated by the correct management of the supporting soil resources.	CoCP, secured via DCO requirement 5, Outline Soil Management Plan (**Volume 5, Document 5.3.3E – Appendix 5.3.3E**) secured via DCO requirement 5 and a soil and aftercare management plan via DCO requirement 6 as well as DCO

Receptor	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
			Requirement 11 (reinstatement)
Agricultural Land	Temporary loss of agricultural land through indirect causes such as field severance and separation of livestock from water supplies	Feedback from landowners to be considered when managing construction works (taking into account environmental and engineering constraints).	CoCP (secured via DCO requirement 5) would include a requirement for contractors to engage with landowners to ensure that such effects within the Order Limits are minimised.
Soil Resources	Damage to and loss of soil resources.	Adoption of industry standard methods for the handling and storage of soils; based on Defra's current good practice guidelines[22], standard working methods and techniques used to protect soil resources.	Outline Soil Management Plan (**Volume 5, Document 5.3.3E – Appendix 5.3.3E**) secured via DCO requirement 5 and a soil and aftercare management plan via DCO requirement 6
Soil Resources	Damage to and loss of soil resources.	Use of trackway panels rather than stoned roads to access construction areas, where practicable, would minimise the stripping and handling of soil resources.	CoCP (**Volume 5, Document 5.3.3B)**, secured via DCO requirement 5.
Soil Resources	Damage to and loss of soil resources, particularly peat and peaty soils.	No peat deposits or peaty soils are identified in the available published data which fall within the Order Limits. Should peat deposits or peaty soils subsequently be identified impacts to these areas would be avoided, where practicable, in line with the requirements of other disciplines and engineering constraints.	Outline Soil Management Plan (**Volume 5, Document 5.3.3E – Appendix 5.3.3E**) secured via DCO requirement 5

11.7 Scope of the assessment

The Project

11.7.1 All construction phase elements of the Project have been scoped into the assessment. However, the assessment is primarily focussed on those operations that will involve notable ground disturbance, specifically: new underground cables; substation construction; CSECs; construction compounds; permanent access roads and temporary haul roads (including bell mouths and visibility splays); dismantling of existing pylons; and the installation of foundations for new (temporary and permanent) and replacement pylons. It is noted that landscaping works will be taking place, particularly at the Substations, these works have been included in the assessment as part of the substation works as a whole.

11.7.2 The operational phase involves the presence, operation and maintenance of the proposed infrastructure. Only maintenance operations, where they occur on agricultural land, are considered to have potential effects on agriculture and soils beyond those which may occur during the construction phase.

Spatial scope

11.7.3 The spatial scope of the assessment of agriculture and soils is the Order Limits of the Project, the Study Area, as described in **Section 11.5**. The locations of temporary and permanent land take have been taken from the Project design.

Temporal scope

11.7.4 The temporal scope of the agriculture and soils assessment is consistent with the period over which the Project would be carried out, and therefore covers the period 2024 to 2028 (for construction) and thereafter (for operation). The duration of the operational phase is not relevant to the assessment of effects, so is considered on an indeterminate basis.

11.7.5 The Project is expected to have a life span of more than 80 years. If decommissioning is required at this point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration. Therefore, the likely significance of effects relating to the construction phase assessment will be applicable to the decommissioning phase and decommissioning effects are not discussed further in this chapter.

Potential receptors

11.7.6 The principal agriculture and soils receptors that have been identified as being potentially subject to effects are summarised in **Table 11.16**.

Table 11.16 - Agriculture and soils receptors subject to potential effects

Receptor	Reason for Consideration
Agricultural land and land use in terms of the loss of BMV agricultural land	Agricultural land, and BMV land in particular, is a finite natural resource as recognised in planning policy. There is the potential for the direct or indirect loss of agricultural land, including BMV land, as a consequence of the

Receptor	Reason for Consideration
	Project and for the scale of that loss to be significant.
Soil resources in terms of potential damage and loss	Soil resources, as recognised in planning policy, are a finite natural resource. There is the potential for soil resources to be lost or damaged as a consequence of the Project; and for the scale of the impact to be significant.

Likely significant effects

11.7.7 The effects on agriculture and soils receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 11.17**.

Table 11.17 - Agriculture and soils receptors scoped in for further assessment

Receptor	Likely Significant Effects
Agricultural land	Loss of agricultural land i.e., change of land-use to non-agricultural through placement of infrastructure, but also through indirect losses such as field severance and separation of livestock from water supplies making areas unsuitable for farming. Mainly occurring during construction, but also during small scale, isolated maintenance activities during the operational phase. It is noted that the dismantling of overhead lines during the construction phase could also result in the reinstatement of some land to agricultural use.
Agricultural land	Loss of BMV agricultural land following reinstatement (i.e., change of land-use to lower quality; arable to pasture). Mainly occurring during construction, but also during small scale, isolated maintenance activities during the operational phase.
Agricultural land	Indirect loss of agricultural land, due to limited access or requirement for change to non-agricultural use for land surrounding permanent infrastructure.
Soil resources	Damage to, or loss of soil resources through incorrect management during construction, reinstatement and small-scale isolated maintenance activities, including: • Damage to the structure and compaction; • Loss of nutrients (e.g., nitrogen); • Loss of soil biota (e.g., bacteria, fungi, earthworms) and reduction of its activity; • Mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse; and • Unauthorised export.

11.7.8 Impacts on agricultural land holdings (farm viability) were scoped out in the socio-economic section of the Scoping Report. Subsequent agreement of this position was received from the Planning Inspectorate, the response stated that given the nature and scale of the Project the topic could be scoped out of the ES; but that this should be kept under review and inclusion reinstated should the potential for significant effects be identified. Should this occur the Impact Assessment would be presented in **Chapter 16: Socio-economics, Volume 5, Document 5.2.16.**

11.8 Assessment methodology

11.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Preparing the ES, Volume 5, Document 5.2.4**, and specifically in **Sections 4.7** to **4.10**. However, whilst this has informed the approach that has been used in this agriculture and soils assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this agriculture and soils assessment.

11.8.2 As explained in **Chapter 4, Volume 5, Document 5.2.4**, the early identification of likely significant adverse environmental effects enables appropriate mitigation (e.g. measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the design of a project, or commitments to be made to environmentally sensitive construction methods and practices. The potential impacts of the Project would therefore be identified and assessed, appropriate mitigation put forward (where required) and the residual (post-mitigation) effects assessed to ensure that the overall effect of the Project on agriculture and soils is reduced as far as is practicable.

11.8.3 The assessment methodology for agriculture and soils has been revised since Scoping and PEIR to incorporate the new IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment[40]' which was published on 17 February 2022. This guidance comprises the first published guidance on the consideration of soils and land in EIA but does not include a methodology for how such assessment should be undertaken. The aims of the guidance are to advocate 'a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils'. The assessment methodology presented below reflects the most up to date industry guidance on assessing the impacts on land and soils in EIAs, which encompasses all of the ecosystem services that soils provide.

11.8.4 The assessment methodology utilised draws upon the IEMA guidance and utilises professional judgement. **Table 11.18**, **Table 11.20**, and **Table 11.21** detail the scale of receptor sensitivity applied within the assessment. **Table 11.19** and **Table 11.22** detail the scale of magnitude of change (i.e. impact). The matrix within **Table 11.23** uses receptor sensitivity and the magnitude of change to determine the level of effect.

Agricultural land

11.8.5 The gradation of sensitivities from very high to negligible is not necessarily one of discrete categories for soil functions, and it is not possible to anticipate all possible permutations of soil resources and soil functions outlined in Table 2 of the IEMA

[40] IEMA (2022). A New Perspective on Land and Soil in Environmental Impact Assessment. IEMA; Lincoln.

guidance[40]. Therefore, assigning sensitivity involves an element of professional judgement.

11.8.6 Using IEMA guidance[40], given the main land use within the Study Area is agriculture, and that all the soils under consideration are mineral soils, the sensitivity of soils will be based on the lands ability to provide food and fuel. This has been assessed by Agricultural Land Classification, with higher grades assigned higher sensitivities. The receptor sensitivity criteria are outlined in **Table 11.18**.

11.8.7 The majority of the agricultural land within the Study Area is productive arable land, of which the majority is calculated as being of BMV quality, and predominantly ALC Grade 2 (see **Table 11.12**), which is typical of the wider area. An overview of the land-use within the Study Area identifies arable and horticultural land tends to be more prevalent within areas graded as BMV (i.e. Grades 1, 2 and Subgrade 3a); land under mixed rotation tends to be on good to moderate quality (i.e. Subgrades 3a and 3b); and pasture land tends to be located on areas of lower quality (i.e. Subgrade 3b, Grade 4). Therefore, for the purpose of this assessment, it is assumed that agricultural land use is closely related to agricultural land quality, and current land use is therefore reflected in the ALC assessment.

Table 11.18 - Receptor sensitivity (agricultural land)

Receptor	Sensitivity	Justification
Soil Resources		
Soils supporting agricultural land quality of grades 1 and 2	Very high	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown (commonly including top fruit, soft fruit, salad crops and Winter harvested vegetables). Yields are high and less variable than on land of lower quality. Land with minor limitations that affect crop yield, cultivations or harvesting. Grade 2 may comprise soils that show difficulties with the production of more demanding crops (e.g. Winter harvested vegetables and arable root crops). The level of yield is generally high, but may be lower or more variable than Grade 1.
Soils supporting agricultural land quality of subgrade 3a	High	Land capable of consistently producing moderate to high yields of a narrow range of arable crops (especially cereals) or moderate yields of a wide range of crops (including cereals, grass, oilseed rape, potatoes, sugar beet) and the less demanding horticultural crops.
Soils supporting agricultural land quality of subgrade 3b	Medium	Land capable of producing moderate yields of a narrow range of crops (principally cereals and grass) or lower yields of a wider range of crops or high yields of grass that can be grazed or harvested over most of the year.
Soils supporting agricultural land quality of grades 4 and 5	Low	Land with severe limitations that significantly restrict the range of crops and / or level of yields. Is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates,

Receptor	Sensitivity	Justification
		yields of grass may be moderate to high, but there may be difficulties in utilisation.
Soils in non-agricultural or urban areas	Negligible	As per 'Low' sensitivity, but with indirect, tenuous and unproven links between sources of impact and soil functions (i.e. non-agricultural or urban). Built-up or 'hard' uses with relatively little potential for a return to agriculture.

11.8.8 The adoption of the new IEMA guidance[40] allows for more flexibility when ascertaining the magnitude of impact to agricultural land, particularly for works that are temporary in nature such as those seen in the construction of linear infrastructure. The magnitude of change criteria for agricultural land is shown in **Table 11.19**, which has been adapted from Table 3 of the IEMA guidance[40].

Table 11.19 - Criteria to assess the magnitude of change (agricultural land)

Magnitude	Damage to Soil Resources
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Minor	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

**Temporary developments can result in a permanent impact if resulting disturbance or land use change results in permanent damage to soils.*

Soil resources

11.8.9 The effect of permanent and temporary development as a consequence of the Project will be assessed in terms of the identified soil resources, their sensitivity, and the degree of loss and damage of soil resource. The assessment criteria combines standard industry approaches, the IEMA guidance and professional experience where necessary.

11.8.10 The sensitivity of soil resources to loss is shown in **Table 11.20**, and is based on the soil's erodibility, i.e. the ease it is lost due to environmental factors such as wind and water. It is noted that loss can also occur due to external factors, such as unauthorised export. Soil erodibility is a measure of the susceptibility of soils to loss both *in-situ* (i.e. as an undisturbed soil profile) and during soil stockpiling, due to wind or water erosion (natural erosion potential). Soil erodibility is considered in the rating of soil sensitivity,

with the sensitivity classification of the different soils encountered based upon data compiled by Cranfield University[32].

11.8.11 The sensitivity of soil resources to disturbance will be assessed by reporting the workability of topsoils and their suitability for reinstatement, and effects assessed on the assumption that good working practice, such as that set out in Defra guidance[26], (see **Section 11.6**) is followed. The sensitivity criteria recognise that soils with different inherent properties will have differing resilience to disturbance, and the impacts from construction may be more severe in certain situations. The sensitivity of soil resources to structural damage is shown in **Table 11.21**, this is adapted from Table 4 in the IEMA guidance[40].

11.8.12 It is important to note that soils of differing texture and structural development may be subject to a range of potential impacts during and following reinstatement. For example, the incorrect handling/reinstatement of a heavy (clay rich) soil whilst in a plastic state may cause permanent or semi-permanent soil compaction. The resulting soil profile with have a reduced natural drainage compared to the undisturbed soil profiles and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Whereas the texture of the lighter sandy soils make them more resistant to compaction pressures and sandy soils also have a greater capacity to recover from compaction without management intervention. They will also remain more permeable if compaction does occur and the drainage potential of these soils is therefore more easily maintained upon reinstatement.

Table 11.20 - Receptor sensitivity (loss of soil resources)

Receptor	Sensitivity	Justification
Soil Resources		
Soils with high risk of erosion and organic soils (peat)	High	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g. use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion (organo-mineral soils: i.e., peaty soils or peaty gleys, peat < 50 cm)	Medium	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g. when above their plastic limit – the moisture state where soil begins to behave as a plastic material). The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	Low	These soils are generally more resistant to damage and may be appropriately managed by standard

Receptor	Sensitivity	Justification
		embedded mitigation measures such as those mentioned in **Section 11.5**.
Poor quality soils within an urban or non-agricultural environment not supporting biodiverse habitats, and no risk of erosion	Negligible	These soils are already highly disturbed and of poor quality and may also be appropriately managed by standard mitigation measures.

Table 11.21 - Receptor sensitivity (structural damage to soil resources)

Receptor	Sensitivity	Justification
Soils with low resilience to structural damage	High	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCD) are 150 or greater. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater. All soils in wetness class (WC) WCV or WCVI.
Soils with medium resilience to structural damage	Medium	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225. Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Soils with high resilience to structural damage	Low	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

11.8.13 The magnitude of effect will be assessed in terms of the change from baseline conditions, as defined in **Table 11.22** for both loss of soil resources and structural damage to soil resources.

Table 11.22 - Criteria to assess the magnitude of change (soil resources)

Magnitude	Loss of Soil Resources	Damage to Soil Resources
High	<25% of soil resources suitable for reuse and retained on-site.	Permanent change to the quality of the soil resource.

Magnitude	Loss of Soil Resources	Damage to Soil Resources
Medium	25-50% of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to more than 25% the soil resource.
Low	51-95% of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to less than 25 % of the soil resource.
Negligible	>95% of soil resources suitable for reuse and retained on-site.	No change to soil resource quality.

11.8.14 The classification of effects for loss and damage of soil resources will be assessed using **Table 11.23**. Where effects are determined as Very Large Adverse, Large Adverse or Moderate Adverse, the effect will be considered Significant. Where effects are determined as Slight Adverse or Negligible, the effect will be considered Not Significant.

Table 11.23 - Classification of Effects (agricultural land and soil resources)

Sensitivity/ value of receptor	Magnitude of Impact				
	Major	Moderate	Minor	Negligible	No Change
Very High	Very Large (Significant)	Large or Very Large (Significant)	Moderate or Large (Significant)	Slight (Not Significant)	Neutral (Not Significant)
High	Large or Very Large (Significant)	Moderate or Large (Significant)	Slight or Moderate (Potentially Significant)	Slight (Not Significant)	Neutral (Not Significant)
Medium	Moderate or Large (Significant)	Moderate (Significant)	Slight (Not Significant)	Neutral or Slight (Not Significant)	Neutral (Not Significant)
Low	Slight or Moderate (Potentially Significant)	Slight (Not Significant)	Neutral or Slight (Not Significant)	Neutral or Slight (Not Significant)	Neutral (Not Significant)
Negligible	Slight (Not Significant)	Neutral or Slight (Not Significant)	Neutral or Slight (Not Significant)	Neutral (Not Significant)	Neutral (Not Significant)

11.8.15 This ES Chapter assesses the potential impacts based upon the extent of the temporary and permanent land take for the Project as defined in the Project Description (**Chapter 3: Description of the Project, Volume 5, Document 5.2.3**); although data for the

whole of the Study Area are provided within the baseline section (see **Section 11.5**) for completeness.

11.9 Assessment of agriculture and soils effects

Agricultural land

11.9.1 The data in **Table 11.7** to **Table 11.11** (see **Section 11.5**) considers all land within the Study Area. However, the amount of agricultural land either permanently lost or temporarily removed from agricultural use as a consequence of the Project would be confined to the areas where works would take place. Therefore, the amount of agricultural land directly affected would be less than that represented by the data for the whole Study Area. The assessment has therefore been based on the actual areas of temporary and permanent loss, based on the Project design.

11.9.2 The elements of the Project (see design in **Figure 1.2, Volume 5, Document 5.4.1**) resulting in permanent land take are: new build pylons; CSECs; permanent access roads and bellmouths for the substations and CSECs; and substations. It is noted that whilst permanent gantries will be developed, these will be within the fenced areas of the substations and CSECs. It is noted that the design shows areas of underground cabling as permanent infrastructure; however, in terms of agricultural land the impact is temporary, as following construction the land above the cable would be reinstated to agricultural use. Therefore, for this assessment, underground cabling has been considered as temporary rather than permanent land take. Elements of the Project resulting in temporary land take are considered to be underground cable works; temporary pylon structures and dismantled or modified pylons; pylon working areas, temporary scaffolding; temporary access roads and bell mouths; construction compounds; and stringing areas.

11.9.3 The ALC (calculated using a combination of the available Post-1988 survey data[33,34,35,37] and the Provisional and Predictive ALC datasets[28, 29], as described above) for areas of permanent and temporary land take for the Project are presented in **Table 11.24**.

Table 11.24 - Calculated ALC for areas of permanent and temporary landtake

ALC Grade	Area (ha)	Percentage of land within the Study Area (%)
Permanent landtake		
Grade 1(BMV)	0	0
Grade 2 (BMV)	7.7	1.5
Subgrade 3a (BMV)	8.9	1.7
Subgrade 3b (non-BMV)	5.8	1.1
Grade 4 (non-BMV)	0.1	<0.1

ALC Grade	Area (ha)	Percentage of land within the Study Area (%)
Grade 5 (non-BMV)	0.8	0.1
Non-agricultural/Urban/ Industrial	0.16	<0.1
Total	23.5	
Temporary landtake		
Grade 1 (BMV)	2.6	0.5
Grade 2 (BMV)	60.8	11.5
Subgrade 3a (BMV)	41.7	7.9
Subgrade 3b (non-BMV)	29.3	5.54
Grade 4 (non-BMV)	4.3	0.8
Non-agricultural/Urban/ Industrial	3.7	0.6
Total	141.7	

11.9.4 Based on the Project design, the total permanent land take for the Project would be c. 23.5 ha (4.5%) of all land within the Study Area, which is predominantly the result of construction of the proposed substations. Over a quarter of the land within the Order Limits, 28.5% (4.5ha), comprises non-agricultural land at Osbaldwick Substation and the proposed works at Osbaldwick Substation would have no impact on agricultural land. Given the prevalence of BMV land within the Study Area, it is unsurprising that the majority of the agricultural land which would be lost to permanent development is of BMV quality, however Grade 1 land has been avoided with developed land comprising Grade 2 (7.7ha) and Subgrade 3a (8.9ha). The remaining land is Subgrade 3b 5.8ha, Grade 4 (0.1ha) and Grade 5 (0.8ha).

11.9.5 Based on the current Project design, the temporary land take covers 141.7ha of which 97.4% (138.0 ha) is located on agricultural land; which will be restored to, or maintained at, its pre-development quality and returned to agricultural use at the end of the construction period. Given the prevalence of BMV land within the Study Area nearly three quarters of the temporary landtake (105.1ha) occurs on BMV quality land of Grades 1 (2.6ha); Grade 2 (60.8ha) and Subgrade 3a (41.7ha). The non-BMV landtake comprises Subgrade 3b (29.3ha) and Grade 4 (4.3ha) land; with a further 3.7ha of non-agricultural land also subject to temporary development.

11.9.6 Based on the criteria outlined in **Section 11.9** and **Table 11.18**, land of ALC grade 1 and 2 is assigned a **Very High Sensitivity**, land of ALC grade 3a a **High Sensitivity**, land of ALC grade 3b a **Medium Sensitivity,** land of ALC Grade 4 a **Low Sensitivity**, and areas of non-agricultural land a **Negligible Sensitivity**.

11.9.7 In areas of permanent development soil resources would be removed from agricultural land use, at the Substations surplus soils would be utilised for landscaping, whereas surplus soils at the CSECs are likely to be exported from site. This would lead the permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20ha, and hence a **Moderate Magnitude**.

11.9.8 The resulting significance in areas of permanent development would be Large (for ALC Grade 2), Moderate (for ALC Subgrade 3a), and Moderate (for ALC Subgrade 3a). The resulting effect would be **Significant.**

11.9.9 In areas of temporary development, the embedded good practice measures (**Section 11.6**) would ensure that any agricultural land subject to temporary development is restored to its original condition (ALC grade) and that no permanent loss of land occurs in these areas. Hence the magnitude would be a temporary, reversible loss of soil-related features, and therefore, the impact would be of **Minor Magnitude**.

11.9.10 The resulting significance in areas of temporary development would be Slight (for ALC Subgrade 3b), Moderate (for ALC Grade 2 and Subgrade 3a). The resulting effect would be **Not significant**.

11.9.11 It is also noted that there is scope for the reinstatement of some BMV land to agricultural use following the replacement of existing pylons along the 275kV Poppleton to Monk Fryston (XC/XCP) overhead line, however the gains, if any, are expected to be small and would not influence the outcome of the assessment.

11.9.12 A summary of significance of effects of the Project on agricultural land is provided in **Table 11.26**.

Soil resources

11.9.13 Impacts on soil resources (loss and damage) only occur when soils are disturbed (which may include effects such as compaction due to works on the soil surface, as well as those caused by the handling of soils). The assessment has therefore been based on the actual areas of soil disturbance (permanent and temporary works), based on the agreed design freeze for the ES assessment. The elements of the Project constituting areas of permanent and temporary land take are as described in paragraph 11.9.2; and the data are shown in **Table 11.25**.

Table 11.25 – Soil Associations Present in areas of permanent and temporary land take

Soil Association	Area (ha)	Percentage of Study Area (%)	Erodibility[32]	Soil texture and Wetness Class[39]
Permanent land take				
Blackwood (821b)	0.1	<0.1	Small Risk (Wind)	Sandy and coarse loamy soils. Wetness Classes I, to IV.
Aberford (511a)	15.6	3.0	Small Risk (Water)	Fine loamy soils over limestone. Wetness Class I.
Enborne (811a)	3.0	<0.1	Very Small Risk (Water)	Fine loamy and clayey soils. Wetness Class II to IV.
Foggathorpe 2 (712i)	7.8	1.5	Very Small Risk (Water)	Clayey and fine loamy over clayey soils. Wetness Class III and IV.
Urban			-	-
Total	23.5	n/a	n/a	n/a
Temporary land take				
Newport 1 (551d)	0.18	<0.1	Very High Risk (Water and also wind)	Medium sandy soils. Wetness Class I.
Enborne (811a)	1.4	0.3	Very Small Risk (Water)	Fine loamy and clayey soils. Wetness Class II to IV.
Escrick 2 (571q)	7.55	1.4	Moderate Risk (Water)	Fine loamy brown soils. Wetness Classes I or II.
Bishampton (572s)	4.1	0.7	Moderate Risk (Water)	Fine loamy soils. Wetness Classes I, to III.

Soil Association	Area (ha)	Percentage of Study Area (%)	Erodibility[32]	Soil texture and Wetness Class[39]
Wick 1 (541r)	0.1	<0.1	Moderate Risk (Water, but also wind)	Coarse loamy and sandy soils. Wetness Class I and II.
Wharfe (561a)	0.7	0.1	Moderate Risk (Water)	Fine loamy typical brown soils. Wetness Classes I, to IV.
Blackwood (821b)	3.3	0.6	Small Risk (Wind)	Sandy and coarse loamy soils. Wetness Classes I, to IV.
Aberford (511a)	59.9	11.2	Small Risk (Water)	Fine loamy soils over limestone. Wetness Class I.
Dunkeswick (711p)	4.1	0.8	Very Small Risk (Water)	Fine loamy over clayey soils. Wetness Class III and IV.
Foggathorpe 2 (712i)	64.5	11.7	Very Small Risk (Water)	Clayey and fine loamy over clayey soils. Wetness Class III and IV.
Urban	0.0		-	-
Total	**141.6**		n/a	n/a

Construction Phase

11.9.14 Based on the DCO Project design, the total permanent land take for the Project would be 23.5ha (4.5% of all land within the Study Area), predominantly associated with construction of the proposed substations. There are four mapped soil associations[27] in areas of permanent land take. All of the soils in the permanent land take area comprise soils which are at very small to small risk of erosion[32] (Blackwood, Aberford, Endborne and Foggathorpe 2). These soils are of **Low Sensitivity** for loss of soil resources.

11.9.15 At Shipton North and South CSEC area the 2022 soil survey (**Appendix 5.3.11A, Volume 5, Document 5.3.11A**) found the soils were predominantly of Silty Clay (ZC) texture with smaller areas of a Sandy Loam (SL) texture. These soils range from **High Sensitivity** (where the soils have a high clay content) to **Low Sensitivity** (where the soils have a higher sand content) to structural damage.

11.9.16 At the New Overton Substation area, the 2022 soil survey (**Appendix 5.3.11B, Volume 5, Document 5.3.11B**) found the soils were predominantly Clay (C) to Clay loam (CL) in texture which are of **High Sensitivity** to structural degradation. With smaller areas of Sandy loams (SL) which are of **Low Sensitivity** to structural degradation.

11.9.17 At Tadcaster CSEC area the 2022 soil survey (**Appendix 5.3.11C, Volume 5, Document 5.3.11C**) found the soils were predominantly Clay loams (CL) which are of High Sensitivity to structural degradation.

11.9.18 At Monk Fryston Substation the 2022 soil survey (**Appendix 5.3.11D, Volume 5, Document 5.3.11D**) found the soils were predominantly Silty Clay loam (ZCL) in texture, these soils are of **Medium Sensitivity** to structural damage.

11.9.19 Based on the DCO Project design, the total temporary landtake for the Project would be 141.6ha; with any soil resources being reinstated to, or maintained at, their pre-development quality. A total of ten soil associations are mapped within the area of temporary landtake[27]. The majority of soil resources within the temporary landtake area (94.1%, 133.2ha out of 141.6ha) are at small or very small risk of erosion[32] (Blackwood, Aberford, Dunkeswick and Foggathorpe 2); whilst soils at moderate risk of erosion[32] (Eskrick 2, Bishophampton, Wick 1 and Wharfe) cover a further 8.4ha.

11.9.20 It is assumed that soils excavated for the temporary works would be stored where possible on-site and reinstated *in situ* within the same landholding (with negligible unavoidable loss due to mixture of track-base aggregate or removal on wheels). Within the proposed cable working widths, this is possible because the soil displaced by the cable would be added to the, much larger, amount of soil temporarily excavated for the working area and reinstated along the proposed cable route. Where excavations are to a depth where the quality/nature of the excavated material is not suitable for reuse as a subsoil material within the restoration soil profile as described above (i.e. excavations have gone deeper than the subsoil into the parent material), the material is not considered to be a soil. This non-soil substrate would also be reinstated *in situ* where possible, any excess non-soil substrate would be removed from site and to a suitably licenced and managed facility; following grant of necessary permissions where required.

11.9.21 Where *in situ* reinstatement is not possible (permanent development areas), the soil resource would be reused elsewhere within the same landholding, where practicable to do so, for example in landscaping and/or screening. However, it is anticipated that small volumes of soil generated at permanent development areas may need to be exported from site for reuse elsewhere, such as from the CSECs (reuse may be within the Order Limits or further afield and would be subject to relevant permissions).

11.9.22 The length of the construction period/duration of soil disturbance is currently predicted to be up to four years and six months (2024 to 2028), which could result in irreversible or long-term damage to soil quality through handling, and stockpiling. However, the embedded good practice soil management measures (see **Section 11.6**) would ensure that appropriate handling, storage, reinstatement and transportation methodologies are employed resulting in the properties, function and structure of the soils being retained such that the level of damage is reduced to a level commensurate with those experienced during normal farming operations. Consequently, based upon the criteria in **Table 11.19** the magnitude of change would be reduced to **Negligible** (no change to soil resource quality).

11.9.23 The embedded soil management measures based on good practice guidance[22] (**Section 11.6**) would ensure that appropriate handling, storage, reinstatement and transportation methodologies are employed resulting in the properties, function and

structure of the soils remaining at a status suitable for reuse; either within the Project or at other consented development or waste management sites in the wider area where there is a requirement for soil to be exported from site.

11.9.24 The above measures would minimise the loss of soil resources such that over 95% of soil resources (as per criteria in **Table 11.19**) are retained in a state suitable for reuse; resulting in a **very low magnitude** of change (the <5% loss is due to unavoidable small-scale losses arising from factors such as trackout of soils on construction vehicle wheels).

11.9.25 Therefore, using the criteria set out in **Table 11.22**, the effect on loss of soil resources for the **very low, low** and **medium** sensitivity soil resources would be **Negligible** and **Not Significant**; the effect on loss of soil resources for the **high** sensitivity soil resources would be a **Minor** and **Not Significant.**

11.9.26 The majority of land within the temporary and permanent land take areas (165ha) comprises the low and medium sensitivity soils to structural degradation. The high sensitivity soils to structural degradation account for 0.1ha(< 0.1%) and is associated with areas of temporary development.

11.9.27 With appropriate embedded soil management measures in place the likely impact on soils (i.e. the risk of damage to soil structure and soil deformation (compaction and smearing)) will be no change in soil resource quality or a temporary/reversible change to less than 25% of soil resources such as small-scale surface damage (equivalent to that done by a typical farm machinery traffic) would be likely to occur. Therefore, the change to soils due to structural damage is **Low Magnitude**.

11.9.28 The effects to the **low**, **medium** and **high** sensitivity soils to structural degradation are therefore considered to be **Minor** to **Negligible** effects, and **Not Significant**).

Operational Phase

11.9.29 During the operational phase, localised short-term soil disturbance may occur due to routine maintenance such as annual infrastructure inspections. Less frequent, non-routine, maintenance of the infrastructure may also result in soil disturbance; such work is typically limited to the planned refurbishment of particular components, or the replacement of components as required.

11.9.30 With appropriate embedded soil management measures in place, the effects to the **low**, **medium** and **high** sensitivity soils to soil loss and structural degradation are therefore considered to be the same as the temporary (construction) effects (**Negligible** and **Minor** effects, and **Not Significant**), although the scale and extent of works is likely to be substantially less.

11.10 Assessment of cumulative effects

Inter-project (combined with other development) cumulative effects

11.10.1 An assessment of the effects which could result from the Project in cumulation with other developments in the vicinity of the Project is provided in Chapter 18: Cumulative Effects Assessment (**Volume 5, Document 5.2.18**).

Intra-project (within the Project) cumulative effects

11.10.2 Intra-project effects have been considered in this assessment, i.e., where effects in one environmental area could give rise to effects in others. The greatest potential for agriculture and soils effects that are inter-related with other aspects is considered to be with Hydrology, Air Quality, and with Socio-economics.

11.10.3 There are potential intra-project effects relating to land contamination, as follows:

- erosion of disturbed soils, leading to pollution of watercourses. This provides a potential intra-related effect with water quality receptors that is discussed in **Chapter 9: Hydrology, Volume 5, Document 5.2.9**;
- loss of agricultural land from land holdings, degradation of soil resources which impact agricultural production. This provides an inter-related effect with receptors considered in **Chapter 16: Socio-economics, Volume 5, Document 5.2.16**; and
- generation of dust from soil works in dry conditions, or wind erosion, leading to adverse effects on air quality. This provides a potential inter-related effect with receptors considered in **Chapter 13: Air Quality, Volume 5, Document 5.2.13**.

11.10.4 With all embedded mitigation measures in place, it is considered that there would not be an overall significant impact from the intra-project effects.

11.11 Significance conclusions

11.11.1 A summary of the results of the agriculture and soils assessment is provided in **Table 11.26**.

Table 11.26 - Summary of significance of effects

Receptor and Summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Agricultural Land: Permanent loss	Very High (ALC Grades 1 & 2), High (ALC Subgrade 3a), Medium (ALC Subgrade 3b), Low (ALC Grade 4) and Negligible (non-agricultural).	Moderate	Significant	The permanent loss of agricultural land is between 5-20 ha for ALC Grades 2 – Subgrade 3b, and there will be the permanent loss of one or more soil function (food production).
Agricultural Land: Temporary loss		Minor	Not Significant	Temporary, reversible loss of soil-related features. With embedded mitigation there would be no long-term changes to the Agricultural Land quality.
Soil resources: Loss of soil resources	Ranges from low to high depending upon the sensitivity of	Negligible	Not Significant	The embedded soil management measures, based on good practice guidance[22] would minimise

Receptor and Summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
	the identified soil associations to erosion.			the loss of soil resources so that over 95% of soil resources are retained in a state suitable for reuse (the <5% loss is due to unavoidable small-scale losses arising from factors such as trackout of soils on construction vehicle wheels).
Soil resources: Damage to soil resources	Ranges from low to high depending upon the sensitivity of the identified soil associations to structural degradation.	Minor to Negligible	Not Significant	The embedded soil management measures, based on good practice guidance[22] would reduce the risk of damage to soil structure and soil deformation (compaction and smearing) to a level where there is no change in soil resource quality or a temporary reversible change to less than 25% of soil resources (equivalent to that done by a typical farm machinery traffic) would be likely to occur.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.8** and is defined as very low, low, medium and high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.8** and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.8**.

Page intentionally blank

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

Registered in England and Wales
No. 4031152