VikingCCS

## Viking CCS pipeline

# Preliminary Environmental Information Report Volume II

## Main PEIR

Applicant: Chrysoar Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
**November 2022**

Harbour Energy | AECOM

Chapter 10

# Agriculture and Soils

## Table of Contents



## Figures



## Tables

# 10 Agriculture and Soils

## 10.1 Introduction

10.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary assessment of the likely significant effects of the Viking CCS Pipeline (hereafter referred to as 'the Project') with respect to Agriculture and Soils. The preliminary assessment follows the methodology outlined at Scoping and is based on information obtained to date and the agreed design freeze for the PEIR assessment.

10.1.2 The chapter should be read in conjunction with the Project description provided in *Chapter 3: The Viking CCS Pipeline*. Additionally, Agriculture and Soils interface with many other aspects and as such, should be considered alongside *Chapter 6: Ecology and Biodiversity*; *Chapter 9: Geology and Hydrogeology*; *Chapter 11: Water Environment*; and *Chapter 16: Socio-economics*. This chapter is supported by **Figures 10-1**, **10-2** and **10-3** which provide details of the Agricultural Land Classification (ALC) and soil associations within the Study Area.

10.1.3 The following definitions are provided as they provide context to the chapter:

- **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. The ALC therefore assesses land quality based upon the type and level of agricultural production the land can potentially support. 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 (Ref 10-2);
- **Best and most versatile (BMV)** agricultural land is defined in the National Planning Policy Framework, 2021 (NPPF) (Ref 10-3) 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;
- **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. Soils provide 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 1.2 m, but are often shallower;
- **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; and
- **Soil Associations** (as represented in **Figure 10-3** and discussed within this chapter) are groupings of related soil series.

## 10.2 Legislation, Policy and Guidance

### Legislative Framework

10.2.1 Whilst it does not apply to the determination of this application, which will be in accordance with the provisions of the Planning Act 2008, Schedule 4, paragraph (y) of The Town and Country Planning (Development Management Procedure) (England) Order 2015 (Ref 10-4) provides some useful context for assessment of development on agricultural land. That provision requires that where a development is not for agricultural purposes and is not in accordance with the provisions of a development plan Natural England must be consulted if:

- the loss of BMV agricultural land exceeds 20 ha and the land is currently (or was last used) for agricultural purposes; or
- the loss of BMV agricultural land is less than 20 ha which is currently (or was last used) for agricultural purposes, but the development is likely to lead to a further loss of BMV land amounting cumulatively to 20 ha or more (for example if it is part of a phased development).

10.2.2 Chapter 1 of The Agriculture Act, November 2020 (Ref 10-5) 'New Financial Assistance Powers', states at Section 1 that *"the Secretary of State may give financial assistance for, or in connection with, …protecting or improving the quality of soil*". Whilst the Act does not provide guidance on how this protection or improvement should be achieved or assessed, this new measure demonstrates the importance placed on soil resources by the current government and shows a commitment to improving the overall baseline condition of UK soils.

10.2.3 The European Union's (EU) Soil Strategy for 2030 aims to deliver measures for the protection, restoration and sustainable use of soils, and proposes a set of voluntary and legally binding measures with a commitment to producing a legislative proposal on Soil Health Law by 2023. The goal is to ensure the same level of protection to soil that exists for water, the marine environment, and air. As the UK is no longer part of the EU it is unlikely to adopt the Soil Strategy or any subsequent legislation, however, the current government has stated its intention to match or better European environmental protection legislation and so it is likely that some of the principles of the 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.

### National Planning Policy

10.2.4 National Planning Policy relevant to Agriculture and Soils is detailed in **Table 10-1**.

***Table 10-1: National Planning Policy Relevant to Agriculture and Soils***

| Policy Reference | Policy Context |
|---|---|
| **National Policy Statements** | |
| Overarching National Policy Statement for Energy (EN-1) (Ref 10-6) | |
| Section 5 (Paragraph 5.10.8) | The Overarching National Policy Statement for Energy (EN-1) (Ref 10-6) is part of a suite of National Policy Statements (NPS) setting out Government policy and objectives for the development of nationally |

| Policy Reference | Policy Context |
|---|---|
| | significant infrastructure, EN-1 is focused on the delivery of major energy infrastructure.<br>*"Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination."* |
| Draft Overarching National Policy Statement for Energy (EN-1) (Ref 10-7) | |
| | The draft update to EN-1 (Ref 10 7) was issued in 2021 to address regulatory, policy and technology changes which have occurred since EN-1 was issued. The draft EN-1 is considered as it is likely to become the adopted NPS during the planning phase of the Project. Draft EN-1 retains the requirements of the current document and adds that where contamination is present, applicants should consider opportunities for remediation where possible. Applicants are also encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. |
| National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 10-8) | |
| Section 2.23 | The National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 10-8) is to be read in conjunction with EN-1. Although EN-4 only covers nationally significant infrastructure pipelines transporting natural gas or oil, it is considered in this chapter as the document itself states "*information in this NPS may be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances*". Section 2.23 of EN-4 considers the impacts of gas and oil pipelines on soil and geology and recognises the potential for the installation of pipelines to result in a loss of soil quality and the importance of understanding the soil types impacted (for example in the development of appropriate mitigation). EN-4 states that desktop studies can form the basis of the assessment and that applicants should consult with the relevant statutory consultees at an early stage. EN-4 advises that appropriate mitigation should include the correct handling, storage and reinstatement of soils (in particular topsoil) during site construction and other infrastructure activity to ensure that residual impacts on the surface are minor, for example some differential vegetation growth. It recommends reference to Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 10-9). EN-4 also recommends that the Infrastructure Planning Commission (IPC) considers what appropriate conditions should be attached to any consent. |

| Policy Reference | Policy Context |
|---|---|
| Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 10-10) | |
| | The draft update to EN-4 (Ref 10-10) was issued in 2021 to address regulatory, policy and technology changes and as such references the need for Carbon Capture and Storage (CCS) pipelines and infrastructure. EN-4 states that it does not have effect for CCS pipelines and infrastructure, highlighting that specific policies and strategies are currently being developed such that further guidance will be provided as the evidence base evolves, however in the meantime EN-4 may contain information that is important and relevant to the Secretary of State's decision on such applications. The draft EN-4 is considered as it is likely to become the adopted NPS during the planning phase of the Project. Draft EN-4 retains the requirements of the current document and adds that mitigation measures should also reference Defra's Guide to assessing development proposals on agricultural land (Ref 10 11) which is discussed below and provides guidelines on soil handling and restoration criteria and land quality. |
| **National Planning Policy Framework (Ref 10-3)** | |
| Section 15, Paragraph 174 | Under Section 15 of the NPPF 2021 (Ref 10 3): Conserving and enhancing the natural environment, Paragraph 174 states that planning policies and decisions should *"contribute to and enhance the natural and local environment by:*<br>*a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*<br>*b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*<br>*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*<br>*f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate".*<br>The footnote to Paragraph 175 also states that *"Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality".* |
| **A Green Future: Our 25 Year Plan to Improve the Environment (Ref 10-12)** | |
| Chapter 1 | A Green Future: Our 25 Year Plan to Improve the Environment (Ref 10 12) sets out the government's 25-year plan to improve the health of the environment by using natural resources more sustainably and efficiently. |

| Policy Reference | Policy Context |
|---|---|
| | Chapter 1 sets out aims to improve land management and incentivisation to deliver a more sustainable farming sector; improve soil health and manage soils in a sustainable way by 2030 including a commitment to developing appropriate management approaches and soil metrics (such as soil health index) to monitor soil quality and ensure changes are having an effect; and deliver a framework for peat restoration in England or were this is not appropriate to develop new sustainable management measures to ensure peaty topsoils are retained for as long as possible and greenhouse gas emissions are reduced. |

## Local Policy

10.2.5 The Project extends across the administrative areas of Lincolnshire County Council (LCC), North Lincolnshire Council (NLC), North East Lincolnshire Council (NELC), West Lindsey District Council (WLDC) and East Lindsey District Council (ELDC). West Lindsey District Council forms part of the Central Lincolnshire Joint Strategic Planning Committee (CLJSPC) along with the City of Lincoln and North Kesteven District Councils; as such its planning policy is delivered through the Central Lincolnshire Local Plan (Ref 10-13) which was adopted in 2017, hereafter referred to as the Plan. The Plan highlights that outside of the urban areas, land use in Central Lincolnshire is predominantly agricultural, with intensive arable crops dominating and that across Central Lincolnshire soils are mostly fertile and of high quality for agriculture. Objective L of the Plan: Natural Resources – Land Use and Soils, is therefore to "*protect and enhance soil and land resources and quality in Central Lincolnshire*".

10.2.6 Paragraphs 10.3.6 and 10.3.7 of the Plan state that BMV agricultural land should, in principle, be protected from development for various reasons including the important role agriculture plays in the local and national economy and the provision of jobs; the need to produce food locally to help minimise and adapt to climate change (for example the need to reduce 'food miles' and the anticipated climate related reduction in the ability of countries to export food to the UK); and the desire of people to source local food as a result of greater awareness of food supply. Part G of Policy LP55: Development in the Countryside, provides measures for the protection of BMV agricultural land which the Central Lincolnshire Authorities recognise as an irreplaceable resource. The policy states:

> *"Proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy. With the exception of allocated sites, development affecting the best and most versatile agricultural land will only be permitted if:*
>
> *a. There is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations);*
>
> *b. The impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and*
>
> *c. Where feasible, once any development which is permitted has ceased its useful life the land will be restored to its former use, and will be of at least equal quality to that which existed prior to the development taken place (this requirement will be secured by planning condition where appropriate)."*

10.2.7 Within the Plan soils are considered as part of geodiversity (along with rocks, minerals, fossils and landforms) which is covered by Policy LP21: Biodiversity and Geodiversity, of which the relevant parts are:

*"All development should:*

- *minimise impacts on biodiversity and geodiversity; and*
- *seek to deliver a net gain in biodiversity and geodiversity.*

*Development proposals should ensure opportunities are taken to retain, protect and enhance biodiversity and geodiversity features proportionate to their scale, through site layout, design of new buildings and proposals for existing buildings.*

*Where any potential adverse effects to the biodiversity or geodiversity value of designated sites are identified, the proposal will not normally be permitted. Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species."*

10.2.8 The Central Lincolnshire Local Plan is currently under review and a Proposed Submission Draft was issued in March 2022 (Ref 10-14), referred to hereafter as the Draft Plan. This is considered within this Chapter as it is likely to become the adopted planning policy for West Lindsey District during the planning phase of the Project. Objective L remains as originally drafted but becomes Objective 9.

10.2.9 Unlike the adopted Plan, the Draft Plan contains a specific policy for the protection of BMV land - Policy S67: Best and Most Versatile Agricultural Land. The Draft Plan specifically references the significance of agriculture across Central Lincolnshire, and the wider Lincolnshire area and the fact that this accounts for a significant proportion of the national food production. The Draft Plan also introduces a need to demonstrate that there are no other suitable alternative sites which would not impact BMV land and a need for an agricultural land classification statement. Policy S67 states:

*"Proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy.*

*With the exception of allocated sites, development resulting in the loss of the best and most versatile agricultural land will only be supported if:*

*a) The need for the proposed development has been clearly established and there is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations);*

*b) The benefits and/or sustainability considerations outweigh the need to protect such land, when taking into account the economic and other benefits of the best and most versatile agricultural land;*

*c) The impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and*

*d) Where feasible, once any development which is supported has ceased its useful life the land will be restored to its former use (this condition will be secured by planning condition where appropriate).*

*Where proposals are for sites of 1 hectare or larger, which would result in the loss of best and most versatile agricultural land, an agricultural land classification report should be submitted, setting out the justification for such a loss and how criterion b has been met."*

10.2.10 Soils are still mainly considered as a component of geodiversity within the Draft Plan and a new objective has been included Draft Objective 4: Biodiversity and Green Infrastructure

which aims to "*conserve and enhance biodiversity and geodiversity across Central Lincolnshire by delivering measurable net gain in biodiversity through development and establishing nature recovery networks through planning".*

10.2.11 Draft Policy S60: Protecting Biodiversity and Geodiversity states that all development should:

a) protect, manage, enhance and extend the ecological network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site (as defined in Ref 10-15).

10.2.12 The Draft Plan also gives greater consideration to Peat and Peaty soils, which although covering a relatively small area of Central Lincolnshire *"should be protected and preserved wherever possible to ensure they continue to store carbon".* It is noted that none of the identified soil associations within the Draft Order Limits are peaty in nature (See **Table 10-8**, **Table 10-11**, **Table 10-14**, **Table 10-16** and **Table 10-19**).

10.2.13 The East Lindsey Local Plan was formally adopted on 18 July 2018. The Local Plan Core Strategy document (Ref 10-16) acknowledges that agriculture continues to play a significant role in the economy of the District. Paragraph 49 mirrors the NPPF by identifying the prioritisation of development on suitable brownfield sites within existing settlements over more distant greenfield (agricultural) sites, the protection of BMV agricultural land, and the direction of development towards lower grade in preference to higher grade agricultural land, as important ways to support this industry.

10.2.14 Measures to protect soils are encompassed in the Strategy's geodiversity measures, which include rocks, minerals, fossils, soils and landforms. Paragraph 12.7 recognises soil as a finite resource which fulfils many roles that are beneficial to society. It states "*As a component of the natural environment, it is important that soils are protected and used sustainably. Soils of high environmental value (e.g., wetland and carbon stores such as peatland) should also be considered as part of ecological connectivity*". The Strategy refers to Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 10-9) for further information on sustainable soil management.

10.2.15 In relation to soils and agricultural land Strategic Policy 10 (SP10) – Design states:

*"The Council will support well-designed sustainable development, which maintains and enhances the character of the District's towns, villages and countryside by:*

*1) Where possible supporting the use of brownfield land for development, unless it is of high environmental value, seeking to use areas of poorer quality agricultural land in preference to that of a higher quality"; and*

*"8) Supporting development that includes measures to recycle, re-use or reduce the demand for finite resources".*

10.2.16 In relation to soils, Strategic Policy 24 (SP24) - Biodiversity and Geodiversity states:

*"1) Development proposals should seek to protect and enhance the biodiversity and geodiversity value of land and buildings, and minimise fragmentation and maximise opportunities for connection between natural habitats.*

*2) The Council will protect sites designated internationally, nationally or locally for their biodiversity and geodiversity importance.... Development, which could adversely affect such a site, will only be permitted in exceptional circumstances..."*

## Guidance

10.2.17 The Planning Practice Guidance (PPG) which accompanies the NPPF is split into a number of guidance notes. Guidance on soils and agricultural land is found in the Planning Practice Guidance for the Natural Environment 2019 (PPGNE) (Ref 10-17) under the heading Agricultural Land, Soil and Brownfield Land of Environmental Value. This describes the ALC and advises that it be used to assess the quality of farmland to enable informed choices to be made about its future use within the planning system. The PPGNE states that '*Planning policies and decisions should take account of the economic and other benefits of the best and most versatile agricultural land*'.

10.2.18 The PPGNE goes on to state that '*In the circumstances set out in Schedule 4 paragraph (y) of the Development Management Procedure Order 2015* (Ref 10-4), *Natural England is a statutory consultee: a local planning authority must consult Natural England before granting planning permission for large-scale non-agricultural development on best and most versatile land that is not in accord with the development plan'* and refers to Natural England guidance to assessing development proposals on agricultural land (Ref 10-11).

10.2.19 Therefore, knowledge of the ALC grading of land affected by the Project is necessary to be able to determine whether the requirements of planning policy are being met.

10.2.20 The PPGNE also recognises soil as an essential natural capital asset that provides important ecosystem services, 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 also recommends Defra's Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 10-8) as a useful tool when setting planning conditions for development sites, as it provides advice on the use and protection of soil in construction projects, including the movement and management of soil resources.

10.2.21 Natural England's Guide to Assessing Development Proposals on Agricultural Land (2021) (Ref 10-11) sets out the government policies and legislation that developers and local planning authorities (LPA) should refer to when considering development proposals that affect agricultural land. It also includes guidance on when Natural England should be consulted on development proposals, provides a detailed explanation of ALC and information on published ALC resources and explains circumstances in which new detailed surveys may be required. It also explains how ALC data should be used in the assessment of planning decisions. Importantly, the guidance states that the LPA should ensure that development proposals include plans to protect soils, that where insufficient data are available new surveys should be undertaken to better inform the planning decision, and that these surveys should be carried out by soil scientists or experienced soil specialists. The guidance also summarises the required survey methodology (also presented in Natural England's 2012 Technical Information Note 049 (TIN049) (Ref 10-18)).

10.2.22 As referred to above, Defra's Construction Code of Practice for the Sustainable Use of Soil on Development Sites (Ref 10-9) provides Technical Guidance on the handling, storage and (re)use of soil within construction projects.

10.2.23 The Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings (Ref 10-19) details the correct methods for stripping, handling, storage, reinstatement and management of soil resources, including advice on stockpile design. This guidance updates and replaces the Ministry of Agriculture, Fisheries and Food's (MAFF) Good Practice Guide for Handling Soils (2000) and despite originating in the quarrying Section is considered relevant as the advice provided is tailored to schemes where soils are removed and stored for reuse upon completion of development, such as will occur during laying of the pipeline.

10.2.24 The MAFF's Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land (Ref 10-2) provides the current guidelines and criteria for grading the quality of agricultural land in England and Wales.

10.2.25 The British Society of Soil Science (BSSS) Guidance Document 3: Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (2021) (Ref 10-20) has been written for development planning and control professionals, site owners and developers to help promote the protection of soils and the important functions they support within the planning system and the development of individual sites.

## 10.3 Scoping Opinion and Consultation

10.3.1 A scoping exercise was undertaken in early 2022 to establish the content of the assessment and the approach and methods to be followed.

10.3.2 The Scoping Report (Ref 10-1) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria to be applied in the assessment to identify and evaluate the likely significant effects of the Project on agriculture and soils.

10.3.3 Following receipt of the Scoping Opinion (*PEIR Volume IV Appendix 5.2*), the following requirements have been identified by the Planning Inspectorate, which will be taken account of as part of the ongoing agriculture and soils assessment:

- Impacts to agricultural land (LCC). LCC acknowledged any impact on agricultural land will be temporary but noted that it is important that there are no long-standing issues to agricultural land. The impacts to agricultural land will be assessed at both PEIR and ES and appropriate mitigation measures proposed (see bullet below);
- Maintenance of land quality, soil sustainability and ongoing provision of Ecosystem Services (Natural England). The standard practice soil management measures to be outlined in the PEIR and ES (and further described within an Outline Soil Management Plan (SMP) as appended to the ES) will retain soil functions and land quality as far as is practicable, thereby ensuring ongoing provision of Ecosystem Services;
- The extent of disturbance to agricultural land, including BMV (Natural England). Disturbance to agricultural land, including BMV, is considered within the impact assessment presented within the PEIR and ES;
- Details of how any adverse impacts on soil resources and BMV agricultural land can be minimised through site design/masterplan should be set out in the ES (Natural England). *Chapter 2: Design Evolution and Consideration of Alternatives* details how ALC was considered in the initial options appraisal assessment. Consequently, the Project design is such that the majority of above ground infrastructure (permanent development leading to permanent land loss, unlike the pipeline), such as the Immingham Facility, is located on non-agricultural land minimising the permanent loss of agricultural land to the development. It is noted that although the pipeline itself is permanent development, the associated disturbance to soils and agricultural land, and removal of land from agricultural use, both from the laying of the pipeline and the formation of construction compounds and accesses *etc.* is temporary. All soils and agricultural land are to be reinstated to their original land use and quality following construction. The provision of soil management measures is described in bullet above;
- Requirement for detailed soil survey to inform ALC (Natural England). Commitment for targeted detailed survey post-consent restricted to agricultural land disturbed by development. All surveys would be undertaken to standard Natural England guidelines (Ref 10-2, Ref 10-11, Ref 10-18) as summarised in the Scoping Opinion; and

- Consideration of guidance provided by Defra, Natural England, and BSSS in relation to the protection of soils and agricultural land during development. This guidance (Ref 10-9, Ref 10-11 and Ref 10-20 respectively) as further described in Section 10.2, will be considered in the assessment along with additional relevant guidance such as that issued by the Institute of Quarrying (Ref 10-19).

10.3.4 It is also noted that LCC confirmed that they are supportive of the proposed approach to the assessment set out at Scoping and which will be followed in both the PEIR and ES.

10.3.5 Following receipt of the Scoping Opinion, the following items were confirmed by the Planning Inspectorate to be scoped out of the agriculture and soils assessment:

- The operational effects of the Project on agriculture and soils (including loss of BMV land), as owing to the nature of the Project, the Planning Inspectorate considers that significant effects on agriculture and soils are unlikely during operation.

10.3.6 The comments received in the Scoping Opinion relevant to agriculture and soils are presented in **Table 10-2**.

### *Table 10-2: Summary of the EIA Scoping Opinion in relation to Agriculture and Soils*

| Section Reference to Scoping Opinion | Applicant's proposed matter | Planning Inspectorate / prescribed consultee comments | Response |
|---|---|---|---|
| Planning Inspectorate Paragraph 10.7.3 | Operational effects on agriculture and soils (including loss of BMV land) | Based on the nature of the Proposed Development, the Inspectorate considers that significant effects on agriculture and soils are unlikely during operation and agrees that the effects of the operational phase on agriculture and soils can be scoped out of the ES. | Operational effects have been scoped out of the PEIR and ES assessments |
| Lincolnshire County Council | Impact on agricultural land | Whilst it is noted that any impact on agricultural land will be temporary in nature but important that there is no long standing issues to agricultural land and supportive of the proposed approach. | It is noted that LCC are supportive of the proposed approach. |
| Natural England | Loss of Agricultural Land (BMV) | In order to both retain the long-term potential of this land and to safeguard all soil resources as part of the overall sustainability of the whole development, it is important that the soil is able to retain as many of its many important functions and services (ecosystem services) as possible. | The standard practice soil management measures are outlined in the PEIR and ES (and would be further described within an Outline Soil Management Plan as appendix to the Draft Construction Environmental Management Plan (CEMP) - if required) which would retain soil functions and services as far as is practicable. |
| | | The following issues should be considered and included as part of the Environmental Statement (ES):<br>• The degree to which soils would be disturbed or damaged as part of the development; | This has been covered in this PEIR chapter. |

| Section Reference to Scoping Opinion | Applicant's proposed matter | Planning Inspectorate / prescribed consultee comments | Response |
|---|---|---|---|
| | | • The extent to which agricultural land would be disturbed or lost as part of this development, including whether any Best and Most Versatile (BMV) agricultural land would be impacted; | This has been covered in this PEIR chapter. |
| | | • The ES should set out details of how any adverse impacts on BMV agricultural land can be minimised through site design/masterplan; and | Permanent development leading to permanent land loss (apart from the Block Valve Stations and the Theddlethorpe Facility Option 2) is on non-agricultural land minimising permanent loss of agricultural land to the development. once installed, land above the pipeline will be reinstated to its original land use and quality. |
| | | • 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. The aim will be to minimise soil handling and maximise the sustainable use and management of the available soil to achieve successful after-uses and minimise offsite impacts. | *Chapter 2: Design Evolution and Consideration of Alternatives* details how ALC was considered in the initial options appraisal assessment. Consequently, the Project design is such that the majority of above ground infrastructure (permanent development), such as the Immingham Facility, is located on non-agricultural land minimising the permanent loss of agricultural land to the development.<br>Although the pipeline itself is permanent development, the associated disturbance to soils and agricultural land, and removal of land from agricultural use, both from the |

| Section Reference to Scoping Opinion | Applicant's proposed matter | Planning Inspectorate / prescribed consultee comments | Response |
|---|---|---|---|
| | | | laying of the pipeline and the formation of construction compounds and accesses etc. is temporary. All soils and agricultural land are to be reinstated to their original land use and quality following construction - unless reinstatement for biodiversity benefit is agreed with landowners. The provision of soil management measures is described above. |
| | | In order to fully assess the impacts to BMV an Agricultural Land Classification may be necessary. 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. | We have made a commitment to targeted detailed surveys at the post-consent stage,. All surveys would be undertaken to standard Natural England guidelines (Ref 10-2, Ref 10-11, Ref 10-18) as summarised in the Scoping Opinion. |
| | Guidance | Further information is available in the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites and The British Society of Soil Science Guidance Note Benefitting from Soil Management in Development and Construction. Further guidance is also set out in the Natural England Guide to assessing development proposals on agricultural land. | This guidance (Ref 10 9, Ref 10 11 and Ref 10 20 respectively) as further described in Section 10.2, will be considered in the assessment along with additional relevant guidance such as that issued by the Institute of Quarrying (Ref 10 19). |

### Consultation

10.3.7 No additional consultation will be undertaken with LCC as the Scoping Opinion acknowledged they were supportive of the proposed approach to the assessment.

10.3.8 It has not been necessary to hold specific technical meetings or discussions in relation to Agriculture and Soils to date. This requirement will be reviewed prior to production of the ES and technical engagement meetings will be held if necessary to develop or discuss the technical assessments.

10.3.9 There will however be ongoing communication between the Project and landowners throughout the planning process, and beyond (see also *Chapter 4: Consultation*). The site-specific information gained will assist in defining the routeing and micro-siting of infrastructure; and in describing site specific Embedded Design Measures, if required. For example, the identification of preferred locations for designated crossing points along the pipeline route during construction to minimise disruption to the movement of livestock and machinery; or details of how these works could be programmed to avoid specific locations during sensitive times in the farming calendar (for example during lambing season).

## 10.4 Assessment Method

10.4.1 As explained in *Chapter 5: PEIR Assessment Methodology*, the early detection of 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 and reinstatement methods and practices (embedded design mitigation – Section 10.6). The likely significant effects of the Project will therefore be identified and assessed assuming that these embedded design mitigation measures are in place (Section 10.7). Additional Mitigation Measures (Section 10.4) will be put forward (where required) and the residual (post-mitigation) effects reassessed to ensure that the overall effect of the Project on agriculture and soils is acceptable in planning terms.

### Agricultural Land

10.4.2 As noted in section 10.2 above, The Town and Country Planning (Development Management Procedure) (England) Order 2015 (Ref 10-4) requires that the local planning authority consults Natural England if the area of a proposed permanent development exceeds 20 ha of BMV land. Whilst this legislation does not apply to the determination of a DCO application, and it does not state that this threshold should be used to determine the significance of loss of agricultural land, for the purpose of environmental assessment, it is usually used as a threshold for considering effects as likely to be significant. To determine the level of significance, other factors are considered, including whether the development is temporary or permanent and the extent of BMV in the locality.

10.4.3 Therefore, the loss of agricultural land will be assessed by estimating the amount and quality of land that may be affected by the Project, with a threshold of 20 ha of *permanent* BMV loss used to determine whether the loss is significant or not. Magnitude of effect and receptor sensitivity classifications are not assigned. Rather, any permanent BMV loss that exceeds 20 ha is assessed as significant, whilst any that is temporary or occupies less than 20 ha is assessed as not significant.

10.4.4 The assessment of the loss of agricultural land therefore does not consider temporary land use change, for instance the pipeline working corridor or construction compounds, as this land would be returned to agricultural use once construction is complete. Within the loss of agricultural land assessment, the areas of temporary land use change will be reported for

illustrative purposes only. This approach has been agreed with the Planning Inspectorate at scoping.

## Soil Resources

10.4.5 The assessment of 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 of soil resource. The assessment criteria will be based on professional experience. This approach has been agreed with the Planning Inspectorate at scoping.

10.4.6 The disturbance of soil resources will be assessed through considering the workability of topsoils and their suitability for reinstatement, and effects assessed on the assumption that good working practice is followed.

10.4.7 Assessing the sensitivity of soil resources to damage (i.e., resistance and resilience of the soil environment, not the importance of the land for agricultural use) is complicated, as soil resources provide a range of functions (ecosystem services), such as supporting plant growth (including food and other crops), water filtration and regulation (including reducing flood risk), nutrient transformation (e.g. soil's role in the nitrogen cycle), carbon storage and sequestration, and supporting biodiversity. The sensitivity criteria for soil resources are based on the erodibility of soils or the presence of organic soils, such as peat which are ecologically important and are afforded additional consideration and protection in planning policy (section 10.2). The soil resources assessment will consider both temporary and permanent damage. The receptor sensitivity criteria are provided in **Table 10-3**. The magnitude of change from the baseline will be defined in terms of the damage to soil resource and loss of soil resources, as provided in **Table 10-4**.

10.4.8 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 (Ref 10-21). Therefore, as a rule, heavy (clay rich) soils are classified as low sensitivity (low soil erodibility), whilst light sandy soils are classified as high sensitivity (high soil erodibility).

10.4.9 However, 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 result in a reinstated soil profile with a reduced natural drainage compared to the natural soil profile and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Conversely, the permeable nature of light sandy soils means that the natural structural recovery and drainage potential of the soils is more easily maintained upon reinstatement. However, as standard good practice measures for soil management will mitigate against any potential adverse impacts during reinstatement, regardless of the soil texture or prevailing structure, only soil erodibility (i.e., the sensitivity of the undisturbed soil profile or soil stockpiles) is considered in the sensitivity criteria of the soil assessment.

### *Table 10-3: Receptor Sensitivity (Soils)*

| Receptor (Soil Resources) | Sensitivity | Justification |
|---|---|---|
| Soils with very high to high risk of erosion and organic soils (peat). | High | Development on these soils should be avoided; however, if this is not possible, they require special consideration and careful planning of construction methods, e.g., use of temporary working surfaces, careful storage, protection from drying out, in order to preserve their functions. Soils of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. |
| Soils with moderate risk of erosion. | Medium | Standard soil management measures would provide appropriate protection to these soils; however, damage is likely to occur if worked in less-than-ideal conditions, e.g., when wet. These soils should be given appropriate consideration because of their importance for agricultural production. |
| Soils with small or very small risk of erosion. | Low | These soils are generally more resistant to damage. Standard soil management measures would provide appropriate protection to these soils (except peat soils). |
| Poor quality soils with no risk of erosion. | Negligible | These soils are generally more resistant to damage. Standard soil management measures would provide appropriate protection to these soils (except peat soils). |

10.4.10 The magnitude of effect will be assessed in terms of the magnitude of change from baseline conditions, as defined in **Table 10-4**. Note the duration of effects differ from those quoted in *Chapter 5: Assessment Methodology*.

### *Table 10-4: Criteria to Assess the Magnitude of Change (Soils)*

| Magnitude | Damage to Soil Resources | Loss of Soil Resources |
|---|---|---|
| High | Permanent irreversible or long-term (>1 year) reversible damage to soil quality following restoration. Damage through handling, and stockpiling. | <25% of soil resources suitable for reuse and retained on site. |
| Medium | Medium-term up to 1-year reversible damage to soil quality following restoration. Damage through handling, stockpiling, machinery traffic, *etc.* | 25-50% of soil resources suitable for reuse and retained on site. |

| Magnitude | Damage to Soil Resources | Loss of Soil Resources |
|---|---|---|
| Low | Short-term (>6 months) reversible damage to soil quality following restoration. Damage through handling, stockpiling, machinery traffic, *etc.* | 51-95% of soil resources suitable for reuse and retained on site. |
| Negligible | No damage or very small-scale surface damage equivalent to that done by a typical farm machinery traffic. | >95% of soil resources suitable for reuse and retained on site. |

10.4.11 The classification of effects for loss and damage of soil resources will be assessed as a function of the sensitivity of the receptor and the magnitude of an impact. An indicative matrix for the determination of significance is provided in **Table 10-5**. Where effects are determined as major adverse or moderate adverse, the effect will be considered significant. Where effects are determined as minor adverse or negligible, the effect will be considered not significant.

***Table 10-5: Classification of Effects (Soils)***

| Sensitivity of receptor | Magnitude of Change | | | |
|---|---|---|---|---|
| | High | Medium | Low | Negligible |
| High | Major (Significant) | Major (Significant) | Moderate (Significant) | Minor (Not Significant) |
| Medium | Major (Significant) | Moderate (Significant) | Minor (Not Significant) | Negligible (Not Significant) |
| Low | Moderate (Significant) | Minor (Not Significant) | Negligible (Not Significant) | Negligible (Not Significant) |
| Negligible | Minor (Not Significant) | Negligible (Not Significant) | Negligible (Not Significant) | Negligible (Not Significant) |

## 10.5 Baseline Environment and Study Area

### Study Area

10.5.1 The Study Area for the Agriculture and Soils assessment within the PEIR is the Draft Order Limits as defined in *Chapter 3: The Viking CCS Pipeline* and shown in **Figure 3-5,** excluding areas considered to be marine or intertidal which do not have the potential to contain soils or agricultural land. There is a slight discrepancy in the area coverage of the soil association data and ALC data, the former extending to cover areas of sand dune and other coastal habitat which is not covered by the ALC. The Study Area has therefore been drawn to include the full extent of the soils data and therefore excludes approximately 3.35 ha of land north of Mablethorpe, which is identified as beach and sea, and for which neither soil association nor ALC data are available. The Study Area therefore covers approximately 706.27 ha as shown in **Figure 10-1**. A buffer was not applied when describing the Study

Area as the impacts to soils and agricultural land only occur on the land that is directly impacted by the Project.

10.5.2 There is approximately 2.35 ha of land to the southern extent of the Study Area (Section 5) for which there are soil association data (shown as Saline 1 association) but no ALC data. Within the ALC calculations this land (which from aerial imaging appears to be sand dune and other coastal habitat) has been recorded as non-agricultural, by reason of it being excluded from the ALC survey programme used to define the Provisional ALC mapping (Ref 10-22).

10.5.3 It is noted that through the iterative design process, the Study Area will become more refined over time as the alignment is developed. The Study Area has been refined since Scoping, (reducing from 2,370 ha) and is likely to be further modified between PEIR and the ES. Furthermore, it is expected that whilst the PEIR considers all land within the Draft Order Limits, the assessment of baseline conditions presented within the ES will consider two areas. Firstly, data will be presented for the proposed working area of the indicative pipeline alignment, to provide an indication of the actual area of soil disturbance and land take resulting from the Project. Secondly, data will be presented for the whole of the Project's Draft Order Limits to provide baseline conditions for the wider area in which the works (disturbance) could occur should potential changes in the pipeline alignment be made within the limits of deviation during construction. Within the ES the same methodologies for baseline data collection and impact assessment will be applied to both the indicative pipeline alignment and Draft Order Limits.

10.5.4 Due to the length of the Project, the baseline has been split along the route based on key road intersections (as shown if **Figure 10-1**):

- Section 1 (Split by the A180);
- Section 2 (Split by the A46);
- Section 3 (Split by the Pear Tree Lane);
- Section 4 (Split by the B1200); and
- Section 5.

10.5.5 The chapter will therefore present data for individual Sections of the Study Area and for the Study Area as a whole.

## Data gathering methodology – PEIR

10.5.6 In preparation of this Chapter of the PEIR, the following sources of published information have been used to establish the baseline conditions:

- LandIS Soils Guide (Ref 10-23);
- Provisional ALC 1:250,000 mapping of the East Midlands Region (1993) (Ref 10-22);
- Provisional ALC 1:250,000 mapping of the Yorkshire and the Humber (1993) (Ref 10-24);
- Aerial Photography from bluesky and from Google Earth;
- Cranfield University (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report (Ref 10-21);
- Multi-Agency Geographical Information for the Countryside (MAGIC). (Ref 10-25);

- Likelihood of Best and Most Versatile Agricultural Land Strategic Scale Map – Yorkshire and the Humber (Ref 10-26);
- Likelihood of Best and Most Versatile Agricultural Land Strategic Scale Map – East Midlands Region (Ref 10-27); and
- Post-1988 survey at Immingham (Ref 10-28).

10.5.7 Additionally, National Soil Map of England and Wales (NATMAP) Vector data has been purchased from LandIS. This is the most detailed available soils mapping covering England and Wales and is taken from survey data from the Soil Survey of England and Wales (Ref 10-29 and Ref 10-30); it provides digitised soil association data at a 1:250,000 scale. It is noted that since these data were purchased, two pipe dumps have been identified which lie either wholly (Section 1, 2.49 ha) or partially (Section 3, 1.49 ha) outside the boundary of the purchased dataset. For these locations soil associations have been assigned through reference to the paper mapping (Ref 10-29). Both locations occur within the Holderness (711u) soil association.

## Current Baseline

### *Data Gathering Methodology – Agricultural Land and Land Use*

10.5.8 The most detailed published ALC data covering the whole of the Study Area are the 1:250,000 scale Provisional ALC mapping (Ref 10-22 and Ref 10-23). The scale of the mapping is not accurate at the field level as it generally does not pick up variations in ALC grade for areas less than approximately 80 ha. Additionally, as the mapping was published in the period 1967 to 1974 it is based on survey data collected prior to the issue of the revised guidelines in 1988 (Ref 10-2). It therefore does not provide a subdivision of Grade 3 land into Subgrade 3a (good quality, BMV) and Subgrade 3b (moderate quality, non-BMV), and the Grade 3 land must therefore be considered as having the potential to be of BMV quality. The data do, however, provide a general indication of the predominant ALC grades within the Study Area and wider Region.

10.5.9 Another consequence of the age of the data is that the mapping shows the underlying Ordnance Survey data that was current at the time of issue (1967 to 1974). Consequently, it does not take account of the extent of development (loss of agricultural land) that has taken place in the intervening period. Therefore, the Provisional ALC mapping has been viewed against current aerial imaging, to allow significant areas of new development (such as the expansion of industry at Immingham) and associated landscape/screening planting to be reassigned as ‘urban’ or ‘non-agricultural’. This provides a more robust baseline for the assessment than directly using the data as originally published.

10.5.10 There is one, detailed published Post-1988 ALC dataset available within the Study Area (Ref 10-28). 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). As shown on **Figure 10-1**, this is located in Section 1. These data were collected as part of a larger survey totalling 12.2 hectares, carried out by MAFF in December 1994 to inform the Cleethorpes Borough Local Plan. Both Provisional and Post-1988 ALC data are available to view on the Government’s geographic information website (Ref 10-25).

10.5.11 To better define the ALC grading of the land within the Study Area, and provide a more robust baseline for the assessment, the subdivision of Subgrade 3a and 3b land has been calculated. As no Post-1988 data containing ALC Grades 1, 2, 4 and 5 is present within the Study Area, Provisional ALC Mapping has been used to directly determine the proportions of ALC Grades 1, 2, 4 and 5. Where there are Post-1988 data available for areas

provisionally mapped as Grade 3, these detailed data have been used in preference. For other areas of provisionally mapped Grade 3, the relative proportions of Subgrade 3a and 3b have been calculated using Natural England's Likelihood of Best and Most Versatile (BMV) Agricultural Land mapping (Ref 10-26 and Ref 10-27). In a change to the methodology set out in the Scoping Report, as it has not been possible to purchase the Likelihood of BMV dataset in an interrogatable digital format, it has been digitised from the publicly available data set (Ref 10-26 and Ref 10-27), as shown in **Figure 10-2**.

10.5.12 These data spatially map the percentage chance (likelihood) of BMV land occurring within a particular area. The Likelihood of BMV mapping was devised by Natural England (NE) based on soil association data from the 1:250,000 scale national soil map (Soil Survey of England and Wales, 1984 Ref 10-29 and Ref 10-30). The methodology assessed each soil association on a regional basis using MAFF's 1988 ALC guidelines (Ref 10-2). The published ALC data used in the assessment were taken from detailed site surveys, where available, and the Provisional ALC mapping data, as well as climatic data from the Met Office (Ref 10-31). The method is further described in Defra's 2001 explanatory note (Ref 10-31).

10.5.13 The data provides 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.

10.5.14 For the purpose of the PEIR and also the assessment presented in the ES and to provide a robust quantification of the area of BMV land within the Study Area, land mapped as High Likelihood will be considered as Subgrade 3a; whereas land mapped as Moderate Likelihood will be split 50/50 between Subgrades 3a and 3b. The land mapped as Low Likelihood will be considered as Subgrade 3b. The 50:50 split of the Moderate Likelihood data is considered to be suitable as a review of available detailed field scale Post-1988 survey data in the vicinity of the Project (as shown in **Figure 10-1**), showed the detailed ALC gradings on provisionally mapped Grade 2 and 3 land to be a combination of Grade 2, Subgrade 3a and Subgrade 3b with over 50% being Subgrade 3b. These survey data are mainly clustered around the fringes of Grimsby and Cleethorpes, with a small area to the north of Louth.

10.5.15 The combination of the areas identified as High Likelihood of BMV and 50% of the areas identified as Moderate Likelihood of BMV land (Ref 10-26 and Ref 10-27) (mapped as Grade 3 on the Provisional mapping) and the Provisionally mapped ALC Grade 1 and 2 land, have therefore been used to provide the total potential area of BMV within the study area (note the available Post-1988 dataset only shows Subgrade 3b land).

10.5.16 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. To provide a worst case scenario, permanent development resulting in the loss of agricultural land (such as Block Valves and the Theddlethorpe Facility (Option 2)) occurring on provisionally mapped Grade 3 land which is of Moderate Likelihood of BMV will be considered as Subgrade 3a (BMV) within the impact assessment.

10.5.17 For this PEIR, a desk-based approach to the gathering of baseline soils and ALC data for areas of temporary development has been used and ensures that the baseline is adequately

described to ensure that all potentially significant effects are identified and a thorough and robust impact assessment to be undertaken.

10.5.18 A breakdown of the Provisional ALC gradings for the administrative areas of NELC, NLC and LCC is also provided for context.

10.5.19 The current land-use has been informed by the use of aerial and Streetview© imaging provided by Google. The majority of the Study Area has been identified to be in arable production, which corroborates the ALC data presented below, as higher quality (BMV) 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. Therefore, for the purpose of this Chapter, 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.

### *Data Gathering Methodology – Soil Resources*

10.5.20 The assessments of loss and damage to soil resources presented in this chapter are based upon 1:250,000 scale survey data from the Soil Survey of England and Wales (Ref 10-29 and Ref 10-30), which is the most detailed available soils mapping covering England and Wales.

10.5.21 Targeted survey to inform the Detailed SMP will be undertaken post-consent as discussed in Section 10.8.

### *Baseline ALC and Soils data: Section 1*

10.5.22 As shown in **Table 10-6** the majority of land within Section 1 of the Study Area (approximately 105.04 ha, 67.7 %) is classified as urban or non-agricultural due to the extent of the current and former industrial facilities within and around Immingham as well as the woodland planting in Houlton's Covert. The non-agricultural land includes all land associated with the Immingham Facility that will be subject to permanent development as a consequence of the Project. The Provisional ALC classifies the remaining 50.23 ha as Grade 3 (Good to Moderate quality). As shown in **Figure 10-1**, Post-1988 survey data (Ref 10-28), cover part of this Provisional Grade 3 area, classifying approximately 3.24 ha of it as non-BMV, moderate quality Subgrade 3b. These detailed survey data cover part of an agricultural field to the southeast of the Section, within the footprint of the Draft Order Limits.

10.5.23 The geographical distribution of the Provisional and Post-1988 ALC grading within Section 1 is shown on **Figure 10-1**.

### *Table 10-6: Summary of Provisional and Post-1988 ALC Grading within Section 1*

| ALC Grade | Area (ha) | Percentage |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 0.0 | 0.0 |
| Grade 3 (Good to Moderate quality) | 46.98 | 30.3 |
| Subgrade 3b* (Moderate quality) | 3.24 | 2.1 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 105.04 | 67.7 |

| ALC Grade | Area (ha) | Percentage |
|---|---|---|
| TOTAL | 155.27 | 100.00 |
| Taken from the Provisional ALC data set for Yorkshire and the Humber (Ref 10-23) and revised to reflect subsequent changes in the extent of agricultural land due to development.<br>*From the detailed ALC survey (Ref 10-27) | | |

10.5.24 As shown on **Figure 10-2** all land within Section 1 mapped as Grade 3 in the Provisional ALC dataset (Ref 10-24) is also mapped as High Likelihood of BMV (124.25 ha) (Ref 10-26 and Ref 10-27). It is noted that **Figure 10-2** shows a small area of Moderate Likelihood (5.28 ha) to the northwest of the Section, however this coincides with land that has been assigned as urban (**Figure 10-1**) due to the industrial operations at Immingham. Therefore, with the exception of the area of 3b land identified in the Post-1988 survey data (Ref 10-28) all Grade 3 land has been classified as Subgrade 3a (BMV), as set out in **Table 10-7**. Considering the lower gradings present in available Post-1988 survey data in the vicinity, this is likely to be an overestimation, but provides a worst case scenario in terms of the assessment.

***Table 10-7: Calculated ALC grading for Section 1***

| ALC Grade | Area (ha) | Percentage |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 0.0 | 0.0 |
| Subgrade 3a (Good quality) | 46.98 | 30.3 |
| Subgrade 3b (Moderate quality) | 3.24 | 2.1 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 105.04 | 67.7 |
| TOTAL | 155.27 | 100.00 |

10.5.25 The purchased NATMAP Vector data identifies two soil associations within Section 1. These are listed (from north to south in order they are first encountered) within Section 1 in **Table 10-8** and shown in **Figure 10-3**. Erodibility data are taken from research by Cranfield University (Ref 10-21). Approximately 1.24 ha of Section 1 is covered by waterbodies (settlement ponds) associated with the current and former industrial activities at Immingham, as these areas have no soil cover, they were not surveyed, and no soils data are presented. Both recorded soils are at small or very small risk of erosion and are therefore classed as being of low sensitivity in accordance with **Table 10-3**.

### *Table 10-8: Soil Associations within Section 1*

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Newchurch 2 (814c) | Loamy and clayey soils of coastal flats with naturally high groundwater developed over stoneless clayey marine alluvium.<br>These soils are usually waterlogged for long periods in winter (Wetness Class IV) | Very small risk (water) | 46.15<br>(29.7 %) |
| Holderness (711u) | Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II). | Small risk (water) | 107.89<br>(69.5 %) |
| Waterbodies | NA | NA | 1.24<br>(0.8 %) |
| TOTAL | | | 155.27 (100 %) |
| *From research by Cranfield University (Ref 10-21) | | | |

### *Baseline ALC and Soils data: Section 2*

10.5.26 As shown in **Table 10-9** the majority of land within Section 2 of the Study Area (approximately 72.61 ha, 71.3%) is classed as Grade 3 on the Provisional mapping. The remaining land is classed as Grade 2 and is identified to the southern tip of the Section extending southwards into Section 3, to the west of Laceby.

10.5.27 The geographical distribution of the Provisional ALC grading within the Section 2 is shown on **Figure 10-1**.

### *Table 10-9: Summary of Provisional ALC Grading within Section 2*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.00 | 0.0 |
| Grade 2 (Very Good quality) | 29.21 | 28.7 |
| Grade 3 (Good to Moderate quality) | 72.61 | 71.3 |
| Grade 4 (Poor quality) | 0.00 | 0.0 |
| Grade 5 (Very Poor quality) | 0.00 | 0.0 |
| Non-agricultural / Urban | 0.00 | 0.0 |

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| TOTAL | 101.81 | 100.00 |
| Taken from the Provisional ALC data sets for Yorkshire and the Humber (Ref 10-23) and the East Midlands Region (Ref 10-21) | | |

10.5.28 As shown on **Figure 10-2** all land within Section 2 mapped as Grade 3 on the Provisional mapping is also mapped as High Likelihood of BMV. Therefore, all Grade 3 land has been classified as Subgrade 3a (BMV), as set out in **Table 10-10,** and all land within Section 2 is therefore considered to be of BMV quality (Grade 2 and Subgrade 3a). However, considering the lower gradings present in available Post-1988 survey data in the vicinity (**Figure 10-1**) this is likely to be an overestimation but provides a worst case scenario in terms of the assessment.

***Table 10-10: Calculated ALC grading for Section 2***

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 29.21 | 28.7 |
| Subgrade 3a (Good quality) | 72.61 | 71.3 |
| Subgrade 3b (Moderate quality) | 0.0 | 0.0 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 0.0 | 0.0 |
| TOTAL | 101.81 | 100.0 |

10.5.29 The purchased NATMAP Vector data identifies five soil associations within Section 2. These are listed (from north to south in order they are first encountered) in **Table 10-11** and shown in **Figure 10-3**. Erodibility data are taken from research by Cranfield University (Ref 10-21). All the mapped associations are at small or very small risk of erosion and are therefore classed as being of low sensitivity in accordance with **Table 10-3**.

***Table 10-11: Soil Associations within Section 2***

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Holderness (711u) | Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II). | Small risk (water) | 66.11 (64.9 %) |

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Burlingham 2 (572o) | Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy soils. Some well drained fine and coarse loamy soils. Developed over chalky till. | Small risk (water) | 13.18 (12.9 %) |
| Landbeach (512b) | Permeable calcareous coarse loamy soils affected by groundwater over glaciofluvial sand and chalky gravel. Some deep, in part non-calcareous fine and coarse loamy soils affected by groundwater. The soils are permeable and either well drained or only occasionally waterlogged (Wetness Classes I or II). | Very small risk (water) | 14.07 (13.8 %) |
| Swaffham Prior (511e) | Well drained calcareous coarse and fine loamy soils over chalk rubble. Some similar shallow soils. Deep non-calcareous loamy soils in places. Striped and polygonal soil patterns locally. Slight risk of water erosion. | Small risk (water) | 6.79 (6.7 %) |
| Newmarket 1 (343f) | Shallow well drained calcareous sandy and coarse loamy soils over chalk or chalk rubble. Some similar deeper sandy soils, often in an intricate striped pattern. Well-drained (Wetness Class I). | Small risk (wind) | 1.66 (1.6 %) |
| TOTAL | | | 101.81 (100%) |
| *From research by Cranfield University (Ref 10-21) | | | |

### *Baseline ALC and Soils data: Section 3*

10.5.30 As shown in **Table 10-12** the majority of land within Section 3 (approximately 142.06 ha, 76.3 %) is classed as Grade 3 in the Provisional mapping. Grade 2 land is identified to the north of the Section extending northwards into Section 2, within and along the western boundary of the Lincolnshire Wolds AONB to the east of Irby upon Humber.

10.5.31 The geographical distribution of the Provisional ALC grading within the Section 3 is shown on **Figure 10-1**.

### *Table 10-12: Summary of Provisional ALC Grading within Section 3*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 44.20 | 23.7 |
| Grade 3 (Good to Moderate quality) | 142.06 | 76.3 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 0.0 | 0.0 |
| TOTAL | 186.26 | 100.0 |
| Taken from the Provisional ALC data sets for Yorkshire and the Humber (Ref 10-24) and the East Midlands Region (Ref 10-22) | | |

10.5.32 As shown on **Figure 10-2,** the Provisional Grade 3 land within Section 3 is mapped as a combination of High (114.32 ha) and Moderate (27.74 ha) Likelihood of BMV. The Moderate Likelihood land occurs in the approximate area where the Study Area runs parallel with the A18. The Grade 3 land has therefore been classified as Subgrade 3a (BMV) and Subgrade 3b, as set out in **Table 10-13.** The majority of land in Section 3 (172.39 ha, 92.6 %) is therefore classed as BMV, comprising Grade 2 and Subgrade 3a.

### *Table 10-13: Calculated ALC grading for Section 3*

| ALC Grade | Area (ha) | Percentage |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 44.20 | 23.7 |
| Subgrade 3a (Good quality) | 128.19 | 68.8 |
| Subgrade 3b (Moderate quality) | 13.87 | 7.4 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 0.0 | 0.0 |
| TOTAL | 184.21 | 100.0 |

10.5.33 The purchased NATMAP Vector data identifies four soil associations within Section 3. These are listed (from north to south in order they are first encountered) in **Table 10-11** and shown in **Figure 10-3**.

10.5.34 Erodibility data are taken from research by Cranfield University (Ref 10-21). All the mapped associations are at small or very small risk of erosion and are therefore classed as being of low sensitivity in accordance with **Table 10-3**.

### *Table 10-14: Soil Associations within Section 3*

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Burlingham 2 (572o) | Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy soils. Some well drained fine and coarse loamy soils. Developed over chalky till. | Small risk (water) | 30.37 (16.3 %) |
| Holderness (711u) | Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II). | Small risk (water) | 125.67 (67.5 %) |
| Arrow (543) | Deep permeable coarse loamy soils affected by groundwater. Developed over glaciofluvial drift | Small risk (water) | 0.91 (0.5 %) |
| Salop (711m) | Slowly permeable seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils associated with fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. | Very small risk (water) | 29.31 (15.7 %) |
| TOTAL | | | 186.26 (100%) |
| *From research by Cranfield University (Ref 10-20) | | | |

### *Baseline ALC and Soils data: Section 4*

10.5.35 All land within Section 4 (approximately 141.34 ha) is provisionally mapped as Grade 3 (Ref 10-22) and therefore no table is included to summarise Provisional ALC grading within the section. The geographical distribution of ALC grading within the Section 4 is shown on **Figure 10-1**.

10.5.36 As shown on **Figure 10-2** the Provisionally mapped Grade 3 land within Section 4 is mapped as a combination of High (13114.32 ha) and Moderate (2.44 ha) Likelihood of BMV. The Moderate Likelihood land occurs as a small sliver alongside the Louth Canal. The majority of the land within Section 4 (99.1 %) is therefore classed as Subgrade 3a (BMV), as set out in **Table 10-15.**

### *Table 10-15: Calculated ALC grading for Section 4*

| ALC Grade | Area (ha) | Percentage % |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 0.0 | 0.0 |
| Subgrade 3a (Good quality) | 140.12 | 99.1 |
| Subgrade 3b (Moderate quality) | 1.22 | 0.9 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | | 0.0 |
| Non-agricultural / Urban | 0.0 | 0.0 |
| TOTAL | 141.34 | 100.0 |

10.5.37 The purchased NATMAP Vector data identifies three soil associations within Section 4. These are listed (from north to south in order they are first encountered) in **Table 10-16** and shown in **Figure 10-3**. Almost all the soils in this Section (96.8%) are listed as the Holderness Association.

10.5.38 Erodibility data are taken from research by Cranfield University (Ref 10-21). All the mapped associations are at small or very small risk of erosion and are therefore classed as being of low sensitivity in accordance with **Table 10-3**.

### *Table 10-16: Soil Associations within Section 4*

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Holderness (711u) | Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II). | Small risk (water) | 136.74 (96.8 %) |
| Newchurch 2 (814c) | Deep stoneless mainly calcareous clayey soils. There occur on flat land and are at risk of flooding in places. Groundwater controlled by ditches and pumps. | Very small risk (water) | 1.45 (1.0 %) |
| Wallasea 2 (813g) | Deep stoneless clayey soils developed over reclaimed marine alluvium. Calcareous in places. Some deep calcareous silty soils. (Wetness Class I to II). | Very small risk (water) | 3.16 (2.3 %) |

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| TOTAL | | | 141.34 (100%) |
| *From research by Cranfield University (Ref 10-21) | | | |

### *Baseline ALC and Soils data: Section 5*

10.5.39 As shown in **Table 10-17** all agricultural land within Section 5 (approximately 107.62 ha, 88.5 % of the Study Area) is Provisionally classed as Grade 3. The remaining land is classed as non-agricultural or urban and is mainly associated with the former Theddlethorpe Gas Terminal, other non-agricultural or urban land comprises areas of dune habitat and existing roads. It is noted that depending upon the location of the Theddlethorpe facility (within the former Gas Terminal or on adjacent agricultural land), its construction may or may not result in the permanent loss of agricultural land.

10.5.40 The geographical distribution of the Provisional ALC grading within the Section 5 is shown on **Figure 10-1**.

### *Table 10-17: Summary of Provisional ALC Grading within Section 5*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 0.0 | 0.0 |
| Grade 3 (Good to Moderate quality) | 107.62 | 88.5 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 13.97 | 11.5 |
| TOTAL | 121.58 | 100.0 |
| Taken from the Provisional ALC data sets for Yorkshire and the Humber (Ref 10-24) and the East Midlands Region (Ref 10-22) | | |

10.5.41 As shown on **Figure 10-2** the Provisionally mapped Grade 3 land within Section 5 is mapped as a combination of High (107.62 ha) and Low (3.77 ha) Likelihood of BMV. The Low Likelihood land occurs as a small section between the eastern boundary of the former Theddlethorpe Gas Terminal and the coast and is classed as Subgrade 3b. The majority of the Grade 3 land in this Section is mapped as High Likelihood and therefore classed as Subgrade 3a (BMV), as set out in **Table 10-18.**

### *Table 10-18: Calculated ALC grading for Section 5*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | | 0.0 |
| Grade 2 (Very Good quality) | | 0.0 |

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Subgrade 3a (Good quality) | 103.84 | 85.4 |
| Subgrade 3b (Moderate quality) | 3.77 | 3.1 |
| Grade 4 (Poor quality) | | 0.0 |
| Grade 5 (Very Poor quality) | | 0.0 |
| Non-agricultural / Urban | 13.97 | 11.5 |
| TOTAL | 121.58 | 100.0 |

10.5.42 The purchased NATMAP Vector data identifies four soil associations within Section 5. These are listed (from north to south in order they are first encountered) in **Table 10-19** and shown in **Figure 10-3**.

10.5.43 Erodibility data are taken from research by Cranfield University (Ref 10-21). Three of the mapped associations are at small or very small risk of erosion and are therefore classed as being of low sensitivity in accordance with **Table 10-3**. However, the sandy soils of the Sandwich association (361) which commonly support sand dune and coastal wetland habitats, are classed as being at high risk of wind erosion and therefore are classed as being of high sensitivity in accordance with **Table 10-3**.

***Table 10-19: Soil Associations within Section 5***

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| Holderness (711u) | Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II). | Small risk (water) | 4.51 (3.7 %) |
| Wallasea 2 (813g) | Deep stoneless clayey soils developed over reclaimed marine alluvium. Calcareous in places. Some deep calcareous silty soils. (Wetness Class I to II). | Very small risk (water) | 113.36 (93.2%) |
| Sandwich (361) | Mainly deep well drained calcareous and non-calcareous sandy soils supporting sand dune and some wetland habitats. Very limited agriculture and coniferous woodland use as the soils are droughty, and unstable when ploughed. Some sparsely vegetated unstable soils. Waterlogged soils in hollows locally. | High risk (wind) | 1.38 (1.1 %) |

| Soil Association | General Description | Erodibility* | Area (ha) (and % of Section) |
|---|---|---|---|
| | Shingle bars and spits locally extensive. | | |
| Saline 1 (0220) | Soils of variable texture flooded by high tides developed over marine alluvium. Many are soft and unripened, others, often on higher sites or of sandy texture, are firm and ripened. Frequently calcareous. | Very small risk (water) | 2.35 (1.9 %) |
| TOTAL | | | 121.58 (100%) |
| *From research by Cranfield University (Ref 10-21) | | | |

### Provisional ALC in the Study Area

10.5.44 As shown in **Table 10-20** the Provisional ALC shows approximately three quarters of the land within the Study Area (approximately 510.60 ha, 72.3%) as Grade 3 agricultural land, with Grade 2 land comprising 73.41 ha (approximately 10.4%). The Grade 2 land is found on the junction of Sections 2 and 3 in and around the Lincolnshire Wolds AONB near Riby, Laceby and Irby upon Humber.

10.5.45 As shown in **Figure 10-1**, Post-1988 survey data (Ref 10-28), see above, cover part of the Provisional Grade 3 area classifying approximately 3.24 ha of it as non-BMV Subgrade 3b. These detailed survey data cover part of an agricultural field to the southeast of Section 1 through which the pipeline is envisaged to be routed.

10.5.46 Urban and non-agricultural land covers approximately 119.01 ha of the Study Area (16.9%) and is located to the north and south of the Study Area associated with the current and former industrial facilities within and around Immingham and the former Theddlethorpe Gas Terminal. Areas of permanent above ground development associated with the Pipeline Immingham Facility and Theddlethorpe Facility (Option 1) will be located within this urban and non-agricultural land. However, if Theddlethorpe Facility Option 2 is followed loss of agricultural land will occur.

10.5.47 The geographical distribution of the Provisional ALC grading within the Study Area is shown on **Figure 10-1**.

10.5.48 As shown on **Figure 10-1** and **Figure 10-2** the majority of land within the Study Area shown as Grade 3 on the Provisional ALC mapping coincides with areas mapped as High Likelihood of BMV. Discrete areas of Moderate and Low Likelihood land also occur as described for the individual Sections, above. The majority of the Grade 3 land within the Study Area is therefore classed as Subgrade 3a, and 80.0 % (565.14 ha) of land within the Study Area is calculated as being of BMV quality (Grade 2 and Subgrade 3a), as set out in **Table 10-21.** The data include the Post-1988 data (Ref 10-28).

### *Table 10-20: Summary of Provisional ALC Grading within the Study Area*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Good quality) | 73.41 | 10.4 |
| Grade 3 (Good to Moderate quality) | 510.60 | 72.3 |
| Subgrade 3b* (Moderate quality) | 3.24 | 0.5 |
| Grade 4 (Poor quality) | 0.0 | 0.0 |
| Grade 5 (Very Poor quality) | 0.0 | 0.0 |
| Non-agricultural / Urban | 119.01 | 16.9 |
| TOTAL | 706.27 | 100.0 |

### *Table 10-21: Calculated ALC grading for The Study Area*

| ALC Grade | Area (ha) | Percentage (%) |
|---|---|---|
| Grade 1 (Excellent quality) | 0.0 | 0.0 |
| Grade 2 (Very Good quality) | 73.41 | 10.4 |
| Subgrade 3a (Good quality) | 491.74 | 69.5 |
| Subgrade 3b (Moderate quality) | 22.11 | 3.1 |
| Grade 4 (Poor quality) | 0.00 | 0.0 |
| Grade 5 (Very Poor quality) | 0.00 | 0.0 |
| Non-agricultural / Urban | 119.01 | 16.8 |
| TOTAL | 706.27 | 99.8 |

## Permanent Loss of BMV land in the Study Area

10.5.50 The permanent loss of BMV land due to the Project results from land use change from agriculture to built development. The Immingham Facility will be located within urban and non-agricultural land and therefore does not impact agricultural land. The Theddlethorpe Facility may or may not result in the permanent loss of agricultural land depending upon whether Option 1 (on non-agricultural land within the former Gas Terminal), or Option 2 (on agricultural land) is progressed. To present a worst case, the total permanent agricultural land take due to the Project is therefore considered to be from the three Block Valve Stations (Sections 2, 3 and 4) and Theddlethorpe Facility (Option 2) (Section 5).

10.5.51 The locations of the Block Valve Stations are shown on **Figure 3-8**. Each of the Block Valve Stations would be approximately 34 by 32m in size, however as stated in *Chapter 3: The Viking CCS Pipeline*, permanent land acquisition would be 50m x 40m. Using the acquisition area as a worst case, the resulting in a permanent footprint of each Block Valve Station is 0.2 ha. The Block Valve Station in Section 2 (west of Aylesby) is located on Provisional Grade 2 (BMV) land, whereas the Block Valve Stations in Sections 3 and 4 are located on Provisional Grade 3 land, which to represent a worst case for the assessment is considered

to be BMV. The total permanent loss of BMV land due to the Block Valve Stations is therefore predicted to be 0.6 ha.

10.5.52 To enable the $CO_2$ to flow from the new 24" pipeline into the existing 36" LOGGS pipeline the Theddlethorpe Facility will be required as detailed in *Chapter 3: The Viking CCS Pipeline*. The location of this facility is yet to be confirmed; the preferred location would be on non-agricultural land within the former Theddethorpe Gas Terminal (Option 1). The alternative location (Option 2) is on agricultural land to the west of the former terminal site on Provisional Grade 3 land. Therefore, to present a worst case it is assumed that the alternative site is brought forward and would have a permanent footprint of 0.5 ha of BMV.

## Soil Resources in the Study Area

10.5.53 The purchased NATMAP Vector data identifies eleven soil associations within the Study Area (**Table 10-22**), along with discrete areas of unsurvey land. Soil descriptions are not included in **Table 10-22** as these are presented of the relevant Sections (above). The main soil association mapped within the Study Area (62.4 %) is the Holderness Association which occurs throughout the Study Area. The next most common association is Wallasea 2 (16.5 %) which occurs to the south of the Study Area from around Grimoldby and Manby to the coast. The remaining nine soil associations are mapped as covering relatively small areas. Ten of the eleven mapped associations (mainly comprising loamy and clayey soils) are at very small or small risk of erosion (Ref 10-21). The sandy soils of the Sandwich association which commonly support sand dune and coastal wetland habitats, are however classed as being at high risk of wind erosion.

### *Table 10-22: Soil Associations within the Study Area*

| Soil Association | Area (ha) | % of Study Area |
|---|---|---|
| Newchurch 2 (814c) | 47.59 | 6.7 |
| Holderness (711u) | 440.90 | 62.4 |
| Burlingham 2 (572o) | 43.55 | 6.2 |
| Landbeach (512b) | 14.07 | 2.0 |
| Swaffham Prior (511e) | 6.79 | 1.0 |
| Newmarket 1 (343f) | 1.66 | 0.2 |
| Arrow (543) | 0.91 | 0.1 |
| Salop (711m) | 29.31 | 4.2 |
| Wallasea 2 (813g) | 116.51 | 16.5 |
| Sandwich (361) | 1.38 | 0.2 |
| Saline 1 (0220) | 2.35 | 0.3 |
| Waterbodies (no soil cover) | 1.24 | 0.2 |
| TOTAL | 706.27 | 100.0 |

### ALC Grading within Lincolnshire

10.5.54 For comparative purposes **Table 10-23** details the Provisional ALC grading in the administrative areas of NELC, NLC and LCC. The data are taken from the Provisional ALC (Ref 10-22 and Ref 10-24), with an assumed 50:50 split of Grade 3 into Subgrade 3a (BMV) and Subgrade 3b (non-BMV) land.

10.5.55 North East Lincolnshire covers an area of 19,232.0 ha of which the Provisional ALC mapping shows 14,836.1 ha to be agricultural land. The data show all of the agricultural land in the district is classified as Grade 2 or Grade 3, comprising 18.8 % and 58.4 % of the total land area within the district, respectively. The remaining land is classified as urban or non-agricultural. Applying a 50/50 split to the Grade 3 data, 9,224.50 ha (62.2 %) of the available agricultural land within the district is predicted to be of BMV quality.

10.5.56 North Lincolnshire covers an area of 84,910.2, ha of which the Provisional ALC mapping shows 78,053.2 ha to be agricultural land. The data show that the majority of the agricultural land in the district is classified as Grade 2 or Grade 3, comprising 43.8 % and 36.8 % of the total land area within the district, respectively. Areas of Grade 1 land area also present (9.7 %), focussed along the flood plain of the River Trent and also present in the Wolds. Grade 4 and 5 land is also present in the district in discrete pockets. Applying a 50/50 split to the Grade 3 data, 61,044.1 ha (78.2 %) of the available agricultural land within the district is predicted to be of BMV quality.

10.5.57 Lincolnshire covers an area of 591,821.5 ha of which 566,202.1 ha is agricultural land. The data show that half of the total land area of the County is classified as Grade 3 (50.1 %). Grade 2 is the next abundant comprising 31.6 % of the total land area within the County. Grade 1 land is also present (12.8 %), along with small areas of Grade 4 (1.3 %). Applying a 50/50 split to the Grade 3 data, 410,630.6 ha (72.5 %) of the available agricultural land within the County is predicted to be of BMV quality.

***Table 10-23: ALC Grading in Lincolnshire***

| ALC Grade | Area (ha) | Percentage (%) of total land area | Percentage (%) available agricultural land* |
|---|---|---|---|
| **North East Lincolnshire** | | | |
| Grade 1 | 0.0 | 0 | 0 |
| Grade 2 | 3,612.9 | 18.8 | 24.4 |
| Grade 3 | 11,223.2 | 58.4 | 75.6 |
| Grade 4 | 0.0 | 0.0 | 0.0 |
| Grade 5 | 0.0 | 0.0 | 0.0 |
| Non-agricultural | 192.7 | 1.0 | - |
| Urban | 4,203.1 | 21.9 | - |
| Total | 19,232.0 | 100.0 | 100.0 |
| Total BMV** | 9,224.5 | 48.0 | 62.2 |
| Total agricultural land* | 14,836.1 | | |
| **North Lincolnshire** | | | |

| ALC Grade | Area (ha) | Percentage (%) of total land area | Percentage (%) available agricultural land* |
|---|---|---|---|
| Grade 1 | 8,249.4 | 9.7 | 10.6 |
| Grade 2 | 37,178.6 | 43.8 | 47.6 |
| Grade 3 | 31,232.1 | 36.8 | 40.0 |
| Grade 4 | 1,382.1 | 1.6 | 1.8 |
| Grade 5 | 10.8 | 0.0 | 0.0 |
| Non-Agricultural | 3,612.0 | 4.3 | - |
| Urban | 3,245.0 | 3.8 | - |
| Total | 84,910.2 | 100.0 | 100.0 |
| Total BMV** | 61,044.1 | 71.9 | 78.2 |
| Total agricultural land* | 78,053.2 | | |
| **Lincolnshire** | | | |
| Grade 1 | 75,757.2 | 12.8 | 13.4 |
| Grade 2 | 186,750.2 | 31.6 | 33.0 |
| Grade 3 | 296,246.4 | 50.1 | 52.3 |
| Grade 4 | 7,448.3 | 1.3 | 1.3 |
| Grade 5 | 0.0 | 0.0 | 0.0 |
| Non-Agricultural | 17,132.6 | 2.9 | - |
| Urban | 8,486.8 | 1.4 | - |
| Total | 591,821.5 | 100.0 | 100 |
| Total BMV** | 410,630.6 | 69.4 | 72.5 |
| Total agricultural land* | 566,202.1 | | |

***** *Excludes land mapped as non-agricultural or urban*

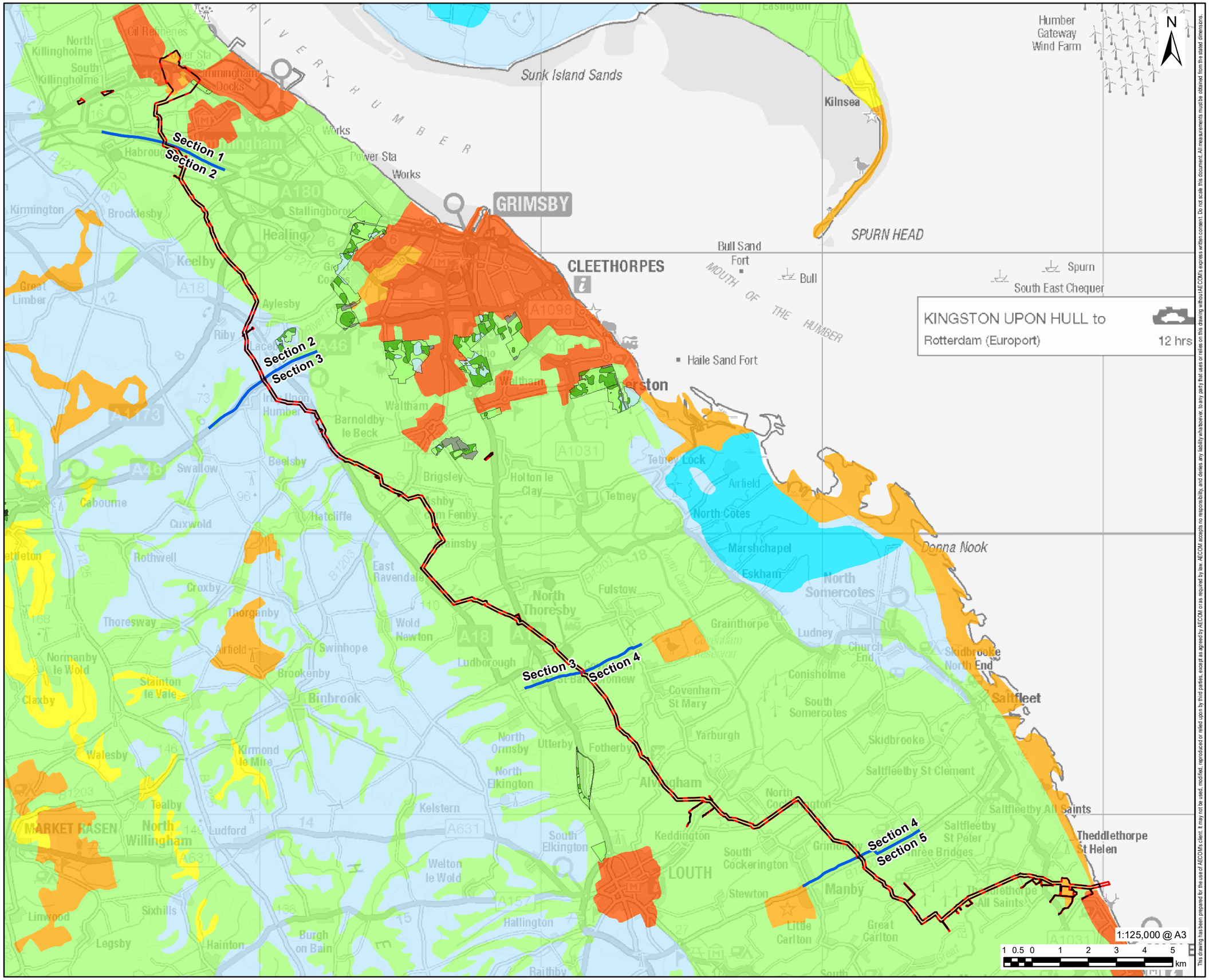
***The land mapped as Grade 3 has been split 50/50 between Subgrades 3a (BMV) and 3b (non-BMV).*

## Land use

10.5.58 The current land-use baseline has been informed by the use of aerial and Streetview© imaging provided by Google. 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) 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. 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.

Revision: 3 Drawn: LC Checked: HS Approved: MW Date: 2022-11-02

Filename: \\eu.aecomnet.com\EMA\UKI\UKNCL2\Jobs\60668965 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\PEIR\VNZ_PEIR_10-1_Agricultural_Land_Classification_v3_20221102_LC.mxd




VikingCCS

AECOM

**PROJECT**

## Viking CCS Pipeline

**LEGEND**

- Draft Order Limits
- Study Area
- Route Section Break

Agricultural Land Classification - Provisional

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Non Agricultural
- Urban

Agricultural Land Classification - Post 1988

- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Not Surveyed
- Other

NOTES:
Reproduced from Ordnance Survey digital map data © Crown copyright 2022. All rights reserved. Licence number 0100031673. Contains public sector information licensed under the Open Government Licence v3.0. © Natural England material is reproduced with the permission of Natural England 2021.

**FIGURE TITLE**

**Figure 10-1**
**Agricultural Land Classification**

**ISSUE PURPOSE**

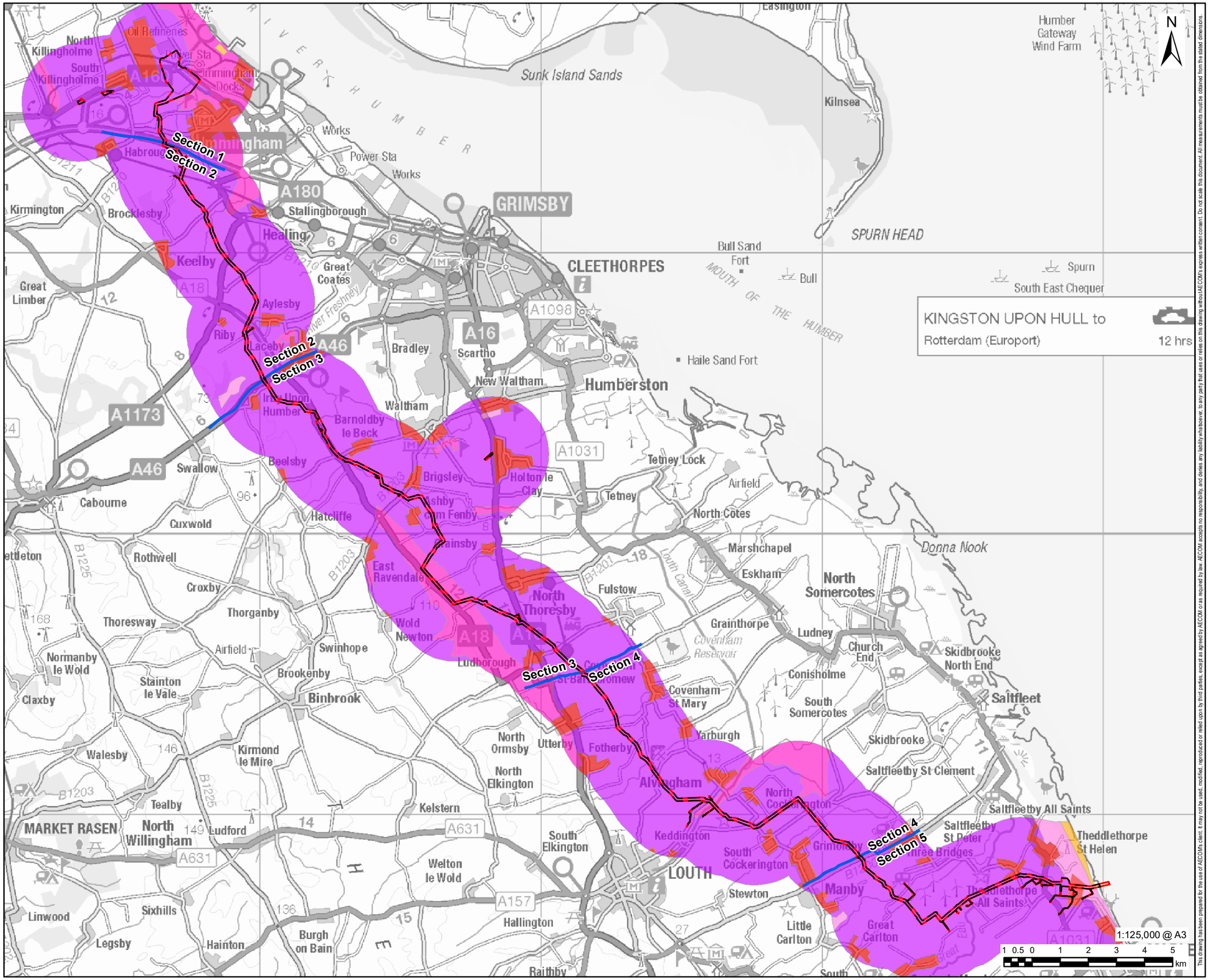
PEIR

**PROJECT NUMBER / REFERENCE**

60668955 / VCCS_221102_PEIR_10-1

Revision: 3 Drawn: LC Checked: HS Approved: MW Date: 2022-11-02

Filename: \\eu.aecomnet.com\EMEA\UKI\UKNCL2\Jobs\60668965 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\PEIR\VNZ_PEIR_10-2_Likelihood_of_BMV_v3_20221102_LC.mxd




VikingCCS

AECOM

**PROJECT**

## Viking CCS Pipeline

**LEGEND**

- Draft Order Limits
- Study Area
- Route Section Break
- High likelihood of BMV land (>60% area bmv)
- Moderate likelihood of BMV land (20 - 60% area bmv)
- Low likelihood of BMV land (<= 20% area bmv)
- Non-agricultural use
- Urban

NOTES:
Reproduced from Ordnance Survey digital map data © Crown copyright 2022. All rights reserved. Licence number 0100031673. Contains public sector information licensed under the Open Government Licence v3.0. © Natural England material is reproduced with the permission of Natural England 2021. Digitised from Natural England 1:250,000 BMV Plans

**FIGURE TITLE**

**Figure 10-2**
**Likelihood of Best and Most Versatile Agricultural Land**

**ISSUE PURPOSE**

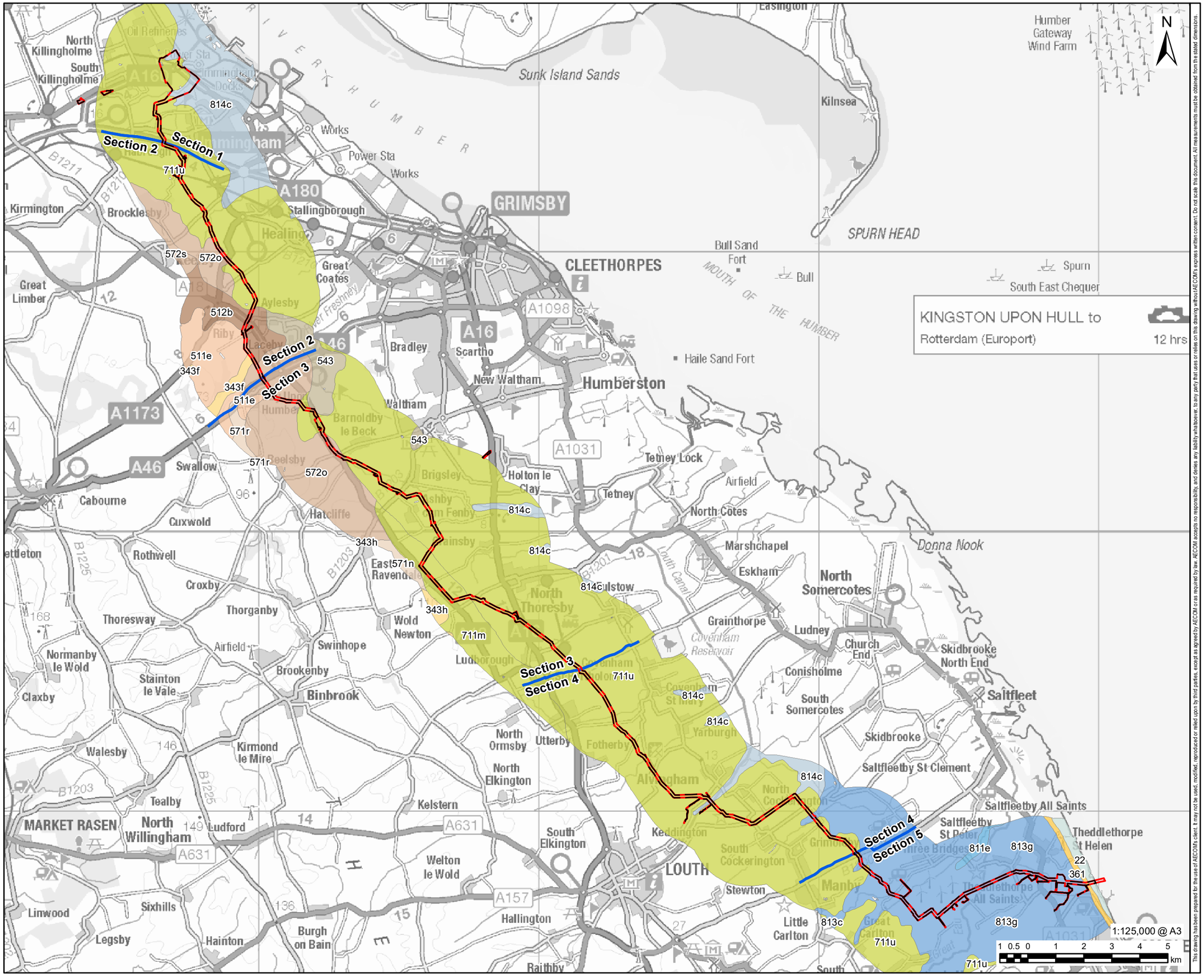
PEIR

**PROJECT NUMBER / REFERENCE**

60668955 / VCCS_221102_PEIR_10-2

Revision: 3 Drawn: LC Checked: HS Approved: MW Date: 2022-11-02

Filename: \\eu.aecomnet.com\EMIAU\UKNCL2\Jobs\60668965 V_Net_Zero_Project\600_CAD_GIS\20_GIS\02_Maps\PEIR\VNZ_PEIR_10-3_National_Soil_Map_v3_20221102_LC.mxd




VikingCCS

AECOM

**PROJECT**

## Viking CCS Pipeline

**LEGEND**

- Draft Order Limits
- Study Area
- Route Section Break

Soil Associations

- 22 - Saline 1
- 343f - Newmarket 1
- 343h - Andover 1
- 361 - Sandwich
- 511e - Swaffam Prior
- 512b - Landbeach
- 543 - Arrow
- 571n - Tathwell
- 571r - Hunstanton
- 572o - Burlingham 2
- 572s - Bishampton 1
- 711m - Salop
- 711u - Holderness
- 811e - Tanvats
- 813c - Fladbury 2
- 813g - Wallasea 2
- 814c - Newchurch 2





**FIGURE TITLE**

**Figure 10-3**
**Soil Associations**

**ISSUE PURPOSE**

PEIR

**PROJECT NUMBER / REFERENCE**

60668955 / VCCS_221102_PEIR_10-3

## 10.6 Mitigation

### Embedded Design Mitigation

10.6.1 EIA is an iterative process which informs the development of project design. Where the outputs of the preliminary assessment identify likely significant effects changes to the design can be made or mitigation measures can be built-in to the proposal to reduce these effects.

10.6.2 This type of mitigation is defined as embedded mitigation, as mitigation measures which have been identified and adopted as part of the evolution of the project design ("embedded" into the project design).

10.6.3 The design of the Project will be further developed to reflect the findings of ongoing environmental studies, comments raised during this statutory consultation and ongoing engagement with stakeholders. As the design develops, the embedded mitigation measures will also be refined as part of an iterative process.

10.6.4 The Project has been designed so that the permanent loss of agricultural land is avoided as far as possible. The Immingham Facility and Theddlethorpe Facility (Option 1) will be located within urban and non-agricultural land. The only potential permanent development on agricultural land (permanent loss of agricultural land through built development) would be due to the installation of three Block Valve Stations and, if required, Theddlethorpe Facility (Option 2). These have been located in Grade 3 land as far as is practicable, and the Block Valve Stations have been located adjacent to the highway network to reduce the need for additional disturbance/loss of land to accesses. The pipeline has been routed to avoid areas identified as Grade 2 on the Provisional ALC mapping (Ref 10-21 and 10-23) as far as is reasonably practicable.

10.6.5 Furthermore, the informed and sensitive positioning of pipeline routeing and access tracks to the edge of fields, in field boundaries, or through less productive areas of individual fields (where possible in consideration of technical and other environmental requirements) will ensure that the maximum area of productive land remains in agricultural use during the construction period (referred to as micrositing). Informed route design will also mitigate indirect effects such as field severance and separation of livestock from water supplies.

### Additional Mitigation and Enhancement Measures

10.6.6 A Preliminary Draft Construction Environmental Management Plan (CEMP) has been prepared as part of this PEIR and can be found in *PEIR Volume IV Appendix 3.1*. This sets out the preliminary additional and enhancement mitigation measures identified in this preliminary assessment of significant effects. The mitigation presented in the Draft CEMP will be secured through a requirement within the DCO, which requires a CEMP to be submitted for approval after the grant of development consent.

10.6.7 This section summarises the types of mitigation measures that will be considered to mitigate against the effects on Agriculture and Soils where required. These measures should be adopted during the construction phase and will be refined and be developed as part of the construction assessment for the ES:

- *B15: Topsoil stripping should be undertaken outside of the winter period (October to March inclusive) where possible. If there is more than 15mm of rain over 24hr period then topsoil stripping should cease until the soil is dry or 24 hours has passed, whichever is the sooner;*
- *E2: Produce an environmental emergency response plan which will detail such measures as making appropriate equipment (e.g. spill kits, absorption mats) easily*

*accessible on-site and training personnel in using them. The plan should include clear protocols and communication channels to ensure that any spillages are dealt with immediately and adequately. This will prevent large areas of soil / geology potentially becoming contaminated and in turn protect surface water quality;*

- *F1: Prepare a Soil Management Plan following the guidance in the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and other relevant documents such as The Institute of Quarrying's Good Practice Guide for Handling Soils in Mineral Workings;*
- *F2: Soil handling operations will be undertaken in line with the Soil Management Plan and appropriately supervised to ensure that they are suitable for re-use within the Project. Stockpiles will be placed away from watercourse to avoid runoff. The appropriate management of soil resources will maintain soil volumes and quality to prevent loss/lowering of ALC grade between pre- and post-construction and thus potential loss of BMV status;*
- *F3: Access to agricultural lands will be maintained throughout the construction process, as far as is practicable;*
- *F4: Damage to the agricultural capability of soils will be avoided by the use of best practice in soil stripping, handling and storage of soil materials;*
- *F5: Existing field drainage systems will be re-instated to ensure that land capability is maintained and drainage related to flooding issues will not be worsened;*
- *F6: Access to water supplies for all fields will be maintained where possible;*
- *F7: Where a pre-existing problem with eelworm or other pests or diseases is identified tests will be taken before entry and the analysis results sent to Harbour Energy/ landowner prior to entry;*
- *F8: Where required pests and diseases tests will be carried out on any imported topsoil before it comes on Site and the analysis results sent to Harbour Energy/ landowner;*
- *F9: Soil testing of any imported soils to the relevant British Standard for topsoil (BS3882:2007) or subsoil (BS8601:2013) will be undertaken to ensure similarity to the in situ soils and its suitability for reuse.*
- *F10: Following completion of construction operations all agricultural land taken temporarily would be fully reinstated as near as practically possible to its former condition. Topsoil would be prepared and, where required (for example for the reinstatement of permanent pasture) sown using an appropriate seed mix as agreed by the landowner;*
- *F11: To ensure that the maximum area of productive land remains in agricultural use during the construction period pipeline routeing and access tracks will be directed to the edge of fields, in field boundaries, or through less productive areas of individual fields wherever practicable, taking into account other environmental, socio-economic and engineering constraints;*
- *F12: Targeted pre-commencement soil and ALC surveys on land that will be subject to direct disturbance to aid in the production of and implementation of the Soil Management Plan, as well as providing baseline land quality data for the success of reinstatement within the pipeline working corridor to be measured against;*

- *F13: Temporary land-take areas will be reinstated to agricultural use, unless otherwise identified for habitat enhancement - any agreed controls over the exact post-reinstatement land use (either set out in the ES or through landowner consultation) will be clearly identified;*
- *G2: Establish the location and condition of existing land drainage and compile a record. Subject to landowner/occupier agreement, existing drains should be restored, or new drains established to help prevent damage to soil structure, maintain work areas in a dry condition and to enable current drainage systems to continue to operate through the construction period; and*
- *G6: Produce an Environmental Emergency Response Plan documenting measures to prevent pollutants infiltrating into the soils beneath the site and reaching surface and groundwater receptors".*

10.6.8 Potential impacts to agricultural operations and farm business viability will be mitigated as far as is practicable, through ongoing consultation with landowner(s) and farmer(s) (Section 10.4), but as set out in the Scoping Report will not be specifically addressed or assessed in the Agriculture and Soils chapter of the ES.

10.6.9 The Outline Soil Management Plan (SMP) submitted with the ES (item F1 in the Preliminary Draft CEMP (*PEIR Volume IV Appendix 3.1*)) will provide a framework within which the appointed Contractor (including any sub-contractors or suppliers) will plan, implement and deliver good practice soil management to protect soil resources against damage and loss during the construction phase of the Project. This will be achieved through the adoption of industry standard methods for the handling and storage of soils appropriate to the soil types identified. The Outline SMP will be developed in to a Detailed (or construction issue) SMP prior to the start of construction by a suitably experienced of qualified soil scientist and will be informed by the detailed pre-construction soil surveys. The implementation of the Detailed SMP is expected to be the subject of a DCO Requirement.

10.6.10 Measures set out in the Outline SMP will include, but are not limited to, the following:

- handling of soil resources only when sufficiently dry to prevent compaction and damage to soil structure, generally limiting soil operations to the months April to October (although this period may be extended during dry periods) and taking account of prevailing weather conditions;
- no soil handling to be carried out when the soil moisture content is above the lower plastic limit;
- stripping, handling, storage and transportation of topsoil separately from subsoil;
- appropriate seeding of soil storage mounds if required for a period longer than six months, to prevent erosion and to maintain soil structure, nutrient content and biological activity;
- de-compacting of the subsoil before topsoil re-instatement to ensure adequate infiltration and drainage;
- minimising the number of machine movements across topsoil to reduce compaction and retain soil structure;
- no trafficking/driving of vehicles/plant or materials storage to occur outside designated areas;
- no trafficking/driving of vehicles/plant on reinstated soil (topsoil or subsoil);

- only direct movement of soil from donor to receptor areas (no triple handling and/or ad hoc storage);
- no mixing of topsoil with subsoil, or of soil with other materials;
- soil only to be stored in designated soil storage areas;
- all plant and machinery must always be maintained in a safe and efficient working condition;
- daily records of operations undertaken, and site and soil conditions should be maintained;
- low ground pressure (LGP models) or tracked vehicles should be used where possible; and
- development of a land drainage strategy, led by a land drainage specialist, for both pre-construction and post-construction.

10.6.11 These standard soil management measures are considered to provide appropriate protection against damage and loss to the majority of the soil resources identified within the Study Area which are of small and very small risk of erosion and hence of low sensitivity (**Table 10-3**).

10.6.12 As described in **Table 10-19** the sandy soils of the Sandwich association found in Section 5 are at high risk of wind erosion. These soils would require further Additional Mitigation (beyond those applied to the rest of the soils within the Study Area) to ensure their protection should they be directly impacted by works at the construction phase of the Project or during maintenance operations.

10.6.13 It is expected however, that impacts to these soils will be mitigated through avoidance (embedded mitigation) as these soils coincide with the designated habitats of the Saltfleetby - Theddlethorpe Dunes Special Area of Conservation (SAC), National Nature Reserve (NNR) and Site of Special Scientific Interest (SSSI) and the Humber Estuary Special Protection Area (SPA) and Ramsar site therefore it is likely that impacts to these habitats, and hence the soils that support them, will be avoided as far as is practicable.

10.6.14 The post-consent/pre-commencement detailed soil surveys will accurately identify the extent of highly sensitive soils within the working area and detail field scale mitigation measures that may be required during construction. This information will be available for any maintenance operations that may occur in the future. The mitigation measures included within the Detailed SMP (which will be informed by the detailed soil survey pre-commencement) will allow for the dynamic management of the soils and adapt to site conditions as they occur. Should highly sensitive soils be directly impacted by the Project, Additional Mitigation measures may include but are not limited to:

- pre-construction survey to identify the in-field location and extent of soils of high sensitivity;
- suitable location of stockpile on a flat area of ground away from areas where there may be high runoff or water ponding;
- covering of the soil stockpiles in a suitable geotextile to reduce the chance of erosion from water and wind;
- use of specialist surface run-off control systems;
- erection of wind barriers; and
- stand-off procedures for adverse weather conditions.

10.6.15 The preliminary assessment is undertaken with the assumption that the embedded and additional mitigation measures are in place.

# 10.7 Preliminary Assessment of Effects

## Construction Effects

### *Loss of agricultural land*

10.7.1 Assuming that all agricultural land within the Study Area except the Block Valve Stations and Theddlethorpe Facility (Option 2) is only unavailable for agricultural use during construction, there will be the temporary loss of approximately 586.16 ha of agricultural land, of which 564.04 ha (99.8 %) is likely to be BMV agricultural land based on calculated data using the Likelihood of BMV mapping).

10.7.2 There will also be the permanent loss of approximately 1.1 ha of agricultural land due to the Block Valve Stations and Theddlethorpe Facility (Option 2), which to represent a worst case is all considered to be of BMV quality. As set out in section 10.4, a threshold of 20 ha of permanent BMV loss is used to determine whether the loss of agricultural land is significant or not significant. As the permanent loss of BMV land due to the Project is less than 20 ha, the effect is considered to be **Not Significant**.

10.7.3 No additional permanent losses of agricultural land are predicted at the operational stage of the Project.

### *Damage to soil resources*

10.7.4 Construction activities will result in a temporary disturbance to soil resources that are of low and high sensitivity. The application of appropriate good practice construction mitigation measures, such as those described in section 10.6, will ensure that the structure, function and resilience of soil resources are protected and maintained.

10.7.5 Almost all (99.8%) of soils within the Study Area are of small to very small risk of erosion and are classed as being of low sensitivity (**Table 10-3**). With the mitigation described in section 10.6 in place, the magnitude of change to these soils through handling, stockpiling, machinery traffic, etc. would be short-term and reversible (low) (**Table 10-4**), and the resulting impact would be **Not Significant** (**Table 10-5**).

10.7.6 It is expected that the erosion-prone 1.38 ha of high sensitivity soils of the Sandwich association in Section 5 (**Table 10-3**) would be avoided by construction operations (embedded mitigation) as these soils coincide with the internationally and nationally designated habitats of the Saltfleetby - Theddlethorpe Dunes SAC, NNR and SSSI and the Humber Estuary SPA and Ramsar site, and that there would be **no impact.**

### *Loss of soil resources*

10.7.7 The application of appropriate mitigation, such as the industry standard good practice soil management measures described in section 10.6, will prevent the unauthorised export of soils; minimise or prevent soil loss through erosion and trafficking on plant wheels; and ensure that soils are maintained in a state suitable for reuse during reinstatement. This will ensure that the loss of soil is restricted to small scale unavoidable losses comparable to those experienced during arable farming, with over 95% of soils being retained on site and suitable for reuse. The mitigation of loss of soil would also help ensure biosecurity by minimising the potential for the transfer of disease, pathogens and weeds.

10.7.8 With the mitigation described in Section 10.6 in place, the low sensitivity soils would have a negligible magnitude of change (**Table 10-4**), and the resulting impact would be **Not Significant** (**Table 10-5**).

10.7.9 As stated above, it is anticipated that the Project design would avoid the high sensitivity soils in Section 5 resulting in **no impact**. However, should these soils be directly impacted by the Project, the application of appropriate mitigation measures such as those outlined in section 10.6 would result in a negligible magnitude of change (**Table 10-4**), and the resulting impact would be **Not Significant** (**Table 10-5**).

### Operational Effects

10.7.10 Operational phase activities with potential to impact upon agriculture and soils, i.e., maintenance and emergency repairs, will be limited and will be of a significantly smaller scale than experienced at Construction. Therefore, with the agreement with the Planning Inspectorate (paragraph 10.3.5), operational effects have been scoped out.

### Decommissioning Effects

10.7.11 The scale and nature of activities undertaken during decommissioning would be similar to those described previously for construction, and they would be temporary during the period of decommissioning activities on site. Following the removal of the structures and the reinstatement of the land there would be no further potential effects on agricultural land and soil resources.

10.7.12 The potential effects from decommissioning should therefore be regarded as no greater than those anticipated at construction and are therefore **Not Significant**.

10.7.13 The preliminary assessment of effects for Agriculture and Soils is presented in **Table 10-24.**

### *Table 10-24: Preliminary Assessment of Effects - Agriculture and Soils (Construction)*

| Receptor | Potential Impacts | Duration | Mitigation | Likely Significance of Effect | Confidence in Prediction |
|---|---|---|---|---|---|
| Agricultural Land | Permanent loss of BMV agricultural land | Permanent | As set out in Section 10.6 | Not Significant<br>Permanent loss of BMV land (1.1. ha) is below 20 ha threshold. | High<br>The design is sufficiently evolved to understand the location and scale of permanent infrastructure. |
| Soil resources | Damage to of soil resources through incorrect management | < 6 months following restoration or reuse. | As set out in Section 10.6 | Not Significant | High<br>It is known that the appropriate application of industry standard soil management measures (outlined in Section 10.6 and as recommended in guidance and in the Scoping Opinion) reduces the impact of development on soil resources to levels where no significant loss of soil structure, function or resilience occurs, and the reinstated soils are capable of delivering ecosystem services to pre-development levels. |
| Soil resources | Loss of soil resources through incorrect management | Permanent | As set out in Section 10.6 | Not Significant | High<br>It is known that the appropriate application of industry standard soil management measures (outlined in Section 10.6 and as recommended in guidance and in the Scoping Opinion) maximises the retention of soil resources and ensures their suitability for reuse. |
| Note the duration of effects for soils and agriculture differ from that quoted in *Chapter 5: PEIR Assessment Methodology.* | | | | | |

### *Table 10-25: Preliminary Assessment of Effects - Agriculture and Soils (Decommissioning)*

| Receptor | Potential Impacts | Duration | Mitigation | Likely Significance of Effect | Confidence in Prediction |
|---|---|---|---|---|---|
| Agricultural Land | Permanent loss of BMV agricultural land<br>- not applicable as there is no scope for additional permanent land take as a result of decommissioning. | Not applicable | Not applicable | Not applicable | Not applicable |
| Soil resources | Damage to soil resources through incorrect management. | < 6 months following restoration or reuse. | As set out in Section 10.6 | Not Significant | High<br>As per **Table 10-24**. |
| Soil resources | Loss of soil resources through incorrect management. | Permanent | As set out in Section 10.6 | Not Significant | High<br>As per **Table 10-24**. |
| Note the duration of effects for soils and agriculture differ from that quoted in *Chapter 5: PEIR Assessment Methodology.* | | | | | |

## 10.8 Summary and Next Steps

10.8.1 Using published data, the approximate area of BMV land within the Study Area has been calculated. Although BMV land will likely be directly impacted by the Project the majority of impacts will be temporary and for the duration of the construction phase only, as all land within the pipeline corridor will be reinstated immediately following construction. The impacts to agricultural land are assessed as Not Significant.

10.8.2 Eleven soil associations were identified within the Study Area. Ten of these are at small or very small risk of erosion and can be adequately protected from loss or damage by the application of industry standard soil management measures (additional mitigation). One high risk soil association was identified, however as this overlies the existing LOGGS pipeline and occurs within a designated environmental site it is considered that it will be avoided by all construction activities if possible. Further additional mitigation measures have been outlined for protection of this resource should avoidance not be possible. Impacts to soil resources in terms of damage and loss are assessed as Not Significant.

10.8.3 Building upon the Preliminary Draft CEMP (*PEIR Volume IV Appendix 3.1*) and the mitigation measures outlined in section 10.6, appropriate soil management measures will be set out in an Outline SMP submitted with the DCO application. This will be updated to a Detailed (or construction issue) SMP prior to construction, taking into account further information such as relevant post-consent soil survey data (section 10.8.6).

### Data gathering methodology for ES

10.8.4 The data gathering methodologies presented in this PEIR will also be used in the ES. Within the ES an assessment will be made of both the proposed working area of the indicative pipeline alignment, to provide an indication of the actual area of soil disturbance and land take resulting from the Project. Secondly, data will be presented for the whole of the Project's Draft Order Limits to provide baseline conditions for the wider area in which the works (disturbance) could occur should potential changes in the pipeline alignment be made within the limits of deviation during construction.

### Planned Surveys

10.8.5 No further surveys are considered necessary for the assessment of impacts on agriculture and soils to be reported in the Environmental Statement.

10.8.6 It is anticipated that to maximise the potential for reuse of soil and ensure the sustainable management of soil resources, targeted soil surveys will be undertaken to inform the Detailed SMP (for example, along the pipeline corridor and temporary accesses and at Block Valve Station locations). These surveys will be completed post-consent when the precise routeing and placement of infrastructure are known, ensuring the surveys are targeted to areas directly impacted by the Project.

10.8.7 For all areas of agricultural land (including Theddlethorpe Facility (Option 2) if brought forward), the post-consent surveys will include an assessment of agricultural land quality using the ALC to provide a baseline against which restoration success can be measured. Surveys will be undertaken to standard guidelines (Ref 10-1, 10-10 and 10-17).

10.8.8 The post-consent surveys will also include any areas of permanent development at the Immingham Facility where there are soil resources in place, as their sustainable reuse must also be informed. As this land is non-agricultural the pre-construction

surveys would not be required to consider ALC. As the Theddlethorpe Facility (Option 1) at the former Theddlethorpe Gas Terminal would be on existing hard standing (no soil resource) no surveys would be required at this location.

## 10.9 References

**Ref 10-1** (AECOM) V Net Zero Pipeline Project Environmental Impact Assessment - Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN070008/EN070008-000018-V%20Net%20Zero%20Pipeline_EIA%20Scoping%20Report.pdf

**Ref 10-2** MAFF (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

**Ref 10-3** Department for Communities and Local Government (2021). The National Planning Policy Framework (NPPF). Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

**Ref 10-4** HM Government (2015). Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015. Available at https://www.legislation.gov.uk/uksi/2015/595/contents/made

**Ref 10-5** HM Government (2020). The Agriculture Act. Available at: https://commonslibrary.parliament.uk/research-briefings/cbp-8702/

**Ref 10-6** Department for Energy and 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

**Ref 10-7** Department for Energy and Climate Change (2021). Draft Overarching National Policy Statement for Energy (Draft EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf

**Ref 10-8** Department for Energy and Climate Change (2011). The 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

**Ref 10-9** DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf

**Ref 10-10** Department for Energy and Climate Change (2021). Draft Gas Supply Infrastructure and Gas and Oil Pipelines (Draft EN-4). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf

**Ref 10-11** Natural England (2021). Guide to assessing development proposals on agricultural land. Available at

https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land

**Ref 10-12** HM Government (2018). 'A Green Future: Our 25 Year Plan to Improve the Environment'. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

**Ref 10-13** Central Lincolnshire Joint Strategic Planning Committee (2017). Central Lincolnshire Local Plan. Available at: https://www.n-kesteven.gov.uk/central-lincolnshire//

**Ref 10-14** Central Lincolnshire Joint Strategic Planning Committee (2022). Central Lincolnshire Local Plan Proposed Submission Draft. Available at https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan-review/

**Ref 10-15** Partnership for Biodiversity in Planning. Wildlife Assessment Check Tool. Available at https://www.biodiversityinplanning.org/wildlife-assessment-check/

**Ref 10-16** East Lindsey District Council (2018). East Lindsey Local Plan Core Strategy. Available at: https://www.e-lindsey.gov.uk/media/9791/Core-Strategy/pdf/Final_Version_of_Core_Strategy_2018.pdf?m=636821922732300000

**Ref 10-17** Ministry of Housing, Communities and Local Government (2019) Planning Practice Guidance for the Natural Environment (PPGNE) Available at: https://www.gov.uk/guidance/natural-environment

**Ref 10-18** Natural England (2012). Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'. Available at: http://publications.naturalengland.org.uk/publication/35012

**Ref 10-19** Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings. Available at: https://www.quarrying.org/soils-guidance

**Ref 10-20** British Society of Soil Science (2021). Guidance Document 3: Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction. Available at: http://publications.naturalengland.org.uk/publication/35012

**Ref 10-21** Cranfield University (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. Available at: https://www.theccc.org.uk/wp-content/uploads/2015/06/Cranfield-University-for-the-ASC.pdf

**Ref 10-22** MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, East Midlands Region (ALC005). Available at: http://publications.naturalengland.org.uk/publication/143027?category=5954148537204736

**Ref 10-23** LandIS Soils Guide. Available at: https://www.landis.org.uk/soilsguide/mapunit_list.cfm

**Ref 10-24** MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, Yorkshire and the Humber (ALC003). Available at: http://publications.naturalengland.org.uk/publication/130043?category=5954148537204736

**Ref 10-25** Multi-Agency Geographical Information for the Countryside (MAGIC). Available at: https://magic.defra.gov.uk/MagicMap.aspx

**Ref 10-26** Defra (2017). Likelihood of Best and Most Versatile Agricultural Land Strategic Scale Map – Yorkshire and the Humber (ALC015) Available at http://publications.naturalengland.org.uk/publication/5093223992655872?category=5208993007403008

**Ref 10-27** Defra (2017). Likelihood of Best and Most Versatile Agricultural Land Strategic Scale Map – Yorkshire and the Humber (ALC015) Available at http://publications.naturalengland.org.uk/publication/6048285720051712?category=5208993007403008

**Ref 10-28** MAFF (1994). Agricultural Land Classification - Detailed Post 1988 ALC survey, Immingham, Manby Road (Cleethorpes Borough LP Site EMP 1F (ii)) (ALCL17194). Available at: http://publications.naturalengland.org.uk/publication/5663044838359040

**Ref 10-29** Soil Survey of England and Wales (1984). Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1.

**Ref 10-30** Soil Survey of England and Wales (1984). Soils and their Use in Eastern England and accompanying 1:250,000 map Sheet 4.

**Ref 10-31** Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales. Available at: https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification

**Ref 10-32** DEFRA (2001) Explanatory note for Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale maps (ALC021). Available at: http://publications.naturalengland.org.uk/publication/6292442749337600?category=5208993007403008