



Humber Low Carbon Pipelines

Preliminary Environmental Information Report
Volume II Chapter 5 Agriculture and Soils
October 2022

nationalgrid

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5. Agriculture and Soils

5.1 Introduction

- 5.1.1 This Chapter reports the results of the preliminary assessment of the potential impacts and effects of the Project on Agriculture and Soils and describes:
- Relevant, legislation, policy and guidance;
 - Engagement undertaken to date;
 - The proposed assessment methodology and associated significance criteria;
 - Preliminary baseline conditions;
 - Potential impacts of construction, operation, and decommissioning;
 - Potential design, mitigation, and enhancement measures;
 - Summary of the preliminary assessment of potential significant effects; and
 - Next steps.
- 5.1.2 This assessment considers the simultaneous construction of a dual pipeline system (one for carbon dioxide and one for hydrogen), as well as the associated Above Ground Installations (AGIs). The majority of the carbon dioxide pipeline would be up to 600 mm (24") nominal diameter and the hydrogen pipeline would be up to 900 mm (36") nominal diameter. This is referred to as the Base Case in this Preliminary Environmental Information Report (PEIR). Also under consideration is the possibility of deploying a larger carbon dioxide pipeline, with a diameter up to 750 mm (30") (with the hydrogen pipeline remaining the same diameter as within the Base Case). This is referred to in this PEIR as Sensitivity 1. Further details regarding the Base Case and Sensitivity 1, as well as the diameter and capacity of the pipelines are provided in Sections 2.3 and 2.4 of Chapter 2: Project Description (Volume II). This Chapter assesses the impacts and effects associated with the Base Case. It is anticipated that the types of potential impacts for the Base Case and Sensitivity 1 would be the same, although the magnitude of impacts may differ. A full assessment of Sensitivity 1 would be undertaken and recorded within the Environmental Statement (ES) if the larger carbon dioxide pipeline diameter is taken forward into the Development Consent Order (DCO) application.
- 5.1.3 This Chapter (and its associated figures) is intended to be read as part of the wider PEIR, with particular reference to:
- Chapter 7: Ecology and Biodiversity (Volume II);
 - Chapter 9: Geology and Hydrogeology (Volume II); and
 - Chapter 17: Hydrology and Land Drainage (Volume II).

5.2 Legislation, policy and guidance

- 5.2.1 A summary of the international, national, and local legislation, planning policy and guidance relevant to the Agriculture and Soils assessment for the Project is set out

below. The Applicant will demonstrate how all policy relevant to Agriculture and Soils has been complied with as part of the ES.

Legislation

- 5.2.2 There is no international, national or local primary legislation relating to agriculture and soils relevant to this assessment.

Policy

National Policy Statement for Energy (EN-1) (Ref 5.1) and draft EN-1 (Ref 5.2).

- 5.2.3 Section 5.10 of the Overarching National Policy Statement for Energy (EN-1) (Ref 5.1) requires applicants to seek to minimise impacts on best and most versatile (BMV) land and preferably use land in areas of poorer quality except where this would be inconsistent with other sustainability considerations. EN-1 also requires applicants to identify any effects and seek to minimise impacts on soil quality, taking into account any mitigation measures proposed. The current draft EN-1 (Ref 5.2) also encourages applicants to develop and implement a Soil Management Plan (SMP) as well as stating the requirement, as outlined above, to minimise impacts on BMV land (in Section 5.11.8 of the current draft).

National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 5.3) and draft EN-4 (Ref 5.4).

- 5.2.4 Section 2.23 of the National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 5.3) and the current draft (Ref 5.4), which sets out policy on the protection of soil and geological resources, states that it is important for applicants to understand the soil types present and to take account of impacts on soil quality, with mitigation measures to include the appropriate treatment of soil resources during construction which should be in line with the Department for Environment, Food and Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 5.5) where applicable.

Other policies

- 5.2.5 Other key policies include:
- National Planning Policy Framework (NPPF) (2021) (Ref 5.6); and
 - Relevant policies from the following:
 - East Riding Local Plan (2016) (Ref 5.7): Policy ENV1 seeks to make prudent and efficient use of natural resources, particularly land, energy and water and Policy ENV4 which seeks to conserve and enhance biodiversity and geodiversity;
 - North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 5.8): Policy CS18 seeks to achieve sustainable resource use and climate change mitigation/adaptation;
 - Central Lincolnshire Local Plan (2017) (Ref 5.9): A core objective seeks to protect and enhance soil and land resources and quality in Central Lincolnshire; and

- Selby District Core Strategy Local Plan (2013) (Ref 5.10): Policy SP18 Protecting and Enhancing the Environment requires that new developments protect soil, air and water quality from all types of pollution.

Guidance

- 5.2.6 Several standards and non-statutory guidelines, which provide details of assessment methodologies and mitigation techniques, are relevant to the assessment of Agriculture and Soils. Where appropriate these have been taken into account in undertaking this assessment. These include:
- DEFRA (2009) Safeguarding our Soils: A Strategy for England (Ref 5.11);
 - Natural England (2012). Technical Information Note 049. Agricultural Land Classification (ALC) Protecting the Best and Most Versatile Agricultural Land (Ref 5.12);
 - Natural England (2021). Guide to assessing development proposals on agricultural land (Ref 5.13);
 - The British Society of Soil Science (2022). Guidance Note: Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (Ref 5.14);
 - British Standard Specification for Topsoil and Requirements for Use (BS3882:2015) (Ref 5.15);
 - DEFRA (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 5.5);
 - National Highways et al. (2019). Design Manual for Roads and Bridges (DMRB) LA 109: Geology and Soils (Ref 5.16);
 - Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Good Practice Guide for Handling Soils. Cambridge: The Farming and Rural Conservation Agency (Ref 5.17);
 - MAFF (1988) Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (Ref 5.18);
 - Institute of Environmental Management & Assessment (IEMA), 2022. A new perspective on land and soil in Environmental Impact Assessment (Ref 5.19); and
 - Department for Levelling Up, Housing and Communities (2019). Planning Practice Guidance for the Natural Environment (NPPG) (Ref 5.20).

5.3 EIA Scoping Opinion and engagement

- 5.3.1 A summary of the Environmental Impact Assessment (EIA) Scoping Opinion from the Planning Inspectorate (PINS) and responses to this EIA Scoping Opinion are outlined below. Furthermore, all relevant engagement undertaken to date is outlined in this Section.

Response to the EIA Scoping Opinion

- 5.3.2 An EIA Scoping Opinion (Appendix 1.2: EIA Scoping Opinion (Volume III)) was received by the Applicant from PINS on 20 May 2022. Table 5.1 lists the comments that PINS

and consultation bodies made in relation to Agriculture and Soils and shows how the Applicant is responding to these.

Table 5.1: Summary of EIA Scoping Opinion in relation to Agriculture and Soils

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
3.1.1	Temporary loss of agricultural land, including BMV land – construction and decommissioning	<p><i>The Applicant proposes to scope out temporary loss of agricultural land including BMV land during construction and decommissioning, as it will be fully reinstated following completion of construction and mitigation will be in place for soil handling and reinstatement. Measures will be described in a Construction Environmental Management Plan (CEMP) and Soil Resource Plan (SRP). Potential effects on soil function will also be assessed separately.</i></p> <p><i>The Inspectorate notes that the Scoping Report does not present information about the extent or duration of any temporary loss of agricultural land during construction and decommissioning. This information should be provided in the ES. Where final details are not known, the maximum possible extent should be provided.</i></p> <p><i>The Inspectorate agrees that, on the basis that effects would be temporary and reduced through implementation of mitigation measures as described in the Scoping Report, these matters can be scoped out of the ES.</i></p>	<p>Agreement in relation to the scoping out of effects associated with the temporary loss of agricultural land, including BMV land, is noted.</p> <p>The extent and duration of the temporary loss of agricultural land will be set out in the ES and a clear commitment will be given in relation to how soil handling (stripping, stockpiling and reinstatement) would be undertaken in accordance with good practice and any aftercare requirements.</p>

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
3.1.2	Permanent loss of agricultural land, including BMV land – pipeline land during operation	<p><i>The Applicant proposes to scope out assessment of permanent loss of agricultural land, including BMV land, as a result of the operation of the pipelines (noting the approach to AGIs is different). It is stated that any maintenance or repair works would be undertaken in accordance with good practice soil handling methods and therefore no significant effects are likely to occur.</i></p> <p><i>The Inspectorate agrees this matter can be scoped out on that basis and that there would be limited permanent land loss associated with the pipeline component.</i></p>	<p>Agreement noted.</p> <p>The extent of the temporary impact on agricultural land will be set out in the ES and a clear commitment will be given in relation to how soil would be re-used in accordance with good practice.</p>
3.1.3	Agricultural landholdings – operation and decommissioning	<p><i>It is proposed to scope out effects to agricultural landholdings during operation and decommissioning, as the majority of land required would be returned to its pre-construction land use (aside from the AGI footprints during operation) and other potential impacts during decommissioning (e.g. due to disturbance, fragmentation, access restrictions or disruption to water supplies and land drainage) could be managed through a Decommissioning Environmental Management Plan (DEMP). Effects on land drainage are also proposed to be considered</i></p>	<p>Agreement noted, this matter will not be assessed further within the ES.</p>

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
		<p><i>separately as part of the hydrology and land drainage assessment (see Chapter 16 of the Scoping Report).</i></p> <p><i>The Inspectorate agrees that these matters can be scoped out on the basis presented in the Scoping Report.</i></p>	
3.1.4	Soil quality and associated ecosystem services - operation	<p><i>The Applicant proposes to scope out soil quality during operation as the majority of land required for construction will be returned to its pre-construction use and effects to soil and its functions are therefore likely to be limited. Permanent loss of agricultural land at AGIs, including BMV, is scoped into the ES. Operational maintenance and repair works that could result in disturbance to soil are proposed to be undertaken in accordance with good practice soil handling methods.</i></p> <p><i>The Inspectorate agrees that this matter can be scoped out on the basis presented in the Scoping Report.</i></p>	<p>Agreement noted; the impact on soil quality during operation will not be assessed further within the ES.</p> <p>The extent of the permanent loss of agricultural land will be set out in the ES and a clear commitment will be given in relation to how soil would be re-used in accordance with good practice.</p>
3.1.5	Economic effects on landowners – construction, operation and decommissioning	<p><i>The Applicant proposes to scope out economic effects to landowners, noting that this matter will be addressed via separate agreements that are stated to be outside the scope of the EIA.</i></p> <p><i>Based on the information presented in the Scoping Report, the Inspectorate agrees that economic effects on</i></p>	<p>Agreement noted, this matter is not assessed further within the ES.</p>

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
		<i>landowners are not likely to result in significant effects and this matter can be scoped out.</i>	
3.1.6	Baseline conditions and surveys	<p><i>The Scoping Report describes data that will be used to establish the baseline conditions. The Applicant proposes to undertake targeted agricultural land classification (ALC) surveys at AGI locations alongside desktop review of existing information sources.</i></p> <p><i>The study area for the ALC survey should have sufficient coverage to ensure that the baseline conditions are understood for all areas of agricultural land where significant effects are likely to occur. In this regard, it is noted that Figure 4.2 of Scoping Report Volume II, Part 1 indicates that the pipeline route is primarily BMV land (Grade 1 to 3) and as such the Inspectorate considers that the ALC survey should also incorporate targeted locations along the pipeline route. The Applicant should make effort to agree the scope of the ALC survey with relevant consultation bodies, including local authorities.</i></p>	<p>A full detailed ALC survey will be undertaken, in accordance with published guidelines, at 100 m intervals along the pipelines route, with further survey points to cover additional land required, for example for temporary construction compounds and AGIs. As results from the surveys become available these will be shared with Natural England and the scope amended if required following consultation.</p>
3.1.7	Mitigation	<i>Paragraph 4.7.1 of the Scoping Report explains that an outline SRP would be developed and a detailed SRP would be in place prior to any soil handling operations commencing. The</i>	<p>An outline SRP, based on the ALC survey results, will be submitted as part of the ES. The existing conditions will form the basis by which a</p>

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
		<i>Inspectorate considers that a draft or outline of the SRP should be submitted as part of the ES. It should describe how a benchmark for soil quality will be established to reference during reinstatement. The Scoping Report also refers to various other mitigation measures, for example processes in the event of animal disease breakout and agreements with farmers to minimise impacts. The ES should identify how any measures that are relied upon to mitigate environmental effects will be secured.</i>	benchmark for soil quality, once land has been reinstated, will be set. All mitigation measures will be secured through a Register of Commitments which will be secured through the DCO. This would include the appointment of an Agricultural Liaison Officer (ALO) to ensure close liaison between landowners and the Project.
3.1.8	Effects to soil quality/function during construction	<i>Paragraph 4.8.2 of the Scoping Report describes some potential impacts to soil quality during construction, including disturbance from excavation and soil stripping. No specific reference is made in this section to other potential impacts, e.g. compaction from the presence of construction vehicles or heavy machinery. These impacts should be considered in the assessment, where significant effects are likely to occur.</i>	The EIA Scoping Report only provides some examples of potential impacts. The ES will assess all potential impacts; soil compaction is a major potential threat to soil condition and health and the SRP will set out the baseline and the measures by which compaction would be avoided or, if it occurs, remediated.
3.1.9	Permanent loss of agricultural land during operation of the AGIs	<i>The Scoping Report states that permanent loss of agricultural land during operation of the AGIs is proposed to be scoped into the ES at this stage but could be scoped out</i>	The agreement is noted, and the full ALC survey results will be included within the ES and used to form the basis for the outline SRP which will also be submitted with the ES.

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
		<i>following completion of the ALC survey, where it shows loss of agricultural land is below the magnitude threshold for a likely significant effect. The Inspectorate agrees that the Applicant can proceed on this basis. The ALC survey should be included within the ES.</i>	
Natural England Scoping Consultation Response	Impacts on soil quality/ function	<i>Natural England notes that the degree to which soils would be disturbed or damaged, as part of the development, should be considered and, where appropriate, be included as part of the ES. The ES should also set out details of how any adverse impacts on soils can be avoided or minimised and demonstrate how soils will be sustainably used and managed, including consideration in site design and master planning, and areas for green infrastructure or biodiversity net gain.</i>	The ES will include the results from a detailed ALC survey, undertaken in accordance with the published guidelines. This will form the basis for an outline SRP which will set out the measures which would be employed to minimise impacts on soil quality and how soils stripped from areas of permanent infrastructure would be re-used. The SRP will also detail how the soils in areas proposed for biodiversity net gain have been assessed to be suitable to support the required habitats.
Natural England Scoping Consultation Response	Impacts on Agricultural land	<i>Natural England notes that the extent to which agricultural land would be disturbed or lost as part of this development, including whether any BMV agricultural land would be impacted, should be considered and, where appropriate, be included as part of the ES. The ES should also set out details of how any adverse impacts on</i>	The ES will include the results from a detailed ALC survey, undertaken in accordance with the published guidelines. This will form the basis for an outline SRP which will set out the measures which would be employed to minimise impacts on soil quality and ensure that land being returned to agriculture can be returned to the pre-construction grade and condition and

Section reference	Applicant's proposed matter	Inspectorate's / consultation bodies comments	Response
		<i>BMV agricultural land can be minimised through site design/masterplan.</i>	<p>how soils stripped from areas of permanent infrastructure would be re-used.</p> <p>Given the extent of BMV land in this area opportunities for route changes to avoid BMV land are considered to be limited. The iterative design process will be detailed in Chapter 2 Project Description and Chapter 4: Consideration of Alternatives of the ES and will detail any changes which have been made to reduce the impacts on BMV land.</p>
East Lindsey District Council Scoping Consultation Response	Agriculture and Soils	East Lindsey District Council has no comments to make at this time.	-

Engagement undertaken to date

5.3.3 Table 5.2 provides a summary of the engagement undertaken to inform the assessment to date.

Table 5.2: Summary of engagement undertaken

Consultee	Date and method of engagement	Summary of issues raised	Response
Lincolnshire County Council	08 March 2022 (email)	The proposed methodology for the assessment of Agriculture and Soils was presented to officers of the Lincolnshire County Council.	Awaiting response from Lincolnshire County Council.
West Lindsey County Council	08 March 2022 (email)	The proposed methodology for the assessment of Agriculture and Soils was presented to officers of West Lindsey County Council.	Awaiting response from West Lindsey County Council.
North Yorkshire County Council	08 March 2022 (email)	The proposed methodology for the assessment of Agriculture and Soils was presented to officers of the North Yorkshire council.	Awaiting response from North Yorkshire Council.
North Lincolnshire Council	08 March 2022 (email)	The proposed methodology for the assessment of Agriculture and Soils was presented to officers of the North Lincolnshire council. On 8 March 2022, officers confirmed they had no concerns or comments to raise.	Agreement noted.
East Riding of Yorkshire Council	08 March 2022 (email)	The proposed methodology for the assessment of Agriculture and Soils was presented to officers of the East Riding council. On the 14 and 15 March 2022, officers from Planning and Biodiversity confirmed they had no concerns or	In response to the comment, the new IEMA guidance is unlikely to change the overall methodology. However, noted to the county officers that in subsequent documents we will set out any

Consultee	Date and method of engagement	Summary of issues raised	Response
		comments to raise. Rural Policy and Partnerships raised whether the new IEMA guidance would impact the proposed methodology.	additions/changes because of the published IEMA guidance.
Natural England	31 March 2022 (email)	Email sent to Natural England for contact details of their soil's specialist in view of a future discussion.	Awaiting response from Natural England.
Natural England	5 March 2022 (virtual meeting)	The approach to baseline data collection, surveys, assessment methodology and scope were presented.	No specific comments raised – Natural England confirmed the information presented would be shared for review with the relevant specialists.

5.4 Assessment methodology and significance criteria

Study Area

- 5.4.1 The Study Area for soils and ALC comprises the land which would be directly affected by the Project (through disturbance or temporary covering of the soils). This will be based on the Proposed Order Limits (see Figure 2.1 (Volume IV)). This is considered appropriate based on technical knowledge of similar projects (for example, the Milford Haven to Tirley High Pressure Gas Pipeline).
- 5.4.2 In relation to farm businesses, the Study Area comprises the agricultural land which is likely to be directly affected by the Project (through, for example, disturbance, temporary covering of the ground or access restrictions) and will be extended where required to provide context to the businesses affected. The extent of this will be confirmed during engagement with the landowners.

Baseline data collection

- 5.4.3 Baseline conditions have been assessed for the PEIR from desk-based information, as set out below. In addition, a suite of site surveys are being undertaken and will be used to fully assess the baseline conditions in the ES.

Desk study

- 5.4.1 Baseline conditions of the Project have been established through a desk study using the following sources:
- Ordnance Survey mapping and aerial imagery to establish land use (Ref 5.21);
 - Soilscape mapping showing the distribution of main soil types was assessed on the Land Information System website (Ref 5.22);
 - ALC mapping, including provisional and (where available) detailed ALC mapping from the MAGIC website (Ref 5.23);
 - The extent of agri-environmental and woodland/forestry schemes from the MAGIC website (Ref 5.23); and
 - Flood risk along the route from the Flood Risk for Planning website (Ref 5.24).

Site visits and surveys

- 5.4.2 A site walkover and targeted soil and ALC surveys will be undertaken within the Proposed Order Limits. A walkover will be undertaken to assess agricultural land use and ground truth information gained from the desk-based review of aerial photographs.
- 5.4.3 A detailed ALC survey will be undertaken in accordance with published MAFF guidelines (Ref 5.18). The survey will comprise the description of soil profiles at a density of one survey point (using a hand auger) every 100 m along the route (within the Proposed Order Limits where land access is granted or obtained). The soil profile will be described to a depth of 1.2 m (where possible), supplemented by the digging of occasional small pits.
- 5.4.4 Additional auger borings will be made in locations where permanent infrastructure, such as AGIs, or temporary working areas, such as construction compounds, are proposed.

- 5.4.5 A composite soil sample will be collected from each field and sent to an accredited laboratory for testing for pH, available phosphorus, potassium and magnesium, organic matter and particle size distribution (i.e. soil texture).
- 5.4.6 The full results from the ALC survey, including maps showing the distribution of ALC grades within the Proposed Order Limits, will be submitted with the ES.

Impact assessment methodology

- 5.4.7 This section sets out the proposed methodology for the agriculture and soils assessment.
- 5.4.8 There are no legislative requirements governing the assessment of agricultural matters, and the framework of any assessment is derived from a combination of national agricultural and land use policies and guidance, along with expert judgement. The key elements of these can be summarised as:
- The conservation of the BMV resources of agricultural land;
 - Retention of a competitive and sustainable agricultural industry;
 - The diversification of individual farm businesses into supplementary non-agricultural activities; and
 - The more positive engagement of individual farm businesses with the delivery of environmental benefits.
- 5.4.9 Published guidance relating to soils and land grade (as defined by the ALC system) is limited. The approach taken will follow the recently published IEMA guidance (Ref 5.19) as set out in the following sections.

Significance criteria

- 5.4.10 The assessment will be based on guidance set out by the IEMA on how land and soil should be assessed in an EIA. This recently published guidance and the sensitivity and magnitude tables have been based on guidance set out in the DMRB LA109 (Ref 5.16) which has traditionally been used to assess the impacts of both highways' projects and other linear infrastructure projects on agriculture and soil receptors.
- 5.4.11 The IEMA guidance (Ref 5.19) seeks to move practice away from a narrow focus on quantifying and financially compensating impacts on agricultural land and advocates a new and wider approach to assessing the soil functions, ecosystem services and natural capital provided by land and soils.
- 5.4.12 The sensitivity of receptors will be assessed based on the criteria set out in Table 5.3 below.

Table 5.3: Sensitivity of Receptors Criteria

Receptor Sensitivity (in-situ)	Soil resource and soil functions
Very High	<p>Biomass production: ALC Grades 1 & 2</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar; Peat soils; Soils supporting a National Park, or Ancient Woodland</p> <p>Soil carbon: Peat soils</p> <p>Soils with potential for ecological/landscape restoration</p> <p>Soil hydrology: Very important catchment pathway for water flows and flood risk management</p> <p>Archaeology, Cultural heritage, Community benefits and Geodiversity: Scheduled Monuments and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/educational access to land covered by National Park designation</p> <p>Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access)</p>
High	<p>Biomass production: ALC Grade 3a</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, Sites of Special Scientific Interest (SSSI) or Areas of Outstanding Natural Beauty (AONB), Special Landscape Area and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation</p> <p>Soil carbon: Organo-mineral soils (e.g. peaty soils)</p> <p>Soil hydrology: Important catchment pathway for water flows and flood risk management</p> <p>Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens; Regionally Important Geological and Geomorphological Sites (RIGS); Soils supporting community/recreational/educational access to RIGS and AONBs;</p> <p>Source of materials: Surface mineral reserves that would be sterilised (i.e., without future access)</p>
Medium	<p>Biomass production: ALC Grade 3b</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; Non-Native Forest and woodland soils</p> <p>Soil carbon: Mineral soils</p> <p>Soil hydrology: Important minor catchment pathway for water flows and flood risk management</p>

Receptor Sensitivity (in-situ)	Soil resource and soil functions
	<p>Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land</p> <p>Source of materials: Surface mineral reserves that would remain accessible for extraction</p>
Low	<p>Biomass production: ALC Grade 4 and 5</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils</p> <p>Soil carbon: Mineral soils</p> <p>Soil hydrology: Pathway for local water flows and flood risk management</p> <p>Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/educational access to land</p> <p>Source of materials: Surface mineral reserves that would remain accessible for extraction</p>
Negligible	<p>As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions</p>

5.4.13 The magnitude of impacts will be assessed based on the criteria set out in Table 5.4 below.

Table 5.4: Magnitude of Impacts Criteria

Magnitude of impact (change))	Description of impacts restricting proposed land use
High	<p>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 set out in Table 5.3 above, as advised by other topic specialists in EIA team (including effects from ‘temporary developments’*)</p> <p>or</p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20 ha, or gain in soil-related features set out in Table 5.3 above, as advised by other topic specialists in EIA team (including effects from ‘temporary developments’*)</p>
Medium	<p>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 set out in Table 5.3 above, as advised by other topic specialists in EIA team (including effects from ‘Temporary Developments’*)</p> <p>or</p> <p>Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20 ha, or gain in soil-related features set out in Table 5.3 above, as advised by other topic specialists in EIA team</p>
Low	<p>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 set out in Table 5.3 above, as advised by other topic specialists in EIA team</p> <p>or</p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5 ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in Table 5.3 above, as advised by other topic specialists in EIA team</p>
Negligible	<p>No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use</p>

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

5.4.14 The significance of an effect is then derived using the matrix set out in Table 5.5 below. This may be supplemented by technical judgement which, where used, will be explained to give the rationale behind the values assigned. Overall significance will also be

concluded for each aspect of agriculture and soils, taking into consideration the potential for the Project to affect more than one attribute of soils or a landholding.

Table 5.5: Significance matrix

Sensitivity of receptor		Magnitude of impact			
		Negligible	Low	Medium	High
	Very High	Slight	Moderate or large	Large or very large	Very large
	High	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral or slight	Neutral or slight	Neutral or slight	Slight

Assumptions and limitations

5.4.15 There are currently no identified limitations associated with undertaking the assessment as set out in this Chapter. A further review will be undertaken in the ES, in particular if it has not been possible to complete the full coverage of ALC surveys proposed (for example due to lack of access agreements).

5.5 Baseline Condition

5.5.1 The Proposed Order Limits have been separated into five sections within the Project Description, namely:

- Section 1 - Drax to Keadby;
- Section 2 - Keadby to Scunthorpe;
- Section 3 - Scunthorpe to Killingholme;
- Section 4 - Killingholme to Hedon (Humber Crossing); and
- Section 5 - Hedon to Easington.

5.5.2 The baseline is set out below for each section.

5.6 Existing Baseline

Section 1 – Drax to Keadby

5.6.1 Table 5.6 below sets out the relevant baseline conditions for Section 1 – Drax to Keadby.

Table 5.6: Baseline for Section 1 - Drax to Keadby

	Description
Bedrock	Section 1 - Drax to Keadby is underlain by two different solid geological areas (Figure 9.2 (Volume IV)). The western portion by the Sherwood Sandstone formation and the eastern portion by Mercia Mudstone.
Superficial Deposits	Within floodplains, the solid geology (Figure 9.1 (Volume IV)) is covered by drift deposits primarily of Alluvium (Quaternary clay, silt, sand and gravel) and Warp (clay-silt). Outside the floodplains, drift geology is either absent or consists of the Hemingborough Glaciolacustrine Formation (clay-silt), peat or the Brighton Sand Formation (sand).
Soil Types	Predominately, the soils are described as being loamy and clayey soils with naturally high groundwater levels, as developed in the alluvial deposits (Figure 5.1 (Volume IV)). In the western portion, nearer to Drax, small areas of soil can be described as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.
Provisional ALC	The Provisional ALC mapping (Figure 5.2 (Volume IV)) shows that the soils formed in the alluvial and warp deposits are of a high grade, predominantly Grade 2 with some areas of Grade 1 land (i.e. BMV land). Grade 3 land is mapped in smaller areas of this section, where the solid or drift geology impose some limitations to the land quality (likely due to a wetness limitation).
Detailed ALC	Limited detailed ALC mapping is available, with the available mapping in this section primarily focussed in areas surrounding Drax (Figure 5.3 (Volume IV)). In these areas it confirms the presence of BMV agricultural land within or in close proximity to the Proposed Order Limits.
Land Use	Land use appears to be predominantly arable. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 5.4 (Volume IV)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 5.5 (Volume IV)).
Climate	The route from Drax to Keadby has an average annual rainfall (AAR) of 613 mm/year, an accumulated temperature (AT0) of 1414 Day °C Jan-Jun, and 128 Field Capacity Days (FCD). Moisture Deficits on

	Description
	this part of the route for wheat and potatoes are 115 mm and 110 mm respectively (Ref 5.25).
Flood Risk	The area between Drax and the River Trent is of high flood risk (primarily Flood Zone 3). Flood risk mapping detailed in Figure 17.2 (Volume IV).

Section 2 – Keadby to Scunthorpe

5.6.2 Table 5.7 below sets out the relevant baseline conditions for Section 2 – Keadby to Scunthorpe.

Table 5.7: Baseline for Section 2 - Keadby to Scunthorpe

	Description
Bedrock	This section is underlain by five different solid geological areas (Figure 9.2(Volume IV)). In the western portion nearer to Keadby, the solid geology consists of Mercia Mudstone and the Penarth Group. In the eastern portions moving closer towards British Steel, the solid geology consists of the Scunthorpe Mudstone Formation, Frodingham Ironstone Member, and the Charmouth Mudstone Formation.
Superficial Deposits	Within the floodplains of the River Trent, in the western portion of this section, the solid geology is covered by drift deposits primarily of Alluvium (Quaternary clay, silt, sand and gravel) and Warp (clay-silt) (Figure 9.1 (Volume IV)). Moving eastwards towards British steel, the drift geology primarily consists of the Sutton Sand Formation (sand), with small, scattered areas of peat.
Soil Types	Around Keadby the soils are described as being loamy and clayey soils with naturally high groundwater levels, as developed in the alluvial deposits (Figure 5.1 (Volume IV)). Moving westwards, towards to British Steel, the soils are described as being freely draining slightly acid sandy soils, with small pockets of sandy loam soils, as developed in the sandy deposits.
Provisional ALC	The Provisional ALC mapping (Figure 5.2 (Volume IV)) shows that the soils formed in the alluvial and warp deposits (in areas surrounding the River Trent) are of a high grade, predominantly Grade 1 and Grade 2 land (i.e. comprising BMV land). Moving westwards, in soils developed over sandy deposits, the land primarily consists of Grade 3, with a significant portion mapped as non-agricultural land. Small areas also mapped as being Grade 4.
Detailed ALC	Limited detailed ALC mapping is available (Figure 5.3 (Volume IV)), with existing mapping showing only the presence of Grade 3 land.

	Description
Land Use	The land use appears from aerial imagery to be predominantly arable, with areas of industry in and around the British Steel site. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 5.4 (Volume IV)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 5.5 (Volume IV)).
Climate	The route from Keadby to Scunthorpe has an AAR of 585 mm/year, an AT0 of 1413 Day °C Jan-Jun and has 127 FCD. Moisture Deficits on this part of the route for wheat and potatoes are 111 mm and 102 mm respectively (Ref 5.25).
Flood Risk	Areas in the vicinity of the River Trent are within areas of high flood risk (Flood Zones 2 and 3). Moving westwards and beyond the floodplain, flood risk becomes minimal (Flood Zone 1). Flood risk mapping detailed in Figure 17.2 (Volume IV).

Section 3 – Scunthorpe to Killingholme

5.6.3 Table 5.8 below sets out the relevant baseline conditions for Section 3 –Scunthorpe to Killingholme.

Table 5.8: Baseline for Section 3 – Scunthorpe to Killingholme

	Description
Bedrock	This section is underlain by several different solid geologies (Figure 9.1 (Volume IV)). In the western portion near to British Steel, the solid geology is dominated by the Frodingham Ironstone Member, various Mudstone Formations, as well as by Kirton Cementstone Beds (which is made up of a mixture of mudstone and limestone). In the eastern portion of the section, the solid geology is dominated by chalk formations, in particular the Burnham Chalk Formation and the Welton Chalk Formation.
Superficial Deposits	Across the western portion of the section, the solid geology is covered by drift deposits of the Sutton Sand Formation (sand) (Figure 9.2 (Volume IV)). This transitions to that of Alluvium (Quaternary clay, silt, sand and gravel) around the River Ancholme. Moving eastwards, drift geology is either not present or consists of glacial formations (diamicton or sand-gravel). In the furthest east reaches of this section around the River Humber, drift geology consists of tidal flat deposits (sand-clay).
Soil Types	The soils of western portion of the section are described as being freely draining lime-rich loamy soils, as developed in the mudstone deposits (Figure 5.1 (Volume IV)). In areas around the River Ancholme, the soils are described as being loamy and clayey soils with naturally high groundwater levels, consistent with the presence of alluvial deposits. In eastern parts of the section, the soils are variable transitioning between freely draining acid-base rich soils and

	Description
	that of impeded drainage acid-loamy soils, to that of loamy and clayey soils with naturally high groundwater adjacent to the River Humber.
Provisional ALC	The Provisional ALC mapping (Figure 5.2 (Volume IV)) shows that the soils formed in the alluvial deposits (in areas surrounding the River Ancholme) are of a high grade, predominantly Grade 2 land (i.e. comprising BMV land). Moving westwards, ALC grading transitions to Grade 3, with some areas mapped as Grade 2 and Grade 1.
Detailed ALC	Limited detailed ALC mapping is available (Figure 5.3 (Volume IV)), with existing mapping confirming only the presence of Grade 2, Grade 3a and Grade 3b land.
Land Use	Land use appears from aerial imagery to be predominantly arable, with areas of industry in and around British Steel. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 5.4 (Volume IV)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 5.5 (Volume IV)).
Climate	The route from Scunthorpe to Killingholme has an AAR of 629 mm/year, an AT0 of 1410 Day °C Jan-Jun and has 141 FCD. Moisture Deficits on this part of the route for wheat and potatoes are 110 mm and 101 mm respectively (Ref 5.25).
Flood Risk	Areas adjacent to rivers (i.e. the River Ancholme and the River Humber) fall within their floodplains and thus, have high flood risk (Flood Risk 3 and 2). The majority of land does not fall into these areas, and as such have minimal flood risk. Flood risk mapping detailed in Figure 17.2 (Volume IV).

Section 4 - Killingholme to Hedon (Humber Crossing)

5.6.4 Table 5.9 below sets out the relevant baseline conditions for Section 4 – Killingholme to Hedon.

Table 5.9: Baseline for Section 4 - Killingholme to Hedon

	Description
Bedrock	Underlain by two chalk formations (Figure 9.2 (Volume IV)), the solid geology of the southern side of the Humber (Killingholme) consists of the Burnham Chalk Formation. The Northern side (Saltend) consists of the Flamborough Chalk Formation.
Superficial Deposits	The solid geology is primarily covered by Tidal Flat Deposits (clay and silt), with smaller scattered areas in and around the northern side of the Humber being covered by Kelsey Hill Gravels (sand and gravel) (Figure 9.1 (Volume IV)).

Soil Types	Adjacent to the River Humber, the soils are described as being loamy and clayey soils of coastal flats with naturally high groundwater (Figure 5.1 (Volume IV)).
Provisional ALC	The Provisional ALC mapping (Figure 5.2 (Volume IV)) shows that the land on the southern side of the Humber is primarily Grade 3. The northern side of the Humber, the land is primarily Grade 2.
Detailed ALC	No detailed ALC mapping is available on the southern side of the Humber (Figure 5.3 (Volume IV)). On the northern side of the Humber, detailed ALC mapping is available around Saltend and shows the presence of a mixture of Grade 2, Grade 3a and Grade 3b land.
Land Use	Land use appears from aerial imagery to be predominantly arable. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 5.4 (Volume IV)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 5.5 (Volume IV)).
Climate	The route from Killingholme to Hedon (Humber Crossing) has an AAR of 600 mm/year, an AT0 of 1402 Day °C Jan-Jun and has 132 FCD. Moisture Deficits on this part of the route for wheat and potatoes are 116 mm and 110 mm respectively (Ref 5.25).
Flood Risk	Adjacent to the River Humber, the Killingholme to Saltend section has high flood risk (Flood Zone 3). Flood risk mapping detailed in Figure 17.2 (Volume IV).

Section 5 - Hedon to Easington

5.6.5 Table 5.10 below sets out the relevant baseline conditions for Section 5 –Hedon to Easington.

Table 5.10: Baseline for Section 5 - Hedon to Easington

	Description
Bedrock	This section is underlain by the Flamborough Chalk Formation (Figure 9.2 (Volume IV)).
Superficial Deposits	Across the Saltend to Easington section, the solid geology (Figure 9.1 (Volume IV)) is primarily covered by Tidal Flat Deposits (clay and silt) and by small scattered areas of Kelsey Hill Gravels (sand and gravel) in the western portion. The eastern portion transition to Devensian till (diamicton) until landfall.
Soil Types	Adjacent to the River Humber, the soils are described as being loamy and clayey soils of coastal flats with naturally high groundwater (Figure 5.1 (Volume IV)). In areas adjacent to the North Sea, soils transition to slightly acid loamy and clayey soils with impeded

	drainage as well as, slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
Provisional ALC	The Provisional ALC mapping (Figure 5.2 (Volume IV)) shows that the land is primarily Grade 2, with small areas adjacent to North Sea coast (around Easington) being Grade 3.
Detailed ALC	Detailed ALC mapping (Figure 5.3 (Volume IV)) is available around Saltend and shows the presence of a mixture of Grade 2, Grade 3a and Grade 3b land. No detailed ALC mapping is available for the rest of this section.
Land Use	Land use appears from aerial imagery to be predominantly arable. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 5.4 (Volume IV)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 5.5 (Volume IV)).
Climate	The route from Hedon to Easington has an AAR of 615mm/year, an AT0 of 1399 Day°C Jan-Jun and has 135 FCD. Moisture Deficits on this part of the route for Wheat and Potatoes are 113 mm and 106 mm respectively (Ref 5.25).
Flood Risk	Land adjacent to the River Humber lies within a high flood risk area (Flood Zone 3). As topography changes moving away from the River Humber and towards the North Sea, flood risk becomes minimal. Flood risk mapping detailed in Figure 17.2 (Volume IV).

5.7 Future Baseline

- 5.7.1 The baseline in relation to soils and ALC grades is unlikely to change from that described over the timescales considered in the assessment for the construction of the Project. The UK Climate Projections (Ref 5.26) provide an assessment of likely climate change trends for the 21st century, with potential changes including wetter winters and drier summers (with higher intensity rainfall), that could affect soil conditions, land grade and farming practices. However, these are unlikely to manifest as noticeable changes in land grade or land management over the time period of the construction phase.
- 5.7.2 There could potentially be changes to land management practices and business approaches across the landowners/land managers. The relevance of any potential future known or planned changes to the assessment of impacts will be covered in the ES.
- 5.7.3 Over the timeframe of the operation of the Project the impacts of climate change in relation to rainfall amounts/intensity and temperature changes have the potential to impact on the productivity of the land and potentially on land grade. For example, increased temperatures and reduced rainfall amounts may increase the draughtiness limitation present in some soils whilst reducing potential wetness limitations in those soils with a heavier texture and/or restricted drainage. However, a report commissioned by the Welsh Government (Ref. 5.27) states that the overall impact of climate change on cropping outcomes in the UK remains unclear due to this balance of potentially positive and potentially negative effects. The report suggests that the potential for

adaptation and innovation within the agricultural sector, as well as the introduction of crops not usually grown in the UK, may counter the climate change effects as they emerge. As such, whilst the baseline may change over the operational timeframe, it is not considered that this would have a material impact on the outcomes from how the land is managed and used.

5.8 Design development, impact avoidance and embedded mitigation

- 5.8.1 The mitigation measures detailed in this section have been considered as an inherent part of the Project and therefore have been considered as part of the Project in the assessment of potential impacts and possible likely significance of effects. The embedded mitigation measures include the following:
- Primary mitigation measures – these are inherent aspects of the Project’s design; and
 - Tertiary mitigation measures – these are aspects that would occur with or without input from the EIA (for example, compliance with legislative requirements or the preparation of a Construction Environmental Management Plan (CEMP), including standard best practice measures).
- 5.8.2 The land required to construct the Project has been rationalised to ensure the minimum extent of land is disturbed. The use of trenchless systems would eliminate disturbance to the soils and land in some short sections.
- 5.8.3 It is proposed that a Register of Commitments is produced for the Project. This will set out environmental actions and commitments (also described in this section) and how they are to be secured. The register will secure the implementation of measures set out within the Project CEMP and the Decommissioning Environmental Management Plan (DEMP).
- 5.8.4 Measures applicable to agriculture and soils are described below.
- 5.8.5 The temporary nature of many of the construction activities and the subsequent restoration of the land is likely to result in the minimisation of potential long-term impacts on agricultural and soil receptors. In addition, the following good practice measures relating to agriculture and soils would be implemented:
- A CEMP and a DEMP would be produced. The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans.
 - Earthworks and stockpiled soil would be protected by seeding or using water suppression where appropriate.
 - Soil management measures would be set out in a Soil Management Plan (SMP) as part of the CEMP. Measures would include, but not be limited to, the following:
 - the soil resources present would be detailed in a Soil Resources Plan (SRP) to include details of ALC grades and profile characteristics;
 - how the topsoil and subsoil would be stripped and stockpiled;

- suitable conditions for when soil handling would be undertaken, for example avoiding handling of waterlogged soil;
 - indicative soil storage locations;
 - how soil stockpiles would be designed taking into consideration site conditions and the nature/composition of the soil;
 - specific measures for managing sensitive soils;
 - suitable protective surfacing where soil stripping can be avoided, based on sensitivity of the environment and the proposed works;
 - approach to reinstating soil that has been compacted, where required; and
 - details of measures required for soil restoration.
- Where land is being returned to agricultural use, the appropriate soil conditions (for example through the replacement of stripped layers and the removal of any compaction) would be recreated. This would be achieved to a depth of 1.2 m (or the maximum natural soil depth if this is shallower). This same depth of cover would also be achieved over the pipelines.
 - Agricultural Liaison Officer(s) (ALOs) would be appointed to be the point(s) of contact for landowners.
 - Access to and from residential, commercial, community and agricultural land uses would be maintained throughout the construction period or as agreed through landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels would be communicated to affected parties at the start of the Project, with any changes communicated in advance of the change being implemented.
 - Where field-to-field access points require alteration as a result of construction activities, alternative field access would be provided in consultation between the landowner/occupier and ALO.
 - Existing water supplies for livestock would be identified pre-construction. Where supplies would be lost or access compromised by construction works, temporary alternative supplies would be provided. Water supplies would be reinstated following construction.
 - Consultation with affected landowners will be carried out to investigate the current extent of land drainage. A scheme of pre- and post-construction land drainage would be designed with the intent of maintaining the integrity of the existing land drainage system and to assist in maintaining the integrity of the working area during construction. The Project may include a system of interceptor drains, utilising existing outfalls, to allow existing land drainage schemes to continue to function. Prior to restoration, a system of post-construction restoration drains would be installed which would replace existing lateral drains damaged by the pipeline and provide an outlet for subsoil loosening works which are required for successful soil structural restoration.
 - Should animal bones be discovered during construction, which may indicate a potential burial site, works would cease, and advice would be sought from the Animal Health Regional Office on how to proceed, relevant to the origin and age of the materials found.

- All movement of plant and vehicles between fields would cease in the event of a notification by DEFRA of a disease outbreak in the vicinity of the Project that requires the cessation of activities. Advice would be sought from DEFRA in order to develop suitable working methods required to reduce the biosecurity risk associated with the continuation of works.
- Measures contained in relevant DEFRA and Environment Agency best practice guidance on the control and removal of invasive weed species would be implemented where appropriate, such as through the appropriate use of herbicides or removal/burial of plant materials.
- Clay bungs or other vertical barriers would be constructed within trench excavations where deemed necessary by a suitably experienced person, to prevent the creation of preferential drainage pathways.
- All soils would be stored away from watercourses (or potential pathways to watercourses), and any potentially contaminated soil would be stored on an impermeable surface and covered to reduce and mitigate against any related pollution event.
- Toolbox talks would be used to inform all those working on the site of the requirements for soil handling and minimisation of disturbance to agricultural activities to minimise potential impacts on the remainder of the landholding and on neighbouring landholdings during the construction phase. Details of the proposed toolbox talks would be presented in the SMP.
- All fencing would be sufficient to resist damage by livestock (where appropriate) from adjacent land and would be regularly checked and maintained in a suitable condition. Any damage to boundary fencing would be repaired in a timely manner.
- Whilst the effects on the land holdings are not considered to be significant, consultation with the landowners would be undertaken to reduce the impacts on the farm businesses, as far as practicable. This would include agreement of assurances and obligations that the Applicant would accept upon entering the land.

5.9 Preliminary assessment of potential impacts

- 5.9.1 This Section details the preliminary assessment of potential impacts for the Project during the construction, operation and decommissioning phases.
- 5.9.2 The nature of the development (i.e. predominantly below-ground) would result in primarily short-term and temporary impacts for the construction and decommissioning, with more permanent impacts being limited to the operation of the Project, as well as to the construction of the AGIs.
- 5.9.3 The impacts during each stage are as set out in the following sections.

Construction

Soils and ALC during construction

- 5.9.4 During construction there would be a potential temporary loss of BMV land (ALC Grades 1, 2 and 3a) from agricultural productivity where land is required for construction activities.

- 5.9.5 Within the construction footprint there is the potential for the disturbance to soils due to their excavation, stripping, stockpiling and reinstatement. These activities have the potential to damage the soil physical characteristics (e.g. causing soil compaction) and result in changes to the biological functioning and associated chemistry. These changes have the potential to impact on the ecosystem services the soils provide.
- 5.9.6 There is a potential for pollution events to contaminate soil directly or for silt-laden runoff to enter surface water features.
- 5.9.7 The sensitivity of the other soil functions will be fully assessed once the soil and ALC survey data is available and the full assessments from other disciplines, such as hydrology and cultural heritage, are available.

Land use during construction

- 5.9.8 During construction there is the potential for temporary impacts on agricultural operations due to disturbance. This could, for example, result in impacts where livestock are present, cause fragmentation, cause access restrictions or result in disruption to water supplies or land drainage.

Operation

Soils and ALC during operation

- 5.9.9 During operation, there would be a permanent loss of relatively small areas of agricultural land and associated soils for the AGIs.
- 5.9.10 The potential impacts during operation will be confirmed once the results of the ALC and soil surveys are available when a full assessment of the potential loss of BMV land can be calculated, and the soil functions provided by those soils can be understood.
- 5.9.11 Any maintenance or repair works required during operation could potentially result in disturbance to soils leading to impacts on BMV land and soil functions.

Land use during operation

- 5.9.12 During operation, there would be limited impacts on agricultural operations. With a proposed cover level of at least 1.2 m over the pipelines, restrictions on agricultural operations are likely to be minimal.
- 5.9.13 Maintenance or repair works required could result in the temporary disturbance to agricultural operations.

Decommissioning

Soils and ALC during decommissioning

- 5.9.14 During decommissioning there would be a potential temporary loss of BMV land (ALC Grades 1, 2 and 3a) from agricultural productivity where land is required for decommissioning activities. There could also be the potential for land to be returned to agriculture following the decommissioning of the AGIs; this would be determined at the time of decommissioning.

- 5.9.15 As the options for decommissioning of the pipelines would leave the pipes in situ the extent of any potential impacts is considered likely to be less than the impacts identified during the construction phase.
- 5.9.16 However, within the footprint required for decommissioning activities there is the potential for the disturbance to soils due to their excavation, stripping, stockpiling and reinstatement. These activities have the potential to damage the soil physical characteristics (e.g. causing soil compaction) and result in changes to the biological functioning and associated chemistry. These changes have the potential to impact on the ecosystem services the soils provide.
- 5.9.17 There is a potential for pollution events to contaminate soil directly or for silt-laden runoff to enter surface water features.
- 5.9.18 The sensitivity of the other soil functions associated with the land areas required for decommissioning would be fully assessed once the decommissioning plans have been developed and any specific measures to protect soil functions would be detailed in the DEMP, in line with good practice at the time of decommissioning.
- 5.9.19 Where it is possible to return land to agricultural use this could have a positive impact, the magnitude of which would be dependent on the extent of land returned, the ALC grade to which it is returned and the soil functions which could be reinstated (compared to the pre-construction condition). It is assumed that land would be returned where practicable to the preconstruction condition.

Land use during decommissioning

- 5.9.20 During decommissioning there is the potential for temporary impacts on agricultural operations due to disturbance. This could, for example, result in impacts where livestock are present, cause fragmentation, access restrictions or disruption to water supplies and/or land drainage.

5.10 Mitigation and enhancement measures

- 5.10.1 This Section sets out the preliminary avoidance, mitigation and compensation measures which are likely to be required to address the potential impacts as assessed in Section 5.9, assuming primary and tertiary mitigation measures are in place.
- 5.10.2 No secondary mitigation is anticipated to be required.

5.11 Summary of the preliminary assessment of potential significant effects

- 5.11.1 Table 5.11 below summarises the preliminary assessment of potential significant effects associated with the Project.

Table 5.11: Summary of the preliminary assessment of potential significant effects

Resource/receptor	Stage	Sensitivity of resource/receptor	Description of the potential impact/change	Mitigation	Potential significant effects
Agricultural land and soil functions	Construction	Where BMV land is affected, this would be of High to Very High sensitivity.	Temporary loss of agricultural land and soil functions.	Good practice measures as set out in the CEMP and SMP.	Not significant (to be confirmed following completion of the ALC and soil surveys)
Land use	Construction	Low to Very High depending on the quality of the agricultural land and the operations being undertaken.	Temporary impacts on agricultural operations.	Good practice measures as set out in the CEMP and SMP, along with landowner agreements (which lie outwith the ES).	Not significant
Agricultural land and soil functions	Operation	Where BMV land is affected, this would be of High to Very High sensitivity.	Permanent loss of agricultural land and soil functions.	No secondary mitigation available	Significant (to be confirmed following completion of the ALC and soil surveys)
Land use	Operation	Low to Very High depending on the quality of the agricultural land and the operations being undertaken.	Permanent loss of agricultural land and the associated agricultural production from that land.	No secondary mitigation available (but managed through landowner agreements which lie outwith the ES).	Not significant
Agricultural land and soil functions	Decommissioning	Where BMV land is affected, this would be of High to Very High sensitivity.	Temporary loss of agricultural land and soil functions.	Good practice measures as set out in the CEMP and SMP.	Not significant (to be confirmed following completion of the ALC and soil surveys)

Resource/receptor	Stage	Sensitivity of resource/receptor	Description of the potential impact/change	Mitigation	Potential significant effects
Land use	Decommissioning	Low to Very High depending on the quality of the agricultural land and the operations being undertaken.	Temporary impacts on agricultural operations.	Good practice measures as set out in the CEMP and SMP, along with landowner agreements.	Not significant

5.12 Next steps

- 5.12.1 Further work is required to complete the assessments set out in this Chapter. These are summarised in the following sections.

Engagement

- 5.12.2 The scope of the proposed ALC and soil surveys will be shared with Natural England. Any comments on the scope received will be taken into account as the surveys are progressed. In addition, as survey results become available these will be shared with Natural England for information and so that any specific issues (such as the presence of organic soils) can be discussed.

Surveys

- 5.12.3 As set out in Section 5.4 of this Chapter, ALC and soil surveys, along with a land drainage surveys and a site walkover, will be undertaken.
- 5.12.4 The results from these surveys will be used to update the baseline and refine and confirm the impact assessment, in particular in relation to the potential permanent loss of BMV land and the potential impacts to soil functions.
- 5.12.5 The full results from the ALC survey, including maps showing the distribution of ALC grades within the Proposed Order Limits, will be submitted with the ES.

5.13 References

- Ref 5.1 Department of Energy & Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 24 March 2022).
- Ref 5.2 Department of Energy & Climate Change (2021) *Draft Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 23 March 2022).
- Ref 5.3 Department for Business, Energy and Industrial Strategy (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 24 March 2022).
- Ref 5.4 Department for Business, Energy and Industrial Strategy (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 23 March 2022).
- Ref 5.5 DEFRA (2009) *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. Available at: <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites> (Accessed: 23 March 2022).
- Ref 5.6 Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed: 23 March 2022).
- Ref 5.7 East Riding of Yorkshire Council (2016) *East Riding Local Plan*. Available at: <https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/> (Accessed: 22 March 2022).
- Ref 5.8 North Lincolnshire Council (2011) *North Lincolnshire Local Development Framework Core Strategy*. Available at: <https://www.northlincs.gov.uk/planning-and-environment/planning-policy-the-north-lincolnshire-local-plan/> (Accessed: 23 March 2022).
- Ref 5.9 Central Lincolnshire Joint Strategic Planning Committee (2017) *Central Lincolnshire Local Plan*. Available at: <https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan/> (Accessed: 17 February 2022).
- Ref 5.10 Selby District Council (2013) *Selby District Core Strategy Local Plan*. Available at: <https://www.selby.gov.uk/selby-district-core-strategy-local-plan> (Accessed: 22 March 2022).
- Ref 5.11 DEFRA (2009) *Safeguarding our Soils: A Strategy for England*. Available at: <https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england> (Accessed: 23 March 2022).

- Ref 5.12 Natural England (2012) *Natural England Technical Information Note 049. Agricultural Land Classification: protecting the best and most versatile agricultural land*. Available at: <http://publications.naturalengland.org.uk/publication/35012> (Accessed: 23 March 2022).
- Ref 5.13 Natural England (2021). Guide to assessing development proposals on agricultural land.
- Ref 5.14 The British Society of Soil Science (2022). Guidance Note: Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction.
- Ref 5.15 British Standards Institution (2015) *BS 3882:2015. Specification for Topsoil and Requirements for Use*. Available at: <https://shop.bsigroup.com/products/specification-for-topsoil/tracked-changes> (Accessed: 22 March 2022).
- Ref 5.16 National Highways (2019) *Design Manual for Roads and Bridges: Geology and Soils (LA109)*. Available at: <https://standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaed30b9c0> (Accessed: 23 March 2022).
- Ref 5.17 Ministry of Agriculture, Fisheries and Food (2000) *Good Practice Guide for Handling Soils. Cambridge: The Farming and Rural Conservation Agency*. Available at: <https://viking-link.com/media/1572/cda31-maff-agricultural-land-classification-in-england-and-wales-a-good-practice-for-handling-soils-april-2000.pdf> (Accessed: 22 March 2022).
- Ref 5.18 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*. Available at: <http://publications.naturalengland.org.uk/publication/6257050620264448> (Accessed: 23 March 2022).
- Ref 5.19 Institute of Environmental Management and Assessment (2022) *A new perspective on Land and Soil in Environmental Impact Assessment*. Available at: iema.net/articles/land-and-soil-in-environmental-impact-assessment (Accessed: 13 February 2022).
- Ref 5.20 Department for Levelling Up, Housing and Communities (2019) *Planning Practice Guidance for the Natural Environment*. Available at: <https://www.gov.uk/guidance/natural-environment> (Accessed: 15 June 2022).
- Ref 5.21 Google (2022) Google Maps. Available at: <https://www.google.co.uk/maps> (Accessed: 16 Feb 2022).
- Ref 5.22 Cranfield University/Department of Environmental, Food and Rural Affairs (2022) *Land Information System (LandIS) website*. Available at: www.landis.or.uk/soilscapes (Accessed: 17 Feb 2022).
- Ref 5.23 DEFRA (2022) *Multi-Agency Geographical Information System (MAGIC)*. Available at: <http://magic.defra.gov.uk> (Accessed: 17 Feb 2022).
- Ref 5.24 Environment Agency (2022) *Flood Map for Planning*. Available at: <https://flood-map-for-planning.service.gov.uk/> (Accessed: 07 August 2022).
- Ref 5.25 Met Office (1989) *Agroclimatic datasets UK Met Office (1961-1988)*.

- Ref 5.26 Met Office (2021) *UK climate continues to change in 2021* Available at: <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2022/uk-climate-continues-to-change-in-2021#:~:text=The%20latest%20annual%20report%20shows,the%20year%20across%20the%20UK> (Accessed: 07 August 2022).
- Ref 5.27 Keay, C.A.; Jones, R.J.A.; Procter, C.; Chapman, V.; Barrie, I.; Nias, I.; Smith, S.; Astbury, S. (2013). *SP1104 the Impact of climate change on the capability of land for agriculture as defined by the Agricultural Land Classification*, DEFRA 138pp.

National Grid plc,
1-3 Strand,
London.
WC2N 5EH United Kingdom

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