UK Onshore Scheme

Environmental Statement

Volume 2 Document ES-2-C.04

Chapter 20

Agriculture & Soils (Proposed Converter Station)

VKL-08-39-G500-009

August 2017

Co-financed by the European Union
Connecting Europe Facility

Environmental Statement Volume 2			
ES Reference	**Chapter**	**Chapter Title**	
ES-2-A.01	Ch01	Introduction	
ES-2-A.02	Ch02	Development of the UK Onshore Scheme	
ES-2-A.03	Ch03	The UK Onshore Scheme	
ES-2-A.04	Ch04	Environmental Impact Assessment Methods	
ES-2-B.01	Ch05	The Proposed Underground DC Cable	
ES-2-B.02	Ch06	Intertidal Zone	
ES-2-B.03	Ch07	Geology & Hydrogeology	
ES-2-B.04	Ch08	Water Resources & Hydrology	
ES-2-B.05	Ch09	Agriculture & Soils	
ES-2-B.06	Ch10	Ecology	
ES-2-B.07	Ch11	Landscape & Visual Amenity	
ES-2-B.08	Ch12	Archaeology & Cultural Heritage	
ES-2-B.09	Ch13	Socio-economics & Tourism	
ES-2-B.10	Ch14	Traffic & Transport	
ES-2-B.11	Ch15	Noise & Vibration	
ES-2-B.12	Ch16	Register of Mitigation	
ES-2-C.01	Ch17	The Proposed Converter Station	
ES-2-C.02	Ch18	Geology & Hydrogeology	
ES-2-C.03	Ch19	Water Resources & Hydrology	
ES-2-C.04	**Ch20**	**Agriculture & Soils**	
ES-2-C.05	Ch21	Ecology	
ES-2-C.06	Ch22	Landscape & Visual Amenity	
ES-2-C.07	Ch23	Archaeology & Cultural Heritage	
ES-2-C.08	Ch24	Socio-economics & Tourism	
ES-2-C.09	Ch25	Traffic & Transport	
ES-2-C.10	Ch26	Noise & Vibration	
ES-2-C.11	Ch27	Register of Mitigation	
ES-2-D.01	Ch28	Cumulative Effects	
ES-2-D.02	Ch29	Summary of Assessment & Conclusions	

Contents

1 INTRODUCTION 1
1.1 Introduction 1
1.2 Chapter Structure 1
2 APPROACH TO ASSESSMENT 3
2.1 Introduction 3
2.2 Summary of Consultation 3
2.3 Additional Consultation 5
2.4 Scope of Assessment 6
2.5 Changes to Proposed Scope 7
2.6 Identification of Baseline Conditions 8
2.7 Assessment Criteria 10
3 BASIS OF ASSESSMENT 17
3.1 Design Mitigation 17
3.2 Assessment Assumptions 17
3.3 Engineering assumptions 21
4 PLANNING POLICY AND LEGISLATIVE CONSIDERATIONS 25
4.1 National Policy 25
4.2 Local Policy 27
5 BASELINE CONDITIONS 30
5.1 Study Area 30
5.2 Zone of Influence 31
5.3 Proposed Converter Station 32
5.4 Permanent Access Road 36
5.5 Proposed AC Cable Route 38
6 POTENTIAL IMPACTS 40
6.1 Overview of Potential Impacts 40
6.2 Proposed Converter Station and Permanent Access Road 44
6.3 Proposed AC Cable Route 49
6.4 Overview of Pre-mitigation Effects 51
7 MITIGATION 55
7.1 Overview of Mitigation 55

8 RESIDUAL EFFECTS 59
8.1 Proposed Converter Station and Permanent Access Road 59
8.2 Proposed AC Cable Route 61
9 CUMULATIVE EFFECTS 63
9.1 Introduction 63
9.2 Intra-project Effects 63
9.3 Inter-project Effects 64
10 SUMMARY OF ASSESSMENT 69
10.1 Overview of Baseline Conditions 69
10.2 Overview of Residual Effects 69
10.3 Overview of Cumulative Effects 70
11 REFERENCES 74

List of Tables

Table 20.1: Environmental Statement (Agriculture & Soils) 1
Table 20.2: Scoping Opinion (Agriculture & Soils) 3
Table 20.3: Additional Consultation (Agriculture & Soils) 5
Table 20.4: Sources of Data (Agriculture & Soils) 8
Table 20.5: Sensitivity Criteria (Agriculture & Soils) 11
Table 20.6: Impact Magnitude Criteria (Agriculture & Soils) 14
Table 20.7: Assessment of Significance (Agriculture & Soils) 16
Table 20.8: Land-use and ALC Grade for each of the local administrative areas 30
Table 20.9: Soil Associations at the Proposed Converter Station Site and Permanent Access Road 34
Table 20.10: ALC at the Proposed Converter Station 35
Table 20.11: ALC within the Proposed Permanent Access Road and Temporary Construction Area 37
Table 20.12: ALC Grading in the proposed AC cable working width, temporary working area and ZoI 39
Table 20.13: Summary of Temporary Impacts (Converter Station and Access Road) 52
Table 20.14: Summary of Long-term impacts (Converter Station and Access Road) 53
Table 20.15: Summary of Temporary Impacts (AC Cable Route) 53
Table 20.16: Summary of Long-term impacts (AC Cable Route) 54
Table 20.17: Cumulative Permanent Loss of BMV land 64
Table 20.18: Summary of Temporary Residual Effects (Converter Station and Access Road) 71
Table 20.19: Summary of Long-term Residual Effects (Converter Station and Access Road) 72
Table 20.20: Summary of Temporary Residual Effects (Proposed AC cable route) 72
Table 20.21: Summary of Long-term Residual Effects (Proposed AC cable route) 72

List of Figures

The following figures are referenced within this chapter and can be found in Volume 3 Part C Figures (ES-3-C.01).

Figure 20.1 The ALC of the Converter Station Site and the Access Road Site

Figure 20.2 The Provisional ALC of the AC Cable Route

Figure 20.3 The Soil Associations at the Converter Station Site and the Access Road Site

Figure 20.4 The Soil Associations at the AC Cable Route

List of Appendices

The following appendices are referenced within this chapter and can be found in Volume 4 Part C Technical Appendices (ES-4-C.04).

Appendix 20.1 Proposed Converter Station Site Agricultural Land Classification

Appendix 20.2 Proposed Permanent Access Road Agricultural Land Classification

Glossary & Abbreviations

Glossary of Terms	
Term	**Meaning**
Agricultural Land Classification (ALC)	Agricultural Land Classification (ALC) is a standardised method for classifying the quality of agricultural land according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using the Ministry of Agriculture, Fisheries and Food's (MAFF) 'Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land, 1988" (Ref: 20-1)
Best and Most Versatile (BMV) Agricultural Land	The National Planning Policy Framework (NPPF) (Department for Communities and Local Government, 2012) defines best and most versatile (BMV) land as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality (Ref: 20-2). 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.

Glossary of Terms	
Term	**Meaning**
Agri-Environment Schemes (AES)	Agri-Environment Schemes (AES) are administered by Department for Environment, Food and Rural Affairs (DEFRA), and can be adapted to particular farming systems and specific environmental conditions. This makes AES a targeted tool for achieving environmental goals. Examples of commitments covered by AES include: · Environmentally favourable farming; · Management of low-intensity pasture systems; · Integrated farm management and organic agriculture; · Preservation of landscapes and historical features such as hedgerows, ditches and woods; and · Conservation of high-value habitats and their associated biodiversity. AES therefore allow landowners; other individuals; and bodies responsible for land management to be incentivised (remunerated) to manage their land for environment benefit. Currently operational AES in England include, but are not limited to, Environmental Stewardship and Countryside Stewardship schemes. Environmental Stewardship schemes including Entry Level Stewardship (ELS); Higher Level Stewardship (HLS); Uplands ELS; Organic ELS (OELS); and Organic HLS (OHLS) were closed to new applicants in 2015; although existing agreements will continue to be managed until they reach their agreed end date. Since 2015, all new applications for environmental land management grants are subject to Countryside Stewardship schemes which comprise three main elements Mid-Tier schemes, Higher Tier schemes and Capital Grants. Higher and Mid-Tier schemes are multi-year agreements and both may include organic land. The difference between Higher and Mid-tier schemes is that Higher Tier schemes incorporate environmentally significant sites, commons and woodlands which require complex management and support from Natural England (NE) or the Forestry Commission (FC). As the only difference between the tiers is due to the scale and management regime, they are considered equally within the assessment. Capital Grants are not considered in the assessment as they are specific to outcomes for hedgerows and boundaries, developing implementation plans, feasibility studies, woodland management plans, woodland creation (establishment), and tree health.
Field Capacity	The water content of soil after is has been saturated in the field and excess water has drained away (usually 48 hours following a rainfall event). The soil is fully saturated and has no capacity to absorb additional water, consequently the soil moisture deficit is zero.
Field Capacity Days (FCD)	The median number of days at which the soil is at field capacity.

List of Abbreviation	
Abbreviation	**Meaning**
AC	Alternating Current
AES	Agri-Environment Scheme
ALC	Agricultural Land Classification
BBC	Boston Borough Council
BMV	Best and Most Versatile (agricultural land)
BPS	Basic Payment Scheme
CLA	Country Landowner's Association
COA	Cable Offload Area
CS	Converter Station
DC	Direct Current
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DTS	Distributed Temperature Sensing
EIA	Environmental Impact Assessment
ELDC	East Lindsay County District Council
ELS	Entry Level Stewardship
EHLS	Entry Level plus Higher Level Stewardship
EMF	Electromagnetic Fields
ES	Environmental Statement
EU	European Union
FC	Forestry Commission
FCD	Field Capacity Days
ha	Hectare
HDD	Horizontal Directional Drilling
HLS	Higher Level Stewardship
HVAC	High Voltage Alternating Current
IPC	Infrastructure Planning Commission
LAAV	Lincolnshire Association of Agricultural Valuers
LCC	Lincolnshire County Council
LDC	Land Drainage Consultant
LPA	Local Planning Authority
LWT	Lincolnshire Wildlife Trust

List of Abbreviation	
Abbreviation	**Meaning**
MAFF	Ministry of Agriculture, Fisheries and Food (now DEFRA)
NE	Natural England
NFU	National Farmers' Union
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
OEHLS	Organic Entry Level plus Higher Level Stewardship
NSRI	National Soil Resources Institute
OELS	Organic Entry Level Stewardship
OHLS	Organic Higher Level Stewardship
SHDC	South Holland District Council
SHSP	Soil Handling and Storage Protocol
SMP	Soil Management Plan
TCA	Temporary Construction Areas
TCC	Temporary Construction Compounds
TWA	Temporary Works Area
ZoI	Zone of Influence

1 Introduction

1.1 Introduction

1.1.1 This chapter has been prepared by Wardell Armstrong LLP. It reports the results of baseline studies and the assessment of the potential impacts of the proposed converter station (including the proposed Alternating Current (AC) cable route and proposed permanent access road) on Agriculture and Soils.

1.1.2 Table 20.1 sets out the structure of the Environmental Statement (ES) with respect to Agriculture and Soils. Impacts on Agriculture and Soils are interrelated with impacts on Ecology (Chapter 21; ES-2-C.05), and Water Resources & Hydrology (Chapter 19; ES-2-C.03). The potential cumulative effects are discussed in Chapter 28 (ES-2-D.01, Cumulative Effects).

Table 20.1: Environmental Statement (Agriculture & Soils)

ES Reference	ES Volume	ES Chapter	Content
ES-2-B.05	2	09	Main Report: Proposed Underground DC Cable
ES-2-C.04	**2**	**20**	**Main Report: Proposed Converter Station**
ES-3-B.01	3	09	Figures: Proposed Underground DC Cable
ES-3-C.01	3	20	Figures: Proposed Converter Station
ES-4-B.05	4	09	Technical Appendices: Proposed Underground DC Cable
ES-4-C.04	4	20	Technical Appendices: Proposed Converter Station

1.2 Chapter Structure

1.2.1 The remainder of this chapter is structured as follows:

- Section 2. Approach to Assessment. Sets out the approach or methodology employed in the assessment.
- Section 3. Basis of Assessment. Sets out the key assumptions which have been made in undertaking the impact assessment.
- Section 4. Planning Policy and Legislative Considerations. Summarises the key points of planning policy and legislation which have been considered as part of the assessment.
- Section 5. Baseline Conditions. Reports the results of desktop and field studies undertaken to establish existing conditions.
- Section 6. Potential Impacts. Identifies the potential impacts on agriculture & soils which may occur as result of construction and operation.

- Section 7. Mitigation. Identifies the mitigation which is proposed including measures which are incorporated into the siting, design and construction of the proposed converter station, permanent access road and underground HVAC cable.
- Section 8. Residual Effects. Reports the residual effects which remain, taking into account the proposed mitigation, and identifies whether these are significant or not.
- Section 9. Monitoring. Identifies any proposed short, medium or long term monitoring which is proposed to be undertaken during construction and/or operation.
- Section 10. Cumulative Effects. Identifies the inter-project cumulative effects which may occur in combination with other developments.
- Section 11. Summary of Assessment. Provides a summary of the key findings of the impact assessment.
- Section 12. References

2 Approach to Assessment

2.1 Introduction

2.1.1 This section describes the approach to the identification and assessment of impacts resulting from the construction, operation and decommissioning of the proposed converter station, permanent access road and proposed AC cable route on Agriculture and Soils.

2.2 Summary of Consultation

Scoping Opinion Review

2.2.1 Table 20.2 summarises the issues raised in the scoping opinion in relation to Agriculture and Soils, and outlines how these has been addressed. A copy of the scoping opinion is included in Appendix 4.

Table 20.2: Scoping Opinion (Agriculture & Soils)

Consultee	Summary of Comment	How and where addressed
Boston Borough Council (BBC)	BBC requested the advice provided by Natural England (NE) is followed and fully taken account of in the final chapter.	The NE response is presented in Appendix 9.2 (ES-4-B.05). The assessment methodology has been presented to and agreed by NE (see Appendix 9.1; ES-4-B.05).
East Lindsay County District Council (ELDC)	ELDC refer to Lincolnshire County Council's (LCC) response that a detailed ALC survey and Soil Management Plan should be submitted to support the application and incorporated in the ES. ELDC also highlighted Lincolnshire Wildlife Trust's (LWT's) concerns regarding certain aspects of the proposed mitigation.	1. Please refer to the NE response (Appendix 9.2; ES-4-B.05), whereby a detailed ALC survey is not required for production of the ES. 2. Measures to protect soils are set out in a Soil Handling and Storage Protocol (SHSP, Ref: 20-3), based on best practice guidance such as Defra's Construction Code of Practice (Ref: 20-4). 3. Please refer to the LWT response.
Lincolnshire County Council (LCC)	LCC requested that a detailed ALC survey and SMP should be submitted to support the application and incorporated in the ES.	Please refer to the ELDC response.
Lincolnshire Wildlife Trust (LWT)	LWT highlighted concerns regarding a preference to route through pasture land as opposed to arable land, but	From an agricultural point of view, pasture land is considered to be of lower sensitivity to development than

Table 20.2: Scoping Opinion (Agriculture & Soils)		
Consultee	**Summary of Comment**	**How and where addressed**
	recognised that the proposed route would take account of a range of environmental considerations.	the high value arable land in the locality. During construction activities, the pasture land outside of the working width can remain *in-situ*/in use, however, due to the requirement for large agricultural equipment this is not often possible for arable land. Appropriate mitigation measures would be in place to ensure that soils were correctly handled and stored to minimise loss of soil function. The iterative design process and consequent final routeing considers the potential impacts identified by all disciplines, including ecology.
Natural England (NE)	NE highlighted the requirement to consider the Government's policy for the protection of the BMV agricultural land as set out in paragraph 112 of the NPPF. NE also recommend that soils should be considered under a more general heading of sustainable use of land and the ecosystem services they provide as a natural resource in line with paragraph 109 of the NPPF, with a focus on the protection and sustainable use of soil resources, and details of how any adverse impacts on soils can be minimised. NE requested a detailed survey (on areas of permanent land take) to enable the consideration of the degree to which soils are going to be disturbed/harmed as part of this development and whether BMV agricultural land is involved.	Government policy has been carefully reviewed and the 'need to protect BMV land' has been considered within the assessment and throughout the iterative design process. The assessment and the mitigation measures set out in the SHSP will ensure that the structure and function of soil resources (hence their ability to provide essential ecosystem services) are protected (Ref: 20-3). However, this is not presented as a separate heading. Detailed soil survey and ALC has been undertaken on areas of permanent land take. For areas of temporary land take, a desk based methodology has been agreed with NE (see Appendix 9.1; ES-4-B.05).
South Holland District Council (SHDC)	SHDC requested the advice provided by NE is followed and fully taken account of in the final chapter.	Please refer to the NE response above and also Appendix 9.2 (ES-4-B.05).

2.3 Additional Consultation

2.3.1 Table 20.3 summarises additional consultation undertaken with relevant statutory and non-statutory consultees in relation to Agriculture and Soils, and outlines how and where this has been addressed within the assessment.

Table 20.3: Additional Consultation (Agriculture & Soils)

Consultee	Nature of additional consultation	How and where addressed
Country Landowner's Association (CLA)	NGVL held a meeting with the CLA's rural surveyor in in October 2016. The CLA stated that matters should be resolved to the satisfaction of the National Farmers' Union (NFU) and that they would liaise with the NFU also.	See NFU response.
Lincolnshire Association of Agricultural Valuers (LAAV)	High-level project update meetings were held between the NGVL and a panel of three representatives of the LAAV in September 2016. The meetings investigated lessons learned from Triton Knoll and other utilities projects; and key landowner concerns (principally agricultural land drainage issues) and outlined how these would be addressed. A further meeting with LAAV, NFU, the appointed land drainage consultant (LDC) and NGVL was held on 3rd May 2017. This was principally to discuss land drainage design, cable burial depths, Option and Easement agreements and legal issues.	Representative of specialist disciplines, including Agriculture and Soils, attended the Triton Knoll planning hearings to identify specific areas of concern and ensure that these were adequately addressed by the UK Onshore Scheme. A specialist Land Drainage contractor (LDC) has been engaged to undertake pre- and post-construction agricultural land drainage design as part of the Scheme design. Feedback from LAAV has been considered during the design process.

Table 20.3: Additional Consultation (Agriculture & Soils)		
Consultee	**Nature of additional consultation**	**How and where addressed**
National Farmers' Union (NFU)	An 'introduction of personnel' meeting between the NGVL and the NFU was held on 12 January 2016. A further project introduction meeting was held on 26 April 2016 which discussed the justification for connecting to Bicker Fen rather than South Humber; contact with LAAV; issues concerning drainage; and stakeholder engagement. An initial high-level consultation meeting between NGVL and two NFU representatives was held on 13th January 2017. NGVL presented a project update; and the meeting addressed key landowner concerns (principally agricultural land drainage issues) and outlined how these would be addressed. A meeting with LAAV, NFU, LDC and NGVL was held on 3 May 2017 – see LAAV response. This was principally to discuss land drainage design, cable burial depths, Option and Easement agreements and legal issues.	Consultation with LAAV has been undertaken (see above). A programme of stakeholder engagement and public consultation is in place. A specialist LDC has been engaged to undertake pre- and post-construction agricultural land drainage design as part of the Scheme design. Feedback from NFU has been considered during the design process.
Natural England (NE)	Consultation between Wardell Armstrong, NGVL and NE took place between July 2016 and March 2017 (Appendix 9.2; ES-4-B.05) to determine the methodology for the determination of BMV land within the UK Onshore Scheme.	The detailed methodology, as agreed with NE, is for detailed soil survey to be undertaken in areas of permanent development, and for a desk based approach to be adopted in areas of temporary development. The methodology is fully described in Appendix 9.1; and consultation with NE is presented in Appendix 9.2 (ES-4-B.05).

2.4 Scope of Assessment

Aspects to be assessed

2.4.1 The following aspects will be assessed for the proposed converter station, permanent access road and AC cable route:

- Loss of agricultural land;

- Loss of soil resources;
- Damage or disturbance to soil resources; and
- Loss of eligibility for AES.

2.4.2 In addition, the impact to agricultural land holding will be assessed for the proposed converter station, and the permanent access road.

2.4.3 The terminology used throughout the Agriculture and Soils assessment is presented in the glossary of terms at the start of this chapter.

Spatial Scope

2.4.4 The spatial scope of the Agriculture and Soils assessment is the Zone of Influence (ZoI) as illustrated in Figure 20.1 for the proposed converter station and permanent access road and Figure 20.2 for the proposed AC cable route.

2.4.5 The ZoI of the converter station covers approximately 29.7 ha and is located with a single agricultural field. The ZoI includes the converter station, drainage, access and landscaping *etc.* as shown in Figure 20.1. The ZoI is also referred to as the proposed converter station site and described in further detail in paragraph 5.2.2.

2.4.6 The ZoI (planning application boundary) of the permanent access road covers approximately 8 ha, as shown in Figure 20.1. The ZoI of the permanent access road is described in further detail in paragraph 5.2.3.

2.4.7 The AC cable ZoI covers an area of approximately 70.6 ha, as shown in Figure 20.2. The ZoI of the AC cable route is described in paragraph 5.2.4.

Temporal Scope

2.4.8 Temporary impacts to Agriculture and Soils due to the proposed converter station, the permanent access road and AC cable route, include the temporary disturbance of soil resources; and the temporary removal of land from agricultural use and AES eligibility due to construction activities. There is also the potential for temporary impacts to arise during maintenance operations.

2.4.9 Longer term and permanent effects to Agriculture and Soils are those which would occur as a result of the construction of the proposed converter station, the permanent access road and AC cable route resulting in permanent land take or as a result of their operation. This would include effects which may begin during construction and endure for the lifetime of the Scheme (for example the permanent loss of agricultural land for the construction of the converter station).

2.5 Changes to Proposed Scope

2.5.1 There have been some changes to the proposed scope of assessment presented in the Scoping Report. These changes provide an improved methodology for the assessment to make best use of the available data and better reflect the available guidance.

2.5.2 The assessment criteria have been refined, removing the 'very high' sensitivity level such that the assessment criteria are in accordance with criteria is other chapters of the ES.

2.5.3 The determination of significance for the loss of agricultural land is no longer assessed using the criteria tables as presented in the Scoping Chapter. This is due to the criteria stating that the permanent loss of BMV land exceeding 20 ha is considered significant. As a result, any loss of BMV which is temporary or falls below the 20 ha threshold is considered as being not significant, Paragraphs 2.7.5 to 2.7.7 provide further explanation.

2.5.4 The assessment of soil resource has been sub divided, which has allowed potential impacts resulting from the disturbance to the soil resource to be assessed separately from the potential loss of soil resource.

2.5.5 There has been a change to the way the AES are assessed in terms of magnitude of change from the baseline. Due to the nature of AES, they can either be in place, or not. As a result, there are three levels of impact magnitude; a permanent loss of eligibility to existing schemes (i.e. on schemes which are currently in place) due to permanent infrastructure (high magnitude); a temporary loss of eligibility to existing schemes due to temporary works in which the land would be re-eligible for the AES following the construction phase (low magnitude), and no impact on the existing AES (negligible magnitude).

2.5.6 The environmental impacts to land holding are only assessed for the proposed converter station and access road, as landholdings impacted by these two elements will experience a permanent loss of agricultural land, whilst landholdings impacted by the proposed AC cable will be temporary and returned to agricultural use after completion of construction.

2.6 Identification of Baseline Conditions

Desk Studies and Assessment Guidance

2.6.1 The published sources of data listed in Table 20.4 have been reviewed, these represent the most current datasets regarding agricultural land quality, soil resource and enrolment in an AES within the ZoI. They have been used to inform the baseline presented in Section 5 of this chapter (Baseline Conditions).

Table 20.4: Sources of Data (Agriculture & Soils)

Source	Data	Reference
Knox *et al.,* (2015)	Research to develop the evidence base on soil erosion and water use in agriculture	Ref: 20-5
National Soil Resources Institute (NSRI)	LandIS soils data (1:250,000 scale National Soil Map, digital dataset including NATMAPvector and associated datasets).	Ref: 20-6
Ministry of Agriculture, Fisheries and Food (MAFF)	Provisional Agricultural Land Classification Sheet, Eastern Region (1:250,000 scale)	Ref: 20-7

Table 20.4: Sources of Data (Agriculture & Soils)		
Source	**Data**	**Reference**
Soil Survey of England and Wales	Soils and their Use in Eastern England and accompanying 1:250,000 map: Sheet 4: Eastern England"	Ref: 20-8
Met Office	Climatological Data for Agricultural Land Classification	Ref: 20-9
DEFRA	Agri-Environment Schemes identified using MagicMap	Ref: 20-10
Natural England	Strategic 1:250,000 scale Predictive 'Likelihood of best and most versatile land' mapping	Ref: 20-11

2.6.2 Where relevant, the impact assessment also utilises information from specific liaison and consultation, for example data gathered by NGVL.

2.6.3 It has been agreed with NE (Appendix 9.2; ES-4-B.05) that a detailed soil survey is only required in areas of permanent land take (i.e. the proposed converter station zone and permanent access road). A desk based methodology for areas of temporary disturbance (i.e. the proposed AC cable route) was therefore agreed with NE with the understanding that 'prior to works commencing a full field survey would be required in order to produce a detailed SHSP.

2.6.4 As described in Chapter 9 (Agriculture and Soils (Proposed Underground DC Cable), ES-2-B.05), owing to the sensitive nature of the agricultural land and the reliance on complex systems of agricultural land drainage within the area of the proposed converter station, permanent access road and proposed AC cable route, pre-and post-construction agricultural drainage design works has been undertaken to inform the design of the Scheme.

2.6.5 An outline SHSP accompanies the planning application (Ref: 20-3), this document sets out good practice soil protection measures and the basis for how works will be undertaken. The detailed measures, however will be finalised by the Contractor taking in to account the detailed Scheme design and pre-construction site-specific soil data.

2.6.6 The 1:250,000 scale Provisional ALC mapping for the Eastern Region (Ref: 20-7) is the most current and detailed published ALC data covering the ZoI (see Appendix 9.1, ES-4-B.05). However, it is important to note that this data pre-dates the revised ALC methodology (issued in 1988 (Ref: 20-1)), and as a result, the data does not provide a distinction between ALC Subgrades 3a and 3b. The Provisional ALC mapping therefore provides an indicative indication of the land quality in the Region, but the extent and distribution of BMV agricultural land within the ZoI and proposed AC cable working width cannot be defined from the Provisional mapping alone.

2.6.7 Therefore, as described in Table 20.3 and shown in Appendix 9.2 (ES-4-B.05), it has been agreed with NE that estimates of Subgrade 3a and 3b within the ZoI and proposed AC cable working width can be determined using purchased LandIS soils data (Ref: 20-6); and the calculated proportion of Subgrade 3a and 3b of each series combined with the mapped ALC Grades 1 and 2 land can be used to quantify the area of BMV land that would be temporarily lost due to the AC cable route. This data has been verified with the NE strategic 1:250,000 scale

Predictive 'Likelihood of best and most versatile land' mapping (Ref: 20-11), and the methodology is fully described in Appendix 9.1 (ES-4-B.05).

2.6.8 The Climate Grade is calculated in a grid across the ZoI using the Meteorological Office data on a 5 km grid basis (Ref: 20-9). This is used to determine the Field Capacity Days (FCD) in each grid box, which would impact the Wetness Grade of the identified Soil Associations depending on the location along the AC cable route.

Field Studies

2.6.9 The following detailed soil surveys have been completed in areas where there will be permanent land take to inform the identification of agricultural land quality and soil resource, as agreed with NE (Appendix 9.2; ES-4-B.05):

- A soil survey of the proposed converter station site on the 25th and 26th August 2016 by two experienced soil scientists. The soil was inspected at 31 points (approximate density of 1 inspection per ha); with 28 auger cores and three soil profile pits in line with standard guidelines (Ref: 20-1).
- A soil was surveyed along the route of the proposed permanent access road on 6th and 7th March 2017. The soil was inspected at 25 points; with 23 auger cores and two soil profile pits undertaken at approximate 100 m (linear) intervals in line with standard guidelines (Ref: 20-1).

2.6.10 A detailed description of the soil survey results and ALC calculations are presented in Appendices 20.1 and 20.2 for the converter station and permanent access road respectively. The soil survey locations are displayed on Figures 20.1 and 20.3.

2.7 Assessment Criteria

Sensitivity of Receptors

2.7.1 The sensitivity of receptors will be assessed in accordance with the definitions in Table 20.5.

Table 20.5: Sensitivity Criteria (Agriculture & Soils)		
Receptor	**Sensitivity**	**Justification**
Soil Resource and AES participation.		
Soils with high risk of erosion and organic soils (peat) Land under Organic Environmental Stewardship Schemes	High	Development on those soils should be avoided, however if this is not possible, they require bespoke consideration and site-specific planning of construction methods, e.g. use of temporary working surfaces, careful storage, protection from drying out, in order to preserve their functions. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion Land under High Level Environmental Stewardship Schemes	Medium	Standard mitigation measures would provide appropriate protection to these soils, however damage is likely to occur if worked in less than ideal conditions, e.g. when above their plastic limit. The soils should be given appropriate consideration because of their importance for agricultural production. Standard mitigation measures would provide appropriate protection to land under these AES schemes.
Soils with low risk of erosion Land under Entry Level Environmental Stewardship Schemes (e.g. Basic Payment Scheme (BPS)); Higher- or Mid-Tier Countryside Stewardship Schemes	Low	These soils are generally more resistant to damage (except peat soils). Standard mitigation measures will provide appropriate protection to land under these AES.
Poor quality soils within an urban environment not supporting biodiverse habitats. Soils with no risk of erosion Land not under an Environmental Stewardship Schemes	Negligible	These soils are already highly disturbed and of poor quality. Only basic mitigation measures are required.
Landholding		
Landholding	Medium	Considered that all arable agricultural landholdings are of the same sensitivity.

2.7.2 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 Knox *et al.* (Ref: 20-5). Therefore, as a general 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).

2.7.3 However, it is important to note that soils of differing texture and structural development will behave differently 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 poor natural drainage and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Whereas, 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 appropriate mitigation measures, such as the good practice set out in the SHSP and Section 7, 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.

Magnitude of Impacts

2.7.4 The magnitude of impacts has been assessed in terms of the change from baseline conditions, as defined in Table 20.6.

Loss of Agricultural Land (Agricultural Land Quality and Land Use)

2.7.5 BMV agricultural land (Grades 1, 2, and Subgrade 3a) is considered to be a finite national resource and is given special consideration under the NPPF (Ref: 20-2). However, there are no defined criteria for the assessment of effects on agricultural land (understood as a permanent land use change to a built development), and no threshold given for BMV loss (permanent land use change) which should be regarded as significant within an Environmental Impact Assessment (EIA).

2.7.6 Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y), requires that the local planning authority consults Natural England if the area of a proposed permanent development exceeds 20 ha of BMV land (Ref: 20-12). Although the guidance does not state that this threshold should be used to determine the significance of loss for the purpose of EIA, it is a guide to consider significance where 20 ha or more of BMV is affected by a development. 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.

2.7.7 Therefore, the loss of agricultural land has been assessed by estimating the amount and quality of land that may be affected by the converter station, permanent access road and AC cables, 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.

2.7.8 The majority of agricultural land within the Planning Application Boundary (see Figures 20.1 and 20.2) is productive arable land, the majority of which is ALC Grade 1 (Ref: 20-7), which is typical for Lincolnshire. Therefore, in this assessment, it can be assumed that agricultural land use is closely related to agricultural land quality, with arable and horticultural land tending to be more prevalent within areas graded as BMV, land under mixed rotation on good to moderate quality land, and pasture land located on areas of lower quality. Land use is therefore reflected in the ALC assessment, which is demonstrated in the loss of agricultural land assessment.

Soil Resources

2.7.9 There are no defined criteria, or policy guidance on the assessment of the effects of development on soil resources. Therefore, the assessment of the effect of permanent and temporary development as a consequence of the proposed converter station, permanent access road and AC cable route has been assessed in terms of the identified soil resources, their sensitivity to disturbance and the degree of loss of soil resource.

2.7.10 The disturbance of soil resources would be assessed by reporting the sensitivity of soil resources to damage. The sensitivity criteria for disturbance of soil resources are based on the erodibility of soils (see paragraphs 2.7.2 and 2.7.3) or ecologically important soils, such as peat. The soil resource assessment considers both temporary and permanent damage. The receptor sensitivity criteria are provided in Table 20.5. The magnitude of change from the baseline would be defined in terms of the damage to soil resource as provided in Table 20.6.

2.7.11 The soil loss assessment would consider permanent loss of the soil resource due to the proposed converter station, permanent access road and AC cable route. The receptor sensitivity criteria are provided in Table 20.5. The magnitude of change from the baseline would be defined in terms of the loss of soil resources, as provided in Table 20.6.

2.7.12 As discussed in paragraph 2.7.3, the vulnerability of soils to damage due to their texture and structural development is minimised through the implementation of standard good practice as set out in the SHSP and Section 7.

Agri-Environment Schemes

2.7.13 There are no defined criteria, or policy guidance on the assessment of the effects of developing land enrolled in an AES. Therefore, the assessment of the effect of the proposed converter station, permanent access road and AC cable route would be assessed in terms of the permanent or temporary change of eligibility of the landholding for AES. The receptor sensitivity criteria are provided in Table 20.5. The magnitude of change from the baseline would be defined in terms of the change of eligibility of the land for AES as provided in Table 20.6.

2.7.14 Due to the nature of AES, they can either be in place, or not, as a result, there are three levels of impact magnitude; a permanent loss of eligibility of existing AES due to permanent infrastructure (high magnitude); a temporary loss of eligibility of existing AES due to temporary works in which the land would be eligible for the AES following the construction phase (low magnitude), and no impact on existing AES (negligible magnitude).

2.7.15 It should be noted that AES are designed to provide areas of ecological enhancement and therefore some of the AES considered in this chapter may also contain features which are considered to be ecological constraints, for example species diverse hedgerows. This chapter focuses on the impacts of the proposed converter station, permanent access road and AC cable route in terms of changes in AES eligibility of schemes currently in place and does not consider the ecological or economic implications of these schemes. Specific ecological and economic issues are addressed in Ecology (Chapter 21; ES-2-C.05) and Socio-economics & Tourism (Chapter 24; ES-2-C.08) respectively.

Agricultural Landholding

2.7.16 There are no defined criteria, or policy guidance on the assessment of the effects of development on agricultural land holdings. Therefore, the assessment of the effect of the proposed converter station and permanent access road has been assessed in terms of the identified land holdings and the proportional permanent loss of agricultural land within the holding as a result of the development.

2.7.17 The effect of the proposed converter station and permanent access road on agricultural land holdings has been assessed as a function of receptor sensitivity and magnitude of change from the baseline condition. The receptor sensitivity criteria are provided in Table 20.5. The magnitude of change from the baseline would be defined in terms of the proportion of land holding temporarily lost as a result of the proposed converter station and permanent access road is provided in Table 20.6. The effects of permanent loss of landholding are not assessed as it is assumed that adequate compensation measures are in place to fully mitigate the loss, see paragraph 7.1.14.

Table 20.6: Impact Magnitude Criteria (Agriculture & Soils)

Magnitude	Damage to Soil Resource	Loss of Soil Resource	AES	Land-holding
High	Permanent irreversible or long-term (>2 years) reversible damage to soil quality through handling, and stockpiling.	<25 % of soil resources suitable for reuse and retained on site	Permanent change to land holding AES eligibility.	Temporary loss in excess of 10 % of the holding's area.

Table 20.6: Impact Magnitude Criteria (Agriculture & Soils)				
Magnitude	**Damage to Soil Resource**	**Loss of Soil Resource**	**AES**	**Land-holding**
Medium	Medium-term (6 months to 2 years) temporary disturbance. Reversible damage to soil quality through handling, and stockpiling, machinery traffic	25-50 % of soil resources suitable for reuse and retained on site	Not applicable	Temporary loss of between 5 and 9.9 % of the holding's area.
Low	Short-term (<6 months) disturbance of soil resources. Reversible damage to soil quality through handling, and stockpiling, heavy machinery traffic	51-95 % of soil resources suitable for reuse and retained on site	Temporary change to land holding AES eligibility.	Temporary loss of between 1 and 4.9 % of the holding's area.
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	No change to AES eligibility.	Temporary loss of less than 1 % of the holding's area; or the loss of land suitably mitigated through bespoke measures.

Assessing the Significance of Effects

2.7.18 For all effects except the loss of agricultural land, the level of significance of effects has been assessed using Table 20.7. Where effects are determined as Major adverse or Moderate Adverse, the effect is considered 'significant'. Where effects are determined as Minor adverse or Negligible, the effect is 'not significant'.

Table 20.7: Assessment of Significance (Agriculture & Soils)				
Magnitude of Impact	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

2.7.19 The assessment of the loss of agricultural land does not take into account temporary land use change, 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 are reported for illustrative purposes only. Temporary land use change is considered implicitly in the assessment of effects in relation to loss of and damage to soil resources, and AES eligibility; in that mitigation to ensure maintenance of soil volume and quality, will also ensure that the soil profile and thereby the quality of land is restored to the pre-commencement condition, allowing AES eligibility to be maintained.

3 Basis of Assessment

3.1 Design Mitigation

3.1.1 Design mitigation are those measures which have been incorporated into the base scheme design of the proposed converter station, permanent access road and proposed AC cable route. Through the iterative design process, alternative converter station locations, alternative permanent access road and alternative AC cable route alignments have been assessed in terms of the potential impacts to Agriculture, Soils and AES for all three components of this assessment, and all alternative converter station locations and alternative permanent access road alignments have been assessed in terms of the potential impacts to agricultural landholdings. Therefore, within the limits of constraints presented by engineering and other environmental disciplines, high sensitivity agricultural receptors have been avoided where possible.

3.1.2 The proposed converter station site (Figure 20.1) is approximately 29.7 ha. The soil survey identified the potential to reduce the impact to BMV land through the considered location of permanent infrastructure and temporary development within the 29.7 ha proposed converter station site (micro-siting). The consideration of alternatives is discussed in the Converter Station and AC Connection Description Chapter (Chapter 17, Section 2, ES-2-C.01).

3.1.3 The placement of both permanent and temporary development to the western side of the 29.7 ha proposed converter station site reduces the potential impact to the excellent quality (Grade 1, BMV) agricultural land (see Figure 20.1) which predominantly lies in the eastern part of the 29.7 ha site.

3.1.4 Within the limits of constraints presented by engineering and other environmental disciplines, the routeing of the permanent access road has been designed to follow field boundaries for as much of its length as practicable so as to minimise impact to agriculture, for example through field severance.

3.1.5 The design mitigation has minimised impacts to AES by avoiding high level and organic schemes.

3.2 Assessment Assumptions

The Proposed Converter Station Site and Permanent Access Road

3.2.1 The assessment of the impacts of the proposed converter station site and the permanent access road is based on site specific soils and land quality data derived from site surveys (paragraph 2.6.9) and published ALC and soils data, including the Provisional ALC mapping (Ref: 20-7), the LandIS NATMAP dataset (Ref: 20-6) and “Soils and their use in Eastern England” (Ref: 20-8). A

full description of the proposed converter station and permanent access road construction and operation is provided in Chapter 17 (ES-2-C.01).

3.2.2 For the purpose of the assessment, it is assumed that soil disturbance due to the construction of the converter station will occur within the entire 29.7 ha converter station ZoI (the proposed converter station site) as shown in Figure 20.1.

3.2.3 Following construction, within the 29.7 ha proposed converter station site, approximately 18.8 ha of land will be permanently excluded from agricultural use, either through built development or land use change. The remaining land (approximately 10.8 ha) will be reinstated and is referred to as the reinstated zone (see Figure 17.4; Chapter 17, ES-2-C.01).

3.2.4 The reinstated zone will be considered in two scenarios; a best-case scenario where the reinstated zone will be returned to agricultural use; and a worst-case scenario where the reinstated zone will be reseeded so that vegetative cover is re-established, but not returned to agricultural use. The restoration soil profile will be the same under each scenario, only the land management will differ.

3.2.5 The new permanent access road comprises a new junction with the A52 and approximately 2.8 km of new road, connecting to the proposed converter station site including a bridge crossing of the Hammond Beck. The soil survey assessed the access road working width area (approximately 8.0 ha).

3.2.6 The assessment of effects to soil resources through loss and/or damage is based on soil association and component soil series characteristics (from field survey or desk based data, as appropriate); and soil erodibility data derived from Knox *et al.,* 2015 (Ref: 20-5). A reasonable worst case approach has been adopted e.g. if, for a given soil association, the risk of erosion is variable, the highest risk related to that soil association is assumed for the whole area of the association.

3.2.7 As described in paragraph 3.3.4, it is assumed that the total construction period for the proposed converter station (from site preparation to final reinstatement) will be between 30 and 42 months; whereas the total construction period for the permanent access road will be a maximum of nine months (Chapter 17, ES-2-C.01).

3.2.8 It is assumed that soils excavated from temporary working areas would be reinstated *in situ* (with negligible unavoidable loss due to mixture of track base aggregate or removal on wheels).

3.2.9 It is assumed that the soils excavated to allow the permanent development of the proposed converter station and permanent access road would be reused on site for landscaping and attenuation, or in the reinstated zone. Where excavations are to a depth where the quality/nature of the excavated material is not suitable for reuse as a subsoil material within the restoration soil profile (i.e. excavations have gone deeper than the subsoil), the material is not considered to be a soil and is referred to in this chapter as non-soil substrate. This non-soil substrate underlying the soil profile would also be reinstated *in situ* where possible, or managed/reused on site in landscaping *etc.* The reuse of non-soil substrate would not compromise the restored soil profiles.

Any excess non-soil substrate material would be removed from site and to a suitably licenced and managed facility.

3.2.10 Land excluded from cultivation, but not within the defined permanent access track ZoI (paragraph 2.4.6), has not been quantified in the assessments, as arrangements would be subject to individual negotiations and preference of the landowner. For example, access to some areas may be made difficult, or the area of a field available for cultivation may make it less practical to continue cropping during construction.

The Proposed AC Cable Route

3.2.11 The assessment of the impacts of the AC cable route is based on published ALC and soils data, including; the Provisional ALC mapping (Ref: 20-7), the LandIS NATMAP dataset (Ref: 20-6) and "Soils and their use in Eastern England" (Ref: 20-8), and is described in detailed in Appendix 9.1 (ES-4-B.05). This assessment approach has been agreed with NE (Appendix 9.2; ES-4-B.05) and the assessed ALC has been verified against NE's strategic Predictive BMV mapping (Ref: 20-11). The justification for this approach for the proposed AC cable route assessment, is that the majority of the land use change (loss of agricultural land) and soil disturbance associated with the AC cable route would be temporary, restricted to the construction period of the AC cable route only. Therefore, the level of detail is commensurate with the geographical and temporal extent of the AC cable route and the likely scale of the effects. A full description of the proposed AC cable route construction and operation is provided in Chapter 17 (ES-2-C.01).

3.2.12 In addition to the AC cable route, there is a Temporary Works Area (TWA) (T17) located between the existing Bicker Fen substation and the proposed AC cable route, with a total area of 0.4 ha.

3.2.13 If the calculation of the ALC grade from the published data results in a Grade other than 3a or 3b, the Grade would be corrected. For example, a calculated Grade 1 or 2 would remain BMV land, but re-assigned to Subgrade 3a, whilst a calculated Grade 4 or 5 would remain non-BMV, but re-assigned to Subgrade 3b. Where it is not possible to determine one single grade for a soil series, equal proportions would be assumed.

3.2.14 While it is possible that the ALC grade or soil association derived from this data does not reflect the grade in a particular location within a field, it does reflect dominant land quality or soil characteristics and provides an average for a larger area. Therefore, it allows for the assessment of effects for loss of agricultural land and damage to soil resources at a scale appropriate to assess both the permanent loss of agricultural land and the effect of temporary disturbance on soils in agricultural use.

3.2.15 However, the spatial arrangement of the ALC Grading cannot be obtained from the Landis NATMAP data, as only the proportion of each soil series within an association is provided, not their geographical location. Therefore, the relative proportions of Subgrade 3a and 3b within the proposed AC cable route and wider ZoI can only be presented in a tabular form and not represented spatially, in the context of the route.

3.2.16 The assessment of effects to soil resources through loss and/or damage is based on soil association and component soil series characteristics derived from the Landis NATMAP dataset; and soil erodibility data derived from Knox *et al.,* 2015 (Refs: 20-6 and 20-5, respectively).

3.2.17 The soil texture information is obtained from the published soil profile descriptions (Ref: 20-8). Where a soil texture is identified as 'heavy or medium' (i.e. silty clay loams and clay loams where texture can be either heavy or medium depending on the percentage clay content), it is assumed the distribution is a fifty-fifty split. Additionally, if more than one soil texture is listed in the description of soils series, their proportions would be assumed to be equal. Furthermore, if more than one soil Wetness Class is listed in the description of soils series, the proportions are assumed to be equal. Where soil wetness can be improved via appropriate land management, it is assumed that appropriate management practices are in place, such as agricultural land drainage.

3.2.18 It is assumed that the period of temporary storage of excavated soils along the proposed AC cable route would vary; however, as stated in paragraph 3.3.17, it is assumed that cable installation would be undertaken in a phased manner so that sections of trench would not be left open, and soils would be stored, for no longer than a year. Good management practices, i.e. embedded construction mitigation measures, include the use of best practice storage handling and reinstatement methods, such as seeding of the stockpiles if soils are stored for longer than six months, which would prevent irreversible damage to soil quality and enable effective restoration (Refs: 20-4 & 20-13).

3.2.19 It is assumed that excavated soils (AC cable working width and Temporary Construction Compounds (TCC; T17)), would be reinstated *in situ* (with negligible unavoidable loss due to mixture of track base aggregate or removal on wheels). Within the AC cable working width, this is possible because the soil displaced by the cable would be added to the, much larger, amount of soil temporarily excavated for the working area and reinstated along the AC cable route. Where excavations are to a depth where the quality/nature of the excavated material is not suitable for reuse as a subsoil material within the restoration soil profile as described above (i.e. excavations have gone deeper than the subsoil), the material is not a soil. This non-soil substrate would also be reinstated *in situ* where possible, any excess non-soil substrate material would be removed from site and to a suitably licenced and managed facility.

3.2.20 The sensitivity of soils for the purpose of assessing the effects to soil resources through loss and/or damage has been determined. This will ensure best management practices (Refs: 20-4 & 20-13), together with any mitigation required, are implemented effectively.

3.2.21 Connection works between the proposed AC cable and the existing Bicker Fen 400 kV substation will not be considered in the Agriculture and Soils assessment, as these works will occur within the footprint of the existing substation (non-agricultural land), and will therefore not impact and soils and agriculture receptors.

Outline SHSP

3.2.22 An outline SHSP accompanies the application (Ref: 20-3), this live document sets out the good practice soil protection measures; and is based upon guidance such as Defra's Construction Code of Practice (Ref: 20-4) and MAFF's Good Practice Guide for Handling Soils (Ref: 20-13). Measures included in the SHSP include, but are not limited to, the control of construction plant movements to avoid operating on unprotected soils; minimisation of topsoil stripping areas to those essential to the works; protection of sensitive areas using specialist surfacing (e.g. geotextile membranes, wooden matting or aluminium trackways), and/or vehicles fitted with low ground pressure bearing pneumatic tyres; segregation of topsoil, subsoils and different superficial deposits and careful reinstatement in reverse excavation order; early reseeding of reinstated ground, to help re-establish and stabilise soil structure; topsoil and subsoil movements only undertaken in suitable weather conditions; soil loosening techniques such as deep tine cultivation and subsoiling, where required; and measures to minimise risks of erosion, leachate, silt and dust generation (e.g. soil stabilisation, storage of soils on impermeable sheeting, covering of stockpiles, runoff management, spraying or seeding).

3.2.23 The SHSP will consider the soil texture and structure and present the appropriate soil handling procedures and timings so to avoid damage to the soil due to handing in incorrect weather conditions. For example, the reinstatement of a heavy textured (high clay content) soil in wet conditions, may result in high levels of soil compaction compromising the soil's drainage properties and a subsequent increased risk of soil erosion due to increased levels of surface water run-off. The use of the appropriate mitigation measures such as the good practice set out in the SHSP and Section 7 will however, mitigate against any potential adverse impacts during soil handling regardless of the soil texture or prevailing structure.

3.2.24 Prior to commencement of construction, where required, site-specific soils data will be utilised to update the SHSP to a detailed document containing site-specific mitigation which will be implemented during construction activities.

3.3 Engineering assumptions

The Proposed Converter Station Site and Permanent Access Road

3.3.1 The permanent access road alignment follows existing field boundaries for the majority of its length. The access road extends from the proposed converter station site for approximately 1.4 km to Hammond Beck, which will be bridged. The alignment of the proposed permanent access road would then extend to the southeast for a further 1.4 km to join the A52, as shown in Figure 20.1.

3.3.2 The permanent access road is proposed to be approximately 2.8 km long and 5 m wide on non-turning sections extending up to 7.5 m to allow for passing places. A TCC approximately 1 ha in size, will be located on agricultural land near the proposed bellmouth junction at the A52. The total land take for the proposed permanent access road would be approximately 3.1 ha.

3.3.3 Land excluded from cultivation, but not used for any construction activities associated with the proposed converter station, permanent access road or proposed AC cable route, has not been quantified in the assessments, as arrangements would be subject to individual negotiations and preference of the landowner. For example, access to some areas within fields may be made difficult, or the area of a field available for cultivation may make it less practical to continue cropping during construction.

3.3.4 The detailed construction programme will be determined by the appointed Contractor; however, the assessment is based upon the indicative construction programme presented in Table 19.6 of Chapter 17 (ES-2-C.01). This illustrates that the duration of works for the proposed converter station (from preparatory works to final reinstatement) would be between 24 and 36 months; and that the access road would be constructed within a maximum of nine months.

The proposed AC Cable Route

3.3.5 The proposed AC cable route consists of six AC cables and two fibre optic cables which will be installed in two trenches, routed from North Ing Drove in South Holland to Bicker Fen substation, as shown in Figure 20.2.

3.3.6 The proposed AC cable working width is typically 50 m wide and comprises the following:

- Trench in which the AC cables are installed and then backfilled;
- Temporary drainage/water management measures (as designed by the specialist LDC);
- Access track including laybys for offloading cable drums; and
- Areas for temporary topsoil and subsoil storage.

3.3.7 Fibre-optic cables will be installed along the proposed AC cable route to monitor the temperature, performance and safety critical parts of the AC cable (Distributed Temperature Sensing (DTS)). One fibre-optic cable will be required for each circuit. An additional fibre-optic cable will be required for communications.

3.3.8 Fibre pits will be required up to every 250 m along the proposed AC cable route to allow inspection of the communications fibre-optic cables. Fibre pits comprise a below ground cable inspection box which will be accessed via an inspection cover (minimum 600 mm x 600 mm; 0.36 m^2) at ground level. The fibre pit cover can be designed flush and strong enough to be trafficked, however it could potentially damage ground penetrating equipment or machinery. Therefore, the option of fencing-off fibre pits to make their location easier to identify would be subject to discussion with the individual landowners. The assessment assumes that permanent land take will result where the fibre pits are located. It is assumed that all fibre-optic cables can be inspected using a single cable inspection box at each location; and that as a worst case, up to eight fibre pits will be required in total.

3.3.9 For the AC cable routes, provision of buried or above ground earthing cross-bonding boxes (known as ‘link boxes’) are required at the end of each circuit, and at joint bays to allow for access during maintenance/outage, assumed to be above-ground every 700 m along the AC

cable route as a worst-case scenario. Above ground link boxes are approximately 680 mm x 1000 mm (0.68 m^2) and 1200 mm high. To represent a worst case, is assumed in the assessment that four link boxes are required.

3.3.10 It is assumed that the majority of the AC cables will be installed via the open cut/trench method. Using the open cut method, the AC cable could be installed in one of two ways (to be determined by the appointed Contractor); they could either be laid directly into the trench, or a duct could be laid into the trench through which the cables are then pulled. The use of pre-laid ducting could potentially result in soils being reinstated more quickly than would occur with direct trench installation.

3.3.11 Through agricultural land, the cables will typically be installed in two trenches, each with an approximate depth of 1.5 m and width of 1.5 m, with a 3.0 m buffer between the trenches.

3.3.12 Following construction, the easement will be levelled, drained and subsoils loosened. Where possible, allowing for the cable infrastructure, topsoil and subsoil will be replaced to the same depths as the original soil profile, with any non-soil substrate (where necessary) replaced first. In agricultural land, the final minimum depth of soil cover above either the protective cover over the AC cable or the ducting will be 0.9 m. Different soil types exhibit different depths of natural soil profile, however (with the exception of peats) the maximum possible depth of a soil profile is generally considered to be 1.2 m. Therefore, the cables may be laid partially within the depth of the natural soil profile, but will be well below the topsoil layer and the minimum depth of cover over the cables is not considered to compromise the ability of the overlying agricultural crops to produce a functioning and effective root system.

3.3.13 The proposed AC cable route includes ZoI of 150 m, therefore the assessment presented provides the worst-case effects occurring within a 150 m wide corridor. It is assumed that all link boxes and joint bays will be located within the ZoI.

3.3.14 The proposed AC cable working width of 50 m will be fenced and pre-construction drainage installed prior to being cleared of vegetation and the topsoil will be stripped and stored to one side. A temporary haul road will be formed on the subsoil surface (using bog-mats or hardcore on geotextile or similar where ground conditions require) to allow plant and machinery to move along the proposed AC cable route.

3.3.15 At certain crossings, trenchless crossing techniques will be required via Horizontal Directional Drilling (HDD), pipe jacking or micro-bore. For the purposes of assessment, it is assumed that a temporary working area of 50 m x 50 m (0.25 ha) on both sides of the crossing will be required for launch and reception compounds, for each of the crossing techniques. Other than the requirement for these temporary working areas, there will be no disturbance to agricultural land due to trenchless crossings.

3.3.16 The presence and operation of the AC cables in the trenchless crossings would not be expected to affect agriculture receptors; as the location and design specification are such that the trenchless crossings would be laid at depth and would not create any ground disturbance, or restrict ploughing depth.

3.3.17 The detailed construction programme will be determined by the appointed Contractor, however, the assessment is based upon the assumption that the open cut installation of a 1 km section of AC cable would take between four and nine months; and that cable installation would be undertaken in a phased manner so that no section of trench would be left open for longer than a year. As stated in paragraph 3.3.10, it is possible that the use of pre-laid ducting could result in reinstatement being achieved more quickly than with a direct trench installation. Therefore, it is assumed that the duration of soil storage for the proposed AC cable route would not exceed 12 months for each section of trench. It is also assumed that the 0.4 ha TWA (TCC, T17) (Figure 20.2), will be required for the full duration of cable installation works and therefore, based upon the indicative construction programme presented in Table 17.6 of Chapter 17 (ES-2-C.01), the maximum duration of storage of soils from this location would be 18 months.

3.3.18 Land excluded from cultivation, but not used for any construction activities, has not been quantified in the assessments, as arrangements would be subject to individual negotiations and preference of the landowner. For example, access to some areas may be made difficult, or the area of a field available for cultivation may make it less practical to continue cropping during construction. It is further possible that some off-site land may need to be under drained to mitigate the impacts of drainage severance.

3.3.19 Marker posts may be required along the proposed AC cable route at field boundaries and crossings and where there are changes in direction.

3.3.20 Pre- and post-construction agricultural land drainage plans will be agreed in advance of construction with landowners.

4 Planning Policy and Legislative Considerations

4.1 National Policy

4.1.1 This section will outline the planning policy background as it related to Agriculture and Soils.

Overarching National Policy Statement for Energy (EN-1)

4.1.2 The context for any environmental assessment relating to energy infrastructure within the United Kingdom is provided by EN-1 (Ref: 20-14).

4.1.3 Paragraph 5.10.8 of Section 5: Land use including open space, green infrastructure & Green Belt, states: '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 ALC) 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'.

4.1.4 Paragraph 5.10.15 of the same Section requires that applicants provide a justification for developments that affect BMV agricultural land; and that the decision maker should 'give little weight to the loss of poorer quality agricultural land' (Subgrade 3b, Grades 4 and 5), 'except in upland areas where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy'.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

4.1.5 A daughter document of EN-1, EN-5 provides specific technical guidance in relation to Electricity infrastructure (Ref: 20-15).

4.1.6 Paragraph 1.7.5 of Section 1 states the effects of electricity network infrastructure on soil are 'likely to be negative, at least in the short term, requiring significant mitigation, but there is uncertainty around long term effects depending on the specific location and the sensitivity of the receiving environment'.

4.1.7 In particular, reference to the AC cable route, paragraph 2.8.9, states that the level of disturbance associated with UGC works will result in greater environmental consequence to soils than an overhead line would.

4.1.8 The only reference to agricultural impacts is in relation to overhead transmission lines. Paragraph 2.10.8, states that 'there is little evidence that exposure of crops, farm animals or natural

ecosystems to transmission line electromagnetic fields (EMFs) has any agriculturally significant consequences'.

National Planning Policy Framework and Guidance

4.1.9 Paragraphs 111 and 112 of The National Planning Policy Framework (NPPF) (Ref: 20-2) promote the sustainable management and protection of soils and agricultural land consistent with the economic, social and environmental needs of England. These paragraphs state:

- *'Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. Local planning authorities may continue to consider the case for setting a locally appropriate target for the use of brownfield land'; and*
- *'Local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development on agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.'*

4.1.10 Paragraph 109 of the NPPF states that development should consider the wider benefits the environment provides, particularly through ecosystem services and protect soil resources from unacceptable levels of pollution:

'The planning system should contribute to and enhance the natural and local environment by:

- *Protecting and enhancing valued landscapes, geological conservation interests and soils;*
- *Recognising the wider benefits of ecosystem services; and*
- *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'.*

4.1.11 The National Planning Practice Guidance (NPPG) (Ref: 20-16) which accompanies the NPPF also makes specific reference to the protection of soils and BMV agricultural land in paragraph 026:

- '*Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.'*

4.1.12 Additionally, the NPPG defines the statutory role of NE as the advisor to local planning authorities with respect to land quality issues. As highlighted in Table 20.3 and Appendix 9.2 (ES-4-B.05), NE have been consulted on the assessment method.

4.1.13 Together, this national framework encourages the sustainable management of BMV agricultural land, and encourages the protection of its soils. Consequently, potential impacts to the soil resources and BMV agricultural land are to be considered and the resources protected against development, where their importance overrides the economic benefits of the development itself.

Soil Strategy for England

4.1.14 The National Strategy for England; Safeguarding our Soils (Ref: 20-17), provides a long-term guide to direct policy regarding the protection of soils in England. The key tenet of the Strategy is that 'by 2030, all England's soils will be managed sustainably and degradation threats tackled successfully'. The strategy highlights the importance of the protection of soils, especially in agricultural landscapes and during development. Protecting soils ensures the protection of their related ecosystem services, the mitigation of climate change, and prevention of contamination.

4.1.15 In particular, Chapter 1 of this document, ensures soils are sustainably managed and degradation threats are successfully dealt with; whilst Chapter 2 puts this into the context of agricultural landscapes. Chapter 6 ensures effective soil protection during development and construction, with a focus on the protection of soil-related ecosystem services. Furthermore, in response to this, Defra has constructed a series of best practice guidelines for the handling and storage of soil resources during development (Ref: 20-4).

4.2 Local Policy

4.2.1 Where available, both adopted and emerging local planning policy is considered, as it is likely that emerging policy will be adopted, and hence become the basis for planning decisions within the LPA areas impacted by the proposed converter station, permanent access road and AC cable route, within the lifetime of the project.

Boston Borough Council

Current Adopted Policy

4.2.2 Boston Borough Council (BBC) currently uses two Plans to guide decisions on planning applications: the Saved Policies of the adopted Boston Borough Local Plan (April 1999) (Ref: 20-18); and the Boston Borough Interim Plan (Non-Statutory Development Control Policy) 2006 (Ref: 20-19).

4.2.3 The Boston Borough Local Plan was adopted in April 1999. Paragraph 12.5 of the adopted Local Plan states that 'most of Boston Borough is countryside, mainly devoted to intensive agriculture and horticulture. The farmland is among the best and most versatile in the UK and, as such, deserves protecting from unnecessary development'.

4.2.4 Policy G8 of the adopted Local Plan states 'planning permission will not be granted for developments which will have an adverse effect upon the quality of air or soil such as to lead to:

1) harm to local living or working conditions or the operation of nearby land uses;

2) harm to the natural flora and fauna of interest in the locality; or

3) added constraints on future developments in the area'

4.2.5 The replacement local plan was withdrawn from the statutory adoption process in February 2006; and a revised version of the replacement local plan was adopted for development control purposes, the Interim Plan (Non-Statutory Development Control Policy) (Ref: 20-19).

4.2.6 Part 8 of Policy G1 of the interim plan: General Considerations, states 'planning permission will be granted for development if there are no adverse effects (including contamination) on the quality of air or soil that will be harmful to the amenities of nearby residents and/or other land users or natural flora and fauna of interest in the locality (particularly sites designated as being of local national or international nature conservation importance), and there are likely to be no adverse effects on future developments in the area that are planned for in other policies of this plan'.

4.2.7 Whilst Policy G2 of the interim plan: Agricultural Land, states that 'planning permission will not be granted for development on the BMV agricultural land unless it can be demonstrated that:

> *1) opportunities have been assessed for accommodating the development on previously developed sites and/or on land within the built-up areas/settlement boundaries shown on the inset maps;*
>
> *2) the amount of land is the minimum required; and*
>
> *3) there is a strong case for the development which overrides the need to protect such land, or the development is associated with agriculture or forestry, or the development is an acceptable form of farm diversification…, or the land is specifically allocated for development in this plan.'*

4.2.8 The interim plan also states that as a large area of agricultural land is located within Boston Borough, the Council wishes to see the "minimum loss of agricultural land to development".

Emerging Policy: South East Lincolnshire Local Plan 2011 – 2036

4.2.9 The South East Lincolnshire Joint Strategic Planning Committee is a partnership of BBC, South Holland District Council (SHDC) and Lincolnshire County Council (LCC) who are working together to create a single Local Plan. The Publication Version of the South East Lincolnshire Local Plan 2011 – 2036, was issued for consultation in March 2017 (Ref: 20-20).

4.2.10 Section 2.5 sets out a list of Strategic Priorities to be delivered, Priority 8 is 'to promote the more efficient use of land, prioritise the re-use of previously-developed land and to minimise the loss of South East Lincolnshire's high-quality agricultural land by developing in sustainable locations, at appropriate densities'.

4.2.11 Although not directly relevant to the AC cable route, Point 13 of Policy 4: Design of New Development states 'Development proposals will demonstrate how the following issues, where they are relevant to the proposal and are viable will be secured: the use of locally sourced building materials, minimising the use of water and minimising land take, to protect best and most versatile soils. The Local Plan also directs the reader to the Defra best practice guidance for the protection of soils which is referenced throughout this chapter (Ref: 20-4).

South Holland District Council

Current Adopted Policy: South Holland Local Plan (2006)

4.2.12 Paragraph 3.4 of the South Holland Local Plan (Ref: 20-21) states 'The Plan seeks to balance demands for a finite quantity of land. This is reflected in the strategy of'… 'maintaining the quality of the countryside'…. 'minimising the loss of the best and most versatile agricultural land to development ...'

4.2.13 Paragraph 3.29 which relates to Agricultural Land and Development in the Countryside states that 'it is important that the development of greenfield land, including the best and most versatile agricultural land is only allowed after all other opportunities to accommodate development on brownfield land and land within existing defined settlement limits has been assessed'. Whilst paragraph 3.3.7 recognises BMV agricultural land as a nationally important resource, to be safeguarded, such that the loss of this land from agricultural production must be carefully controlled. It further recognises that the prioritisation and phasing of development can help to retain land in agricultural production until it is required for building, but the permanent development of high quality land in the countryside will only be permitted if there are no other suitable sites available.

5 Baseline Conditions

5.1 Study Area

5.1.1 The Study Areas in which the initial baseline studies to inform siting and routeing were undertaken are common across all disciplines and comprised the differing route options put forward for review.

5.1.2 The study area for the baseline comprises three distinct areas; the proposed converter station site; the proposed permanent access road; and the proposed AC connection to the existing Bicker Fen 400 kV Substation.

5.1.3 All proposed converter station and permanent access road works are within the administrative area of SHDC; whereas the AC cable study area lies within the administrative areas of SHDC and BBC.

5.1.4 The majority of agricultural land within the proposed converter station site; the proposed permanent access road; and the proposed AC connection to the existing Bicker Fen 400 kV Substation Study Areas is productive arable land, which is typical for Lincolnshire.

5.1.5 Table 20.8 displays areas of land use within each of the local administrative areas (BBC and SHDC); and presents a breakdown of the agricultural land by ALC grade. The percentage figure considers each ALC grade as a percentage of the total agricultural land within the local administrative area, it does not consider urban, non-graded or non-agricultural areas within the total.

Table 20.8: Land-use and ALC Grade for each of the local administrative areas

ALC Grade	Area (ha)	Percent (agricultural land)
Boston Borough Council		
Agricultural		
Grade 1	22,586.7	65.7
Grade 2	11,225.3	32.6
Grade 3	0.0	0.0
Grade 4	592.0	1.7
Grade 5	0.0	-
Non-agricultural	688.4	-
Urban	991.8	-
Non-graded	3695.1	-
South Holland District Council		

Table 20.8: Land-use and ALC Grade for each of the local administrative areas		
ALC Grade	**Area (ha)**	**Percent (agricultural land)**
Agricultural		
Grade 1	42,837.8	58.1
Grade 2	29,648.0	40.2
Grade 3	324.7	0.4
Grade 4	974.1	1.3
Grade 5	0.0	0.0
Non-agricultural	0.0	-
Urban	681.1	-
Non-graded	7,084.7	-
Note: Non-graded land is mainly the coast and the Wash.		

5.2 Zone of Influence

5.2.1 The discipline-specific ZoI for Agriculture and Soils comprises the area in which more detailed baseline studies to inform the EIA have been undertaken; and on which the impact assessment presented in this chapter is based.

5.2.2 The converter station site covers an area of approximately 29.7 ha within a single agricultural field located at North Ing Drove, north-west of Donington, Lincolnshire at approximate Ordnance Survey (OS) central grid reference TF 18712 37347, as shown in Figure 20.1.

5.2.3 The ZoI of the permanent access road includes the full length of the road, including the approximate 20 m proposed working width which comprises the 5 m wide (extending to 7.5 m to allow for passing places) permanent carriageway; the road verge and embankment; the extended temporary working width for the bridge at Hammond Beck; and the 1 ha TCC located adjacent to the proposed bellmouth junction at the A52 (Figure 20.1). The proposed permanent access road ZoI covers an area of approximately 8.0 ha.

5.2.4 The ZoI for the AC cable route is shown in Figure 20.2. The AC connection links from the north of the proposed converter station site to the east of the existing Bicker Fen 400 kV Substation, requiring the diversion of the trenches to connect to bays at either end of the substation. The AC connection to Bicker Fen Substation will require two trenches to accommodate six cables, each trench containing three AC cables.

5.2.5 A TWA (T17) is located to the east of the AC cable construction area, with a total area of 0.4 ha (compound area) (Figure 20.2).

5.3 Proposed Converter Station

Soil Resource

5.3.1 The soil survey identified one soil association within the proposed converter station site; the Wallasea 2 (813g) soil association. A detailed description of the soil profiles identified during the soil survey can be found in Appendix 20.1.

5.3.2 Soils in the north west of the converter station site are characteristic of the Wisbech series of the Wallasea 2 association. Topsoil comprises a brown silty loam; with a moderate to coarse sub-angular blocky structure and loose consistence; it is stoneless and extends to a depth of 280 to 500 mm (scaled as decimetres in Photograph 20.1). Subsoil comprises a brownish yellow silty loam to sandy loam texture; with a moderate to coarse angular blocky structure and firm to extremely hard consistence; it is stoneless and extends to depths of over 600 mm (Photograph 20.1).

5.3.3 Soil in the remainder of the converter station site is characteristic of the Blacktoft series of the Wallasea 2 association. Topsoil comprises a very dark grayish-brown to brown silty clay loam; with a moderate to coarse sub-angular blocky structure and loose to firm consistence; it is stoneless and extends to a depth of 100 to 500 mm (Photograph 20.2). Subsoil comprises a yellowish brown to dark brown silty clay loam or sandy loam; with a moderate to very coarse angular blocky structure and firm to extremely hard consistence; it is stoneless and extends to depths of over 600 mm (scaled as decimetres Photograph 20.2).

Photograph 20.1: Soil profile at the proposed converter station site sample point 11 (scale in decimetres), consistent with the Wisbech soil series of the Wallasea 2 soil association.

Photograph 20.2: Soil profile at the proposed converter station site sample point 1 (scale in decimetres) consistent with the Blacktoft soil series of the Wallasea 2 soil association.

5.3.4 The soils identified are not erosion prone nor organic rich; and are therefore considered to be less sensitive to damage and susceptible to loss than lighter textured, sandy soils and are of **low sensitivity** (Table 20.5).

Table 20.9: Soil Associations at the Proposed Converter Station Site and Permanent Access Road

Soil Association	Soil Series	Geology	Soil Type	Soil Characteristics	Wetness Class	Erodibility (Ref: 20-5)	Area in Converter Station Site (ha)	Area in the Access Road working width (ha)
Wallasea 2 (813g)	Wallasea, Newchurch, Blacktoft, Wisbech	Marine alluvium	Pelo-alluvial gley soils	Deep stoneless clayey soils Some deep calcareous silty soils Flat land often with low ridges giving a complex soil pattern	Most of the land is pump-drained and the more permeable Blacktoft and Wisbech soils are well drained (Wetness Class I) Wallasea and Newchurch soils are less permeable but respond to underdrainage; (Wetness Class II)	Very small risk of water erosion	29.7	8.0
Reproduced from Soil Survey of England and Wales 1984 Soils and their Use in Eastern England (Ref: 20-8)								

Agricultural Land Quality & Land Use

5.3.5 The ALC calculated from the soil survey carried out at the proposed converter station site on the 25th and 26th August 2016 shows that the agricultural land is primarily of BMV quality (Grades 1 and 2), with a small area of non-BMV land (Subgrade 3b). This is illustrated in Figure 20.1 and summarised in Table 20.10. The site survey is described in paragraph 2.6.9, with the detailed ALC survey results presented in Appendix 20.1.

5.3.6 The eastern and western boundaries of the converter station site were marked by a change in crop; the southern boundary is formed by North Ing Drove, from which the site was accessed during the survey.

5.3.7 The small area of non-agricultural land (approximately 0.2 ha) located at the centre of the southern boundary comprised an agricultural building and a yard containing tall stacks of large agricultural crates.

Table 20.10: ALC at the Proposed Converter Station

ALC Grade Proposed Converter Station Site	Area (ha)	Percentage (%)
Grade 1 (Excellent)	14.6	49.3
Grade 2 (Very good)	14.2	47.5
Grade 3b (Moderate)	0.7	2.5
Non-agricultural	0.2	0.7
Total	**29.7**	**100.0**

Agricultural Landholding

5.3.8 The proposed converter station site is located on Landholding A, which is part of an arable farm with a combined area of 224.6 ha.

5.3.9 The cropping rotation at the proposed converter station site typically comprises; oilseed rape, potatoes, vegetables, wheat and peas. To optimise cropping and accommodate different crops, in some years the field is cropped with two crops. For example, during winter 2016 the field was split in half, with one half cropped with oilseed rape and the other with potatoes. The landholding is of **medium sensitivity** (see Table 20.5).

Agri-Environment Schemes

5.3.10 The proposed converter station site has been identified as being enrolled in the Basic Payment Scheme (BPS) which is the main rural payment for farmers in the European Union (EU), and therefore is a **low sensitivity** receptor (see Table 20.5).

5.4 Permanent Access Road

Soil Resource

5.4.1 Detailed soil survey was undertaken along the route of the permanent access road and TCA, within the proposed working width. The soil survey identified one soil association the Wallasea 2 association, as identified for the proposed converter station site. A detailed description of the soil profiles identified during the soil survey can be found in Appendix 20.2; and a summary of the published soil association data (Ref: 20-8) is provided in Table 20.9**Error! Reference source not found.**, and shown in Figure 20.3.

5.4.2 It should be noted that the survey locations do not entirely correspond with the access road red line boundary in Figure 20.3, this is due to design iterations occurring between the soil survey taking place and the final design being issued. However, the consistent soil association identified from the soil survey suggests that this soil association is widespread in the area.

5.4.3 Soils in the permanent access road working width are, overall, characteristic of the Wallasea series of the Wallasea 2 association. Topsoil comprises a very dark greyish brown silty clay; with a moderate to coarse sub-angular blocky structure and friable consistence; it is stoneless and extends to a depth of 250 to 350 mm (Photograph 20.3). Subsoil comprises a brown to greyish brown silty clay texture; with a moderate angular blocky or prismatic structure and firm to very firm consistence; it is stoneless and extends to depths of over 600 mm (Photograph 20.3).

Photograph 20.3: Soil profile at permanent access road sampling point 4 (scale in decimetres) consistent with the Wallasea soil series from the Wallasea 2 soil association.

5.4.4 The soils identified are not erosion prone nor organic rich; and are therefore considered to be less sensitive to damage and susceptible to loss than lighter textured, sandy soils and are of **low sensitivity** (Table 20.5).

Agricultural Land Quality & Land Use

5.4.5 The ALC calculated from the soil survey carried out within the permanent access road working width and temporary construction area on the 6th March 2017 shows that the agricultural land is

of BMV quality (Grade 2 and Subgrade 3a) as shown in Figure 20.1 and summarised in Table 20.11: The site survey is described in Paragraphs 2.6.9 *et seq*, with the detailed ALC survey results presented in Appendix 20.2.

Table 20.11: ALC within the Proposed Permanent Access Road and Temporary Construction Area

ALC Grade	Area (ha)	Percentage (%)
Grade 2 (Very good)	3.6	45.0
Grade 3a (Good)	3.2	40.0
Non-agricultural	1.2	15.0
Total	**8.0**	**100.0**

Agricultural Landholding

5.4.6 The proposed permanent access road transects two landholdings; referred to as Landholding A and Landholding B.

5.4.7 To the west of the Hammond Beck, the permanent access road is located within Landholding A. The land is under combinable crop production (i.e. all types of crops gathered by use of a combine harvester). This is the same landholding as the proposed converter station site (paragraphs 5.3.8 and 5.3.9).

5.4.8 To the east of the Hammond Beck the permanent access road is located within Landholding B. This land is owned by a large institutional landowner with a vast acreage across the UK, with 1044 ha in Lincolnshire; and forms part of a 607 ha holding which is let on a Farm Business Tenancy.

5.4.9 The 607 ha landholding in turn forms part of a large farming estate with over 4047 ha of agricultural land specialising in the production of vegetables, especially potatoes, onions, parsnips, carrots with some combinable cropping.

5.4.10 The two landholdings are both of **medium sensitivity** (see Table 20.5).

Agri-Environment Schemes

5.4.11 There are no Environmental Stewardship schemes in place in the ZoI of the permanent access road. However, Landholding A has been identified as receiving money via the BPS. It is not currently known whether Landholding B is in receipt of money via the BPS. Therefore, on the current information, Landholding A within the permanent access road ZoI is considered to be of **low sensitivity,** whilst Landholding B is considered to be of **negligible sensitivity** (see Table 20.5).

5.5 Proposed AC Cable Route

Soil Resource

5.5.1 A review of the LandIS NATMAP dataset (Ref: 20-6) identified one soil association within the ZoI of the AC cable route and temporary working area (T17); the Wallasea 2 (813g) soil association, as shown in Figure 20.4. This is the same soil association identified during soil survey of the proposed converter station site and the permanent access road working width. A summary of the soil association data is provided in Table 20.9.

5.5.2 The soils identified are not erosion prone nor organic rich; and are therefore considered to be less sensitive to damage and susceptible to loss than lighter textured, sandy soils and are of **low sensitivity** (Table 20.5).

Agricultural Land Quality & Land Use

5.5.3 The ALC estimates for the proposed AC cable route ZoI were obtained using the Provisional ALC 1:250,000 scale mapping, and indicate that the entire ZoI is underlain with ALC Grade 2 (Very Good quality) agricultural land (Ref: 20-7).

5.5.4 Further evidence for the high agricultural quality of this land comes from the DEFRA strategic 1:250,000 scale Predictive mapping 'Likelihood of best and most versatile land', in which the area is mapped as High likelihood (>60 % area) of being BMV (Ref: 20-11).

5.5.5 It is assumed that fibre pits are required every 250 m and due to the prevailing land quality, will be located within BMV quality agricultural land. Therefore, along the 2.34 km AC cable route, it is assumed that, as a worst-case, eight fibre pits are required which would permanently remove approximately 2.88 m^2 (0.0003 ha) of BMV land from agricultural use. This assumes that the fibre pits are not fenced off, and that therefore loss of land is restricted to the link box infrastructure only; however, consideration of the fenced off situation is made within the assessment.

5.5.6 As described in paragraph 3.3.9, it is assumed as a worst-case, that up to four link boxes will be required, which would permanently remove approximately 2.72 m^2 (0.0003 ha) of BMV land from agricultural use This assumes that the link boxes are not fenced off, and that therefore loss of land is restricted to the link box infrastructure only. Therefore, there is a total potential permanent land take of 5.96 m^2 (0.0006 ha) due to fibre pits and link boxes.

5.5.7 The Provisional ALC of the proposed AC cable working width and TCC, T17 is comprised of Grade 2. This is reflected by the wider ZoI, see Table 20.12 and Figure 20.2.

Table 20.12: ALC Grading in the proposed AC cable working width, temporary working area and ZoI						
	AC cable working width		Temporary working area (T17)		ZoI including AC cable working width and TWA	
ALC Grade	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)
Grade 1	0.0	0.0	0.0	0.0	0.0	0.0
Grade 2	13.0	100.0	0.4	100.0	70.6	100.0
Grade 3	0.0	0.0	0.0	0.0	0.0	0.0
Grade 4	0.0	0.0	0.0	0.0	0.0	0.0
Grade 5	0.0	0.0	0.0	0.0	0.0	0.0

Agri-Environment Schemes

5.5.8 As of 17 May 2017, there are no land parcels enrolled in AES within the ZoI of the proposed AC cable route. Therefore, the effects of the AC cable route on AES have been scoped out of the assessment.

6 Potential Impacts

6.1 Overview of Potential Impacts

6.1.1 Potential impacts are the impacts which could potentially occur as a result of the proposed converter station, permanent access road and proposed AC cable route in the absence of appropriate mitigation measures.

Temporary Construction Impacts

6.1.2 Temporary impacts typically occur during the construction phase only.

6.1.3 The following potential temporary effects have been identified and will be addressed in the Agriculture and Soils chapter:

- Loss of agricultural land;
- Damage or disturbance to soil resources;
- Loss of soil resources;
- Loss of eligibility for AES; and
- Impacts to landholding due to change in land use (converter station and permanent access road only).

6.1.4 There is a potential for airborne dust to be generated during soil handling operations and as a consequence of the wind erosion of dry soil stockpiles. This dust has the potential to impact surrounding crops during construction. However, soil erosion (dust generation) is considered in the assessment of loss of soil resources and therefore not considered separately.

6.1.5 There is a potential for a disruption to agricultural land drainage, however this is not assessed within this chapter; as a specialist LDC has been engaged to undertake pre- and post-construction agricultural land drainage design as part of the Scheme design.

6.1.6 The Agriculture and Soils assessment only considers the potential environmental impacts of the proposed converter station, permanent access road and proposed AC cable route. Potential impacts to farm business are therefore not assessed, but are considered to be appropriately managed through on-going discussion between NGVL and affected businesses.

6.1.7 The impact of heat generated by the cables on the above ground crops is not considered sufficient to cause ‘sterile strips’ on agricultural land; and the continuing viability of land above cables can be readily witnessed in areas where existing underground cables are installed. The cables which will be installed along the AC cable route are designed to have a low resistance, and hence low losses to prevent the cable heating up under normal operating conditions. During events when there is a fault, there is potential for heat to be generated, however the heat would

not be sufficient in scale or in duration to cause sterile strips. Therefore, the potential impact of heat generation is not considered further.

6.1.8 Connection works between the proposed AC cable and the existing Bicker Fen 400 kV substation will occur within the footprint of the existing substation, and will therefore not impact and soils and agricultural receptors and can be scoped out of the assessment.

Loss of agricultural land

6.1.9 During construction activities there will be a temporary loss of agricultural land.

6.1.10 As set out in paragraph 2.7.6, a threshold of 20 ha of permanent BMV loss is used to determine whether the loss is significant or not.

Disturbance to Soil Resource

6.1.11 Construction activities may result in a temporary disturbance of soil resources (adverse), which could result in a longer-term impact on the soil resource (see paragraph 6.1.22). Construction activities which have an impact upon soil resources include, but are not limited to:

- Stripping and stockpiling of topsoil and subsoil, storage and reinstatement;
- Ground excavation;
- Stockpiling materials;
- Levelling ground;
- Trenching;
- Access road construction; and
- Vehicle movements on site.

6.1.12 The disturbance of soil resources caused *in situ*, for example through trafficking by vehicles; or through soil removal, handling, storage and subsequent reinstatement, may result in the impairment of soil function, quality and resilience (adverse). This effect comprises such changes as such as:

- Compaction and smearing (damage to soil structure);
- Conditions within the soil profile conducive to excessive drying or wetness;
- Mixing of distinct soil horizons (e.g. topsoil with subsoil) reducing their potential reuse;
- Damage or removal of vegetation layer;
- Changes in the soil profile stone content;
- Loss of nutrients (e.g. nitrogen), biota (e.g. bacteria, fungi, earthworms) and reduction in soil fertility; and
- Loss of ecosystem services, such as the ability of the soil to support food production and habitat creation.

Loss of Soil Resource

6.1.13 During the construction activities, there may be a physical loss of soil resource as a result of soil removal, handling and storage in the construction phase, where soils will be either permanently or temporarily stripped to enable construction activities. Loss of soils may also include the theft of stockpiles soils; however, it is assumed that within the proposed converter station, permanent access road and proposed AC cable route all soil resources will be retained on site and not exported for reuse elsewhere.

6.1.14 The inappropriate removal, handling and storage of soil resources during construction activities may also render them unsuitable for reuse in site restoration and therefore also constitutes a loss of soil resource. For example, the mixing of topsoil and subsoil; the mixing of soils of differing textures; or the mixing of soils with non-soil substrate or other unsuitable materials; as this mixing cannot be reversed nor the constituent materials returned to their original state. Incorrect handling leading to mixing and loss of suitability is considered the greatest risk to soil retention.

6.1.15 The loss of soil resource may result in the impairment of the remaining soils' function, quality and resilience. This effect also comprises such changes as reduction of topsoil depth.

6.1.16 During large-scale projects, there is the potential for disease and pathogen transfer between different areas of agricultural land (i.e. a biosecurity risk). This is considered in the loss of soil resource as the main cause of potential disease and pathogen transfer and is due to the transfer of soil from infected to uninfected areas via heavy plant.

Agri-Environment Schemes

6.1.17 The temporary impact to the AES during construction activities may result in the loss of compliance with/eligibility for any AES currently in place.

6.1.18 It should be noted that AES are designed to provide areas of ecological enhancement and therefore some of the AES considered in this chapter may also contain features which are considered to be ecological constraints, for example species diverse hedgerows.

6.1.19 A review of AES present in the ZoI of the AC cable route revealed that as of 17 May 2017, there are no land parcels enrolled in an AES. Therefore, the short-term effects of the AC cables on AES have been scoped out of the assessment. However, AES in the form of BPS are in place within the proposed converter station site and permanent access road.

Agricultural Landholding

6.1.20 Construction activities may result in areas of a landholding experiencing a temporary change in land use from agricultural to non-agricultural, i.e. a proportion of the landholding will be temporarily excluded (lost to) agricultural use. The effect is measured as a function of the proportion of the overall landholding affected. This impact is only assessed for the proposed converter station site and the permanent access road.

Longer Term, Operational and Permanent Impacts

Loss of Agricultural Land

6.1.21 During construction and operational activities, the permanent loss of agricultural land will be restricted to the areas occupied by the permanent infrastructure of the proposed converter station and permanent access road (or restored land which is subsequently excluded from agricultural use), fibre pits and link boxes (paragraph 3.3.8). This land will therefore no longer be available for agricultural use.

Disturbance to Soil Resource

6.1.22 The disturbance of soil resources is restricted to construction, therefore there would be no additional disturbance to soil resources during operation and longer term, operational and permanent effects have been scoped out of the assessment.

6.1.23 The disturbance of soil resources within the proposed AC cable route is largely restricted to construction; however, during the operational lifetime of the proposed AC cable route, there is a potential for additional disturbance (excavation) of soil resources to occur during any maintenance or remedial works which may be required. Although the scale and extent of these works would be significantly less than required for initial construction, being confined to the specific areas of cable where maintenance is required.

Loss of Soil Resource

6.1.24 The disturbance of soil resources, and hence the potential for soil loss, is restricted to construction, therefore there would be no additional disturbance to soil resources during operation and the longer term.

6.1.25 There is a potential for additional loss of soil resources to occur during any maintenance or remedial works which may be required; for example, through erosion, excess trafficking on plant wheels, or unauthorised export. Although the scale and extent of maintenance/remedial works and hence the potential scale of soil loss would be significantly less than for initial construction.

Agri-Environment Schemes

6.1.26 Impacts to AES are considered to be short-term and occur during construction only. Therefore, longer term, operational and permanent effects have been scoped out of the assessment.

Decommissioning Impacts

6.1.27 Due to the similar type and duration of works and the consequent potential impacts to soil resources, there is also a potential for effects to loss of agricultural land, loss of soil resources, disturbance to soil resources and AES at the decommissioning phase to be similar but no worse than at the construction phase. Therefore, the effects of decommissioning are not specifically addressed, but are considered to be the same as the temporary effects identified for construction.

The only difference is in relation to the decommissioning of the proposed converter station, permanent access road, fibre pits and link boxes; if the land is returned to agricultural use then the decommissioning effect would be beneficial as opposed to adverse.

6.1.28 It is acknowledged that, during the predicted 40-year operational lifespan of the proposed converter station, permanent access road and AC cable route, the Agriculture and Soils baseline does have the potential to alter due to changes in land use and farming practice. These changes may include, but are not limited to, the adoption or surrender of AES or changes in government policy in relation to these schemes; and shift from pastoral to arable agricultural practices. Changes to the baseline may therefore be positive or negative.

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

6.1.30 Although there is the potential for the baseline presented in this chapter to change over time; it is considered to provide a good representation of land use and agricultural conditions at the time of decommissioning; but it is acknowledged that further impact assessment may be required at that time.

6.2 Proposed Converter Station and Permanent Access Road

Temporary Construction Impacts

Loss of agricultural land

6.2.1 There would be a temporary loss of approximately 5.0 ha of BMV agricultural land within the permanent access road working width and the access road temporary construction area.

6.2.2 As discussed in paragraph 3.3.3, the loss of agricultural land at the proposed converter station is considered in two scenarios; scenario 1: a best-case scenario where the reinstated zone will be returned to agricultural use after construction; scenario 2: a worst-case scenario where the reinstated zone will be reseeded, but not returned to agricultural use.

Scenario 1 (best-case scenario)

6.2.3 Within the proposed converter station site, approximately 10.8 ha of BMV land will be temporarily removed from agricultural use during construction.

6.2.4 As set out in paragraph 2.7.7, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not. Under scenario 1, the temporary loss of 15.8 ha of BMV agricultural land within the ZoI of the proposed converter station and the permanent access road construction works is therefore considered to be **not significant**.

Scenario 2 (worst-case scenario)

6.2.5 All agricultural land within the proposed converter station site (approximately 29.5 ha) will be permanently lost to agricultural use either through the construction of permanent infrastructure or the permanent exclusion of reinstated areas from agricultural use.

6.2.6 At a worst-case scenario, it is therefore considered that there is no temporary loss of agricultural land within the proposed converter station site, as although areas of temporary development within the proposed converter station site will be reinstated to grassland or other landscaping as required (the reinstated zone and the landscaping zone), no land will be reinstated to agricultural use. The permanent loss of agricultural land under scenario 2 is therefore considered as a longer term, operational and permanent impact.

6.2.7 As set out in paragraph 2.7.7, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not. Under scenario 2, the temporary loss of 5.0 ha of BMV agricultural land within the ZoI of the proposed converter station and the permanent access road is therefore considered to be **not significant**.

Disturbance to Soil Resources

6.2.8 Construction activities will result in a temporary disturbance to soil resource in the ZoI of the proposed converter station site and permanent access road. In the absence of appropriate handling and storage measures (mitigation) there is the potential for permanent irreversible or long-term reversible damage to the soil structure and soil quality; and the magnitude of impact would be **high** (Table 20.6). Therefore, although these soils are of **low sensitivity** to soil erosion, the potential impact to the heavy textured soils found in the ZoI would be **moderate**; and in the absence of mitigation, the potential effect of disturbance to soil resources would be **significant (adverse)** (Table 20.7).

Loss of Soils Resources

6.2.9 Although the working methodology is for the soils excavated within the proposed converter station site and permanent access road ZoI to be stored and reinstated on site post-construction with no soils being exported; in the absence of appropriate construction mitigation measures, there is the potential for soil loss for example through erosion, inappropriate handling, inaccurate stripping, excess trafficking on plant wheels, or unauthorised export; or loss of the soil resource due to soil degradation. This uncontrolled loss of soil would also increase biosecurity risk.

6.2.10 Therefore, in the absence of mitigation, it is estimated that there is potential for more than 5% of the soil resource from the proposed converter station site and permanent access road ZoI could be physically lost or rendered unsuitable for reuse in reinstatement. The magnitude of impact in the absence of appropriate mitigation would therefore be **low** (see Table 20.6). Using the criteria in Table 20.7, in the absence of mitigation, the potential impact to the **low sensitivity soils** would be **negligible** and the potential effect of soil loss would be **not significant**.

Agri-Environment Schemes

6.2.11 Landholding A (proposed converter station site and proposed permanent access road to the west of Hammond Beck) is registered with the BPS and consequently is of **low sensitivity**. In the absence of appropriate mitigation measures, there is the potential for the quality of the reinstatement to fall short of the requirements which would allow BPS payments for the impacted area of the land holding to be reinstated.

6.2.12 Permanent change to BPS eligibility would be a **high magnitude** of impact (Table 20.6); and therefore, in the absence of mitigation, the potential effect would be **moderate** and **significant (adverse)**.

Landholding

Landholding A

6.2.13 All land within the proposed converter station ZoI is located within Landholding A. Assuming scenario 1 (best case), 10.8 ha of the landholding within the proposed converter station ZoI would experience a temporary change from agricultural to non-agricultural use. Assuming scenario 2 (worst case) none of the landholding within the proposed converter station ZoI would be returned to agricultural use and therefore the change from agricultural to non-agricultural use would be permanent across the whole proposed converter station ZoI.

6.2.14 The section of the permanent access road ZoI to the west of Hammond Beck is also located within Landholding A, resulting in a further approximately 1.38 ha of Landholding A experiencing a temporary change from agricultural to non-agricultural use.

6.2.15 Under scenario 1, the proportion of the overall Landholding A which would experience a temporary change to non-agricultural use during the construction of the proposed converter station and permanent access road would be approximately 5.4 %, resulting in a **medium magnitude** of impact (see Table 20.6). As landholdings are considered to be **medium sensitivity** receptors (Table 20.5) the effect would be **moderate** and **significant (adverse)** (Table 20.7).

6.2.16 Under scenario 2, the proportion of the overall Landholding A which would experience a temporary change in land use to non-agricultural during the construction of the proposed converter station and permanent access road would be approximately 0.6 % resulting in a **negligible magnitude** of impact (see Table 20.6). As landholdings are considered to be **medium sensitivity** receptors (Table 20.5) the effect would be **negligible** and **not significant** (Table 20.7).

Landholding B

6.2.17 The section of the permanent access road ZoI to the east of Hammond Beck (including the TCC) is located within Landholding B. Approximately 3.6 ha of the landholding will experience a temporary change from agricultural to non-agricultural use due to the construction of the

permanent access road, which equates to approximately 0.59 % of the overall landholding, resulting in a **negligible magnitude** of impact (see Table 20.6). As landholdings are considered to be **medium sensitivity** receptors (Table 20.5) the effect to Landholding B would be **negligible** and **not significant** (Table 20.7).

6.2.18 The loss of agricultural land may place restrictions on normal agricultural practices within a landholding.

6.2.19 It is acknowledged that, in the absence of appropriate mitigation to ensure soil function, quality and resilience; and effective restoration, the restored agricultural land may not achieve the same quality (ALC grade) as prior to construction, however this effect is addressed in the assessment of effects to soils resources and AES.

Longer Term, Operational and Permanent Impacts

Loss of agricultural land

6.2.20 The 29.7 ha proposed converter station site includes 0.2 ha of non-agricultural land; 0.7 ha of non-BMV agricultural land and 28.8 ha of BMV agricultural land (see Table 20.8).

6.2.21 Under scenario 1 (best-case), 10.8 ha of agricultural land would be reinstated to agricultural use following construction, resulting in a permanent loss of 18.0 ha of BMV agricultural land (assuming that all permanent loss occurs in BMV).

6.2.22 As discussed in paragraphs 6.2.5 and 6.2.6, under scenario 2 (worst-case), all agricultural land within the proposed converter station site (29.5 ha; comprising 28.8 ha of BMV and 0.7 ha of non-BMV) would be permanently lost to agricultural use, either through the construction of permanent infrastructure or the permanent exclusion of reinstated areas from agricultural use.

6.2.23 There will be an additional permanent loss of 3.1 ha of BMV agricultural land within the permanent access road ZoI, restricted to the footprint of the proposed permanent access road itself.

6.2.24 Therefore, up to 31.9 ha of BMV agricultural land would potentially be permanently removed from agricultural use due to the proposed converter station and permanent access road. As a result, both the best-case (loss of 21.1 ha) and the worst-case (loss of 31.9 ha) scenarios would result in a total permanent loss of BMV agricultural land **in excess of 20 ha** and therefore assessed as **significant (adverse).**

6.2.25 It must be noted that the potential effects to agricultural land as assessed above cannot be mitigated as the area of permanent land take required to deliver the proposed converter station and permanent access road, and hence the total area of permanent BMV loss, cannot be reduced. Therefore, both the potential and residual effects in relation to loss of agricultural land are the same, and the scale of the loss is considered to be significant in the national context (paragraphs 2.7.5 to 2.7.7).

6.2.26 However, when considered in the context of the availability of BMV land in the wider locality, Table 20.8 identifies that over 98 % (62,485.8 ha) of agricultural land within the administrative

area of SHDC is either Grade 1 (excellent) or Grade 2 (very good) BMV land. Additionally, the worst-case loss of BMV land as a result of the proposed converter station and permanent access road (31.9 ha) only equates to a loss of 0.05 % of BMV land within the District.

Disturbance to Soil Resources

6.2.27 During operation, there would be no additional disturbance to the soil resources and hence no additional loss of soil resource. Therefore, longer term, operational and permanent effects have been scoped out of the assessment.

Loss of Soils Resources

6.2.28 During operation, there would be no additional disturbance to the soil resources and hence no additional loss of soil resource. Therefore, longer term, operational and permanent effects have been scoped out of the assessment.

Agri-Environment Schemes

6.2.29 Impacts to AES (which includes the BPS), are considered to be short term and occur during the construction phase only as eligibility is restored post-construction. Therefore, longer term, operational and permanent effects to AES have been scoped out of the assessment.

Landholding

6.2.30 The potential longer term, operational and permanent impacts to landholding due to the proposed converter station and permanent access road are considered to be the permanent change of land use to non-agricultural due to permanent infrastructure development or permanent exclusion from agricultural use. However, any areas of land which are permanently removed from agricultural use would be either be permanently removed from the landholding (sold off), or appropriate and agreed compensation would be in place for the duration of the operation. Therefore, the permanent loss of agricultural land is considered to be fully mitigated through the process of discussion and negotiation between NGVL, the landowners and any agricultural tenants (if applicable); and that once the proposed converter station and permanent access track are operational, they would no longer form part of an agricultural landholding (see also paragraph 7.1.14). The longer term, operational and permanent impacts to landholding have been scoped out of the assessment.

6.3 Proposed AC Cable Route

Temporary Construction Impacts

Loss of agricultural land

6.3.1 During construction activities, there will be a temporary loss of approximately 13.0 ha of BMV (Grade 2, see paragraph 5.5.3 and Table 20.12) agricultural land within the AC cable route ZoI (comprising the proposed AC cable working width and TCC, T17).

6.3.2 As set out in paragraph 2.7.7, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not. Therefore, the temporary loss of 13.0 ha of BMV agricultural land within the AC cable route ZoI considered to be **not significant**.

6.3.3 It should be noted that the potential effects to agricultural land as assessed above cannot be mitigated as the area of temporary land take required during the construction of the proposed AC cable route, and hence the area of temporary BMV loss, cannot be reduced. Therefore, both the potential and residual effects in relation to loss of agricultural land are the same.

Disturbance to Soil Resources

6.3.4 Construction activities will result in a temporary disturbance to soil resource in the ZoI of the proposed AC cable route. In the absence of appropriate handling and storage measures (mitigation) the magnitude of impact would be **high** (Table 20.6). Therefore, the potential impact to the **low sensitivity** soils found in the ZoI would be **moderate**; and in the absence of mitigation, the potential effect of disturbance to soil resources would be **significant (adverse)** (Table 20.7).

Loss of Soils Resources

6.3.5 Although the working methodology is for the soils excavated within the proposed AC cable route ZoI to be stored and reinstated on site post-construction with no soils being exported; in the absence of appropriate mitigation measures such as the good practice set out in the SHSP and Section 7, there is the potential for physical soil loss for example through erosion, inappropriate handling, inaccurate stripping, excess trafficking on plant wheels, or unauthorised export. This uncontrolled loss of soil would also increase biosecurity risk. Additionally, there is the potential for soils to be rendered unsuitable for use in reinstatement (as described in paragraph 6.1.14) which also constitutes a loss of soil resource.

6.3.6 Therefore, in the absence of mitigation, it is estimated that no more than 5 % of soils excavated within the proposed AC cable route ZoI could be lost (or rendered unsuitable for reinstatement). The magnitude of impact in the absence of appropriate mitigation would therefore be **low** (see Table 20.6). Using the criteria in Table 20.7, in the absence of mitigation, the potential impact to the **low sensitivity** soils would be **negligible** and the potential effect of soil loss would be **not significant**.

Longer Term, Operational and Permanent Impacts

Loss of agricultural land

6.3.7 The permanent loss of BMV agricultural land within the AC cable route ZoI will be restricted to the areas occupied by the four link boxes and eight fibre pits (paragraphs 3.3.8, 3.3.9, 5.5.5 and 5.5.6). The figures presented assume that the fibre pits and link boxes are not fenced off, and that therefore loss of land is restricted to the area of the installed above ground infrastructure only.

6.3.8 Each of the eight fibre pits (spaced at approximate 250 m intervals along the proposed AC cable route), requires a permanent land take of approximately 0.36 m^2 (0.000036 ha); therefore, the total area of BMV land permanently removed from agricultural use due to the fibre pits is approximately 2.88 m^2 (0.0003 ha). Additionally, the four link boxes would permanently remove approximately 2.72 m^2 (0.0003 ha) of BMV land from agricultural use.

6.3.9 Therefore, there is a total potential permanent land take of 5.6 m^2 (0.0006 ha) due to fibre pits and link boxes.

6.3.10 As set out in paragraph 2.7.7, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not. Therefore, as the total permanent loss of agricultural land due to the proposed AC cable route would be <0.001 ha, the potential effect of the loss is **not significant**.

6.3.11 It should be noted that the areas of loss presented above assume that the fibre pits and link boxes are *not* fenced off, and that therefore the permanent loss of land is restricted to the area of the infrastructure only. However, given the scale of the predicted loss in relation to the 20 ha threshold, any additional losses due to fencing-off (permanent exclusion of land from agricultural use) would not be of a scale whereby the 20 ha threshold was exceeded and the overall loss would be considered significant.

6.3.12 It must be noted that the potential effects to agricultural land as assessed above cannot be mitigated as the area of permanent land take required for fibre pits and link boxes, and hence the total area of permanent BMV loss, cannot be reduced. Therefore, both the potential and residual effects in relation to loss of agricultural land are the same.

Disturbance to Soil Resources

6.3.13 The disturbance of soil resources within the proposed AC cable route ZoI is largely restricted to construction; however, during the operational lifetime of the proposed AC cable route, there is a potential for additional disturbance (excavation) of soil resources to occur during any maintenance or remedial works which may be required. Although the scale and extent of these works would be significantly less than required for initial construction, being confined to the specific areas of cable where maintenance is required, in the absence of appropriate handling and storage measures (mitigation) the magnitude of impact to the disturbed resources would be **high** (Table 20.6). Therefore, the potential impact to the **low sensitivity** soils found in the ZoI

would be **moderate**; and in the absence of mitigation, the potential effect of disturbance to soil resources would be **significant** (Table 20.7).

Loss of Soils Resources

6.3.14 The disturbance of soil resources, and hence the potential for soil loss, within the proposed AC cable route ZoI is largely restricted to construction. However, during the operational lifetime of the proposed AC cable route, in the absence of appropriate handling and storage measures (mitigation), there is a potential for additional loss of soil resources to occur during any maintenance or remedial works which may be required; for example, through erosion, excess trafficking on plant wheels, or unauthorised export; or through the soils being rendered unsuitable for reuse at reinstatement. Although the scale and extent of maintenance/remedial works and hence the potential scale of soil loss would be significantly less than for initial construction, in the absence of appropriate mitigation, it is estimated that no more than 5 % of soils excavated during these works could be lost. The magnitude of impact in the absence of appropriate mitigation would therefore be **low** (see Table 20.6). Using the criteria in Table 20.7, in the absence of mitigation, the potential impact to the **low sensitivity soils** would be **negligible** and the potential effect of soil loss would be **not significant**.

6.4 Overview of Pre-mitigation Effects

6.4.1 The summary of pre-mitigation effects for the proposed converter station site and permanent access road are listed in Table 20.13 and Table 20.14.

6.4.2 The summary of pre-mitigation effects for the AC cable route are listed in Table 20.15 and Table 20.16.

Table 20.13: Summary of Temporary Impacts (Converter Station and Access Road)				
Description of Receptor	**Value / Sensitivity**	**Description of Pre-mitigation Effect**	**Significance**	**Significant**
Agricultural Land	NA	Temporary loss of BMV agricultural land.	NA	No
Disturbance to Soil Resources	Low	Incorrect handling and storage of soils during construction leading to damage to the structure, function and resilience of the soil resource.	Moderate adverse	Yes
Loss of Soil Resources	Low	Incorrect handling and storage of soils during construction resulting in more than 5 % of soil resources being lost or rendered unsuitable for reuse.	Negligible adverse	No
Agri-Environment Schemes	Low	Poor quality restoration after construction preventing re-eligibility for AES (Landholding A only).	Moderate adverse	Yes
Agricultural Landholding A: Scenario 1	Medium	Between 1 and 4.9 % of landholding experiences a temporary change in land use from agricultural to non-agricultural.	Moderate adverse	Yes
Agricultural Landholding A: Scenario 2	Medium	Less than 1 % of landholding experiences a temporary change in land use from agricultural to non-agricultural.	Negligible adverse,	No
Agricultural Landholding B	Medium	Less than 1 % of landholding experiences a temporary change in land use from agricultural to non-agricultural.	Negligible adverse,	No

Table 20.14: Summary of Long-term impacts (Converter Station and Access Road)				
Description of Receptor	**Value / Sensitivity**	**Description of Pre-mitigation Effect**	**Significance**	**Significant**
Agricultural Land	NA	Permanent loss of BMV agricultural land due to the proposed converter station and permanent access road will exceed 20 ha.	NA	Yes
Disturbance to Soil Resources	NA	NA	NA	NA
Loss of Soil Resources	NA	NA	NA	NA
Agri-Environment Schemes	NA	NA	NA	NA
Agricultural Landholding	NA	NA	NA	NA

Table 20.15: Summary of Temporary Impacts (AC Cable Route)				
Description of Receptor	**Value / Sensitivity**	**Description of Pre-mitigation Effect**	**Significance**	**Significant**
Agricultural Land	NA	Temporary loss of BMV agricultural land.	NA	No
Disturbance to Soil Resources	Low	Incorrect handling and storage of soils during construction leading to damage to the structure, function and resilience of the soil resource.	Moderate adverse	Yes
Loss of Soil Resources	Low	Incorrect handling and storage of soils during construction resulting in more than 5 % of soil resources being lost or rendered unsuitable for reuse.	Negligible adverse	No
Agri-Environment Schemes	NA	NA	NA	NA

Table 20.16: Summary of Long-term impacts (AC Cable Route)				
Description of Receptor	**Value / Sensitivity**	**Description of Pre-mitigation Effect**	**Significance**	**Significant**
Agricultural Land Quality and Land Use	NA	Permanent loss of BMV agricultural land will not exceed 20 ha.	NA	No
Disturbance to Soil Resources	Low	Incorrect handling and storage of soils during maintenance or remediation works leading to damage to the structure, function and resilience of the soil resource.	Moderate adverse	Yes
Loss of Soil Resources	Low	Incorrect handling and storage of soils during construction resulting in more than 5 % of soil resources being lost or rendered unsuitable for reuse.	Negligible adverse	No
NA	NA	NA	NA	NA

7 Mitigation

7.1 Overview of Mitigation

Design Mitigation

7.1.1 The design mitigation employed in relation of Agriculture and Soils is fully described in Section 3.1.

Construction Mitigation

7.1.2 To minimise damage to, and loss of, soil resources; and ensure that agricultural land is restored to the same quality (ALC grade) as prior to construction and to a level where AES eligibility is reinstated, good practice soil storage, handling and reinstatement methods (embedded mitigation measures) would be used as standard for all construction operations, including during maintenance and remediation works. These measures are set out in the outline SHSP which accompanies the application (Ref: 20-3). The document is based upon guidance such as Defra's Construction Code of Practice (Ref: 20-4) and MAFF's Good Practice Guide for Handling Soils (Ref: 20-13). See also paragraph 3.2.22. The embedded construction mitigation measures set out in the SHSP include, but are not limited to:

- avoiding or limiting soil handling after periods of heavy rainfall or during periods when soils are waterlogged to minimise compaction and damage to soil structure;
- limiting the number of machine movements within defined areas of the working width to minimise compaction and damage to soil structure;
- the establishment of vegetative cover, as soon as possible after construction is complete to maintain soil structure and prevent soil loss through erosion. For arable land, in the absence of being able to immediately re-enter the land into arable rotation upon restoration, areas of bare soil should be seeded with grass or a green manure crop, as informed through ongoing discussion between NGVL and landowners/tenant farmers. For pasture land, areas of bare soil should be seeded with grass crop, as informed through ongoing discussion between NGVL and landowners/tenant farmers;
- ensuring the separate handling and storage of topsoil and subsoil (and distinct sub-horizons therein). Soil removed (excavated) in order of horizons and stored in separate stockpiles based on soil type, near to its original location so it can be replaced/reinstated in a similar location. Soil profile is reinstated;
- reducing the potential for soil compaction through use of Low Ground Pressure (LGP) tracked or wheeled tyres to spread the weight of vehicles, limiting the height of soil stockpile mounds, restricting construction traffic to specific areas on the construction working width and loosening the area afterwards using recognised practices and equipment to remove any compaction; and

- seeding of soil stockpiles if soil resources are stored for longer than six months to prevent irreversible damage to soil resource quality through factors such as erosion, and enable effective and quick restoration.

7.1.3 The damage to soil resource will be further minimised through the use of suitably designed haul roads to mitigate soil compaction, the installation of land drainage to intercept and divert clean water away from the working area; and managing the restored soils sympathetically to an agreed aftercare programme for a period of two to three years.

7.1.4 It is essential that the 0.9 m minimum depth of cover is achieved over the cables trenches and excavations, see paragraph 3.3.12.

7.1.5 The Wallasea 2 soils identified at the proposed converter station site, permanent haul road and AC cable route are heavy textured and poorly drained soils. The moderate structural development of these soils requires careful management during handling and restoration, ideally restricted to the drier periods of the year when soils are not at field capacity, to avoid soil compaction and smearing and facilitate soil structural recovery. This will enable the recovery of the natural soil drainage and return to a normal crop yield post construction. Detailed soil handling procedures will be provided in the SHSP.

7.1.6 The reinstated topsoil over the AC cable route should be cultivated using agricultural equipment and a crop established at the earliest opportunity. The early cropping of the restored land assists with the recovery of the soil structure through crop rooting whilst also minimising the risk of erosion.

7.1.7 The SHSP should is a 'live document' and prior to commencement of construction, site-specific soils data (from LDC or others) will be utilised to update the SHSP to a detailed document containing site-specific mitigation which will be implemented during construction activities. The outline SHSP also sets out good practice measures to minimise the potential transfer of disease, pathogens, and weeds (biosecurity), again making reference to guidance such as Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref: 20-4). This embedded mitigation would include, but not be limited to:

- avoiding soil movement between land ownerships via heavy plant movement as far as is practicable in normal working operations, with additional tailored mitigation such as disinfectant spraying being employed should specific pathogens or diseases be identified (e.g. Foot and Mouth Disease);
- an on-going weed management programme for the displaced soil (soil storage mounds); including suitable herbicide application should control the weed seed burden in both the top- and sub-soil so as to avoid the increased growth of weeds (particularly harmful weeds such as black grass, thistles, ragwort) following soil replacement. Although none of the land within the ZoI has been identified as being organically managed, the use of herbicide will be tailored if required.

7.1.8 Good practice measures set out in the SHSP will ensure that wind erosion of soils (generation of dust emissions) during soil handling or from stockpiles will be minimised (Ref: 20-3).

7.1.9 It is assumed that the installation of a 1 km section of AC cable would take between four and nine months; and that cable installation would be undertaken in a phased manner so that no section of trench would be left open for longer than a year so that the period of temporary storage of excavated soils in any given Section of the proposed AC cable route would not exceed 1 year; so as to minimise soil storage impacts. Additionally, it is possible that a ducted installation method may be chosen by the appointed Contractor which could potentially further minimise the duration of cable installation works and soil storage times.

7.1.10 Appropriate Defra bio-security policies will provide appropriate measures in the event of any disease outbreaks or transfer of weeds between land ownerships. Prior to construction, Defra's Animal and Plant Health Agency should be consulted on the presence of animal burial pits, disease controls in place; and the presence of notifiable plant disease. Again, the SHSP would be revised with site-specific data (if available) to further inform and tailor biosecurity measures.

7.1.11 Periodic stockpile observations will be carried out along the AC cable route during construction activities to assess the condition of the stockpiles, and identify the requirement for weed control and or erosion mitigation measures. Details of the frequency of observations and required information to consider will be listed in the SHSP.

Other Measures

7.1.12 The soils identified within the ZoI (proposed converter station, permanent access road and proposed AC cable route) are not, when in their undisturbed state or in stockpiles, considered to be erosion prone, nor are they organic rich. The identified within the ZoI are therefore not considered to be sensitive to damage and susceptible to loss (low receptor sensitivity; see Table 20.5). Therefore, no additional bespoke mitigation is required beyond the mitigation described.

7.1.13 Site specific (bespoke) mitigation measures would be implemented where required. These measures could include changes to the grazing regime to accommodate the loss in workable area; construction of designated crossing points to minimise disruption to the movement of livestock and machinery; programming works to avoid specific locations (for example lambing sheds) during sensitive times in the farming calendar (for example lambing). The identification of these measures is the subject of ongoing discussion between the landowners/farmers within the ZoI, NGVL and ALOs; once identified these measures will be incorporated into project documentation (such as the detailed construction phase CEMP, site specific method statements, or similar).

Compensation Measures

7.1.14 As discussed in paragraph 6.2.30 the long-term effects to landholdings as a result of permanent land use change (loss of agricultural land from the landholding) are considered to be fully mitigated through the process of discussion and negotiation between NGVL, the landowners and any agricultural tenants (if applicable). It is considered that such negotiations have already reached a satisfactory stage whereby landowners and/or tenants will be reasonably

compensated for all potential losses due to the permanent loss of land. Permanent loss of landholding is therefore not considered further within the assessment.

7.1.15 NGVL will ensure that agricultural liaison officers maintain communication with farmers/landowners to ensure their needs are understood before, during and after construction.

8 Residual Effects

8.1 Proposed Converter Station and Permanent Access Road

8.1.1 The construction effects are typically temporary or short-term occurring during the construction phase only.

Temporary Construction Effects

Loss of Agricultural Land

8.1.2 The potential construction effects to agricultural land as assessed in Section 6 cannot be mitigated as the area of temporary land take required during the construction of the proposed converter station and permanent access road, and hence the area of temporary BMV loss, cannot be reduced. Therefore, the potential and residual effects in relation to loss of agricultural land are the same.

8.1.3 As set out in paragraph 2.7.7, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not; and as the loss of agricultural land is **temporary**, it is therefore **not significant**.

Disturbance to Soil Resource

8.1.4 Construction activities will result in a temporary disturbance to soil resource in the ZoI of the proposed converter station site and permanent access road. The application of appropriate good practice construction mitigation measures, such as those set out in Section 7 and the SHSP, will ensure that the structure, function and resilience of soil resources are protected and maintained; and the magnitude of impact would be reduced to **negligible** (Table 20.6). Therefore, the impact to the **low sensitivity** soils would be **negligible** and the residual effect of soil disturbance during construction of the proposed converter station and permanent access road would be **not significant** (Table 20.7).

Loss of Soil Resource

8.1.5 The application of appropriate mitigation measures such as the good practice set out in the SHSP and Section 7, 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, ensuring that over 95 % of soil resources will be retained on site and be 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.

8.1.6 Therefore, with appropriate mitigation, the magnitude of impact would be **negligible** (see Table 20.6), and the residual effect to the **low sensitivity** soils within the proposed converter station and permanent access road ZoI would be **negligible** and **not significant** (Table 20.7).

Agri-Environment Schemes

8.1.7 Landholding A is currently registered with the BPS and consequently is of **low sensitivity**. With good practice mitigation measures, such as those set out in the SHSP and Section 7, in place, the quality of the reinstatement would ensure that the land regained BPS eligibility post-construction; and therefore, the change to AES eligibility would be temporary, for the duration of construction operations only.

8.1.8 Therefore, with appropriate mitigation, the magnitude of impact would be **low** (see Table 20.6); and the residual effect would be **negligible** and **not significant** (Table 20.7).

Land holding

8.1.9 The application of appropriate site-specific bespoke mitigation measures to minimise disruption to agricultural activities, such as the construction of designated crossing points to minimise disruption to the movement of livestock and machinery. Therefore, with appropriate mitigation, the magnitude of impact would be **low** (see Table 20.6); and the residual effect would be **negligible** and **not significant** (Table 20.7).

Longer Term, Operational and Permanent Effects

Loss of agricultural land

8.1.10 As stated in paragraph 6.2.25 the potential long-term impacts to agricultural land cannot be mitigated, as the area of permanent land take required to deliver the proposed converter station and permanent access road, and hence the total area of permanent BMV loss, cannot be reduced. Therefore, the potential and residual effects in relation to loss of agricultural land are the same, and as the total permanent loss of BMV agricultural land under both scenario 1 and 2 is **in excess of 20 ha** the effect is **significant (adverse).**

8.1.11 However, when the loss of BMV land due to the proposed converter station and permanent access road is considered in the context of the availability of BMV land in the wider locality, Table 20.8 shows that over 98 % (62,485.8 ha) of agricultural land within the administrative area of SHDC is either Grade 1 (excellent) or Grade 2 (very good) BMV land. Therefore, as a new converter station must be developed within SHDC in order to deliver the essential electricity infrastructure required to secure supply, and the footprint of the converter station would be approximately the same (over 20 ha permanent land take) regardless of location, the significant effect to agricultural land would most likely occur regardless of location. Additionally, the worst-case loss of BMV land as a result of the proposed converter station and permanent access road (31.9 ha) only equates to a loss of 0.05 % of BMV land within the District.

8.1.12 The longer term, operational and permanent impacts to soil resources, AES and landholdings have been scoped out of the assessment, as discussed in Section 6.

8.2 Proposed AC Cable Route

Temporary effects

Loss of agricultural land

8.2.1 As stated in paragraph 6.3.3, the potential construction effects to agricultural land as assessed in Section 6 cannot be mitigated as the area of temporary land take required during the construction of the proposed AC cable route, and hence the area of temporary BMV loss, cannot be reduced. Therefore, the potential and residual effects in relation to loss of agricultural land are the same.

8.2.2 As set out in paragraph 2.7.5, a threshold of 20 ha of **permanent** BMV loss is used to determine whether the loss is significant or not; and as the loss of agricultural land is **temporary**, it is therefore considered to be **not significant.**

Disturbance to Soil Resource

8.2.3 Construction activities will result in a temporary disturbance to soil resource in the ZoI of the proposed AC cable route. The application of appropriate good practice mitigation measures, such as those set out in Section 7 and the SHSP, will ensure that the structure, function and resilience of soil resources are protected and maintained; and the magnitude of impact would be reduced to **negligible** (Table 20.6). Therefore, the impact to the **low sensitivity** soils would be **negligible** and the residual effect of soil disturbance during construction of the proposed AC cable route would be **not significant** (Table 20.7).

Loss of Soil Resource

8.2.4 The application of appropriate mitigation measures such as the good practice set out in the SHSP and Section 7, will prevent the unauthorised export of soils and minimise or prevent soil loss through erosion and trafficking on plant wheels; ensuring that over 95 % of soil resources will be retained within the proposed AC cable route ZoI and be 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.

8.2.5 Therefore, with appropriate mitigation, the magnitude of impact would be **negligible** (see Table 20.6) and the residual effect to the **low sensitivity** soils within the proposed AC cable route would be **negligible** and **not significant** (Table 20.7).

Operational, Longer Term and Permanent Effects

Loss of Agricultural Land

8.2.6 Although design mitigation will seek to position the fibre pits and link boxes within non-agricultural land or to the edge of fields, the permanent loss of agricultural land due to the fibre pits and link boxes cannot be fully mitigated. Therefore, the residual effect is the same as the potential effect.

8.2.7 As the total permanent loss of agricultural land due to the proposed AC cable route would not exceed 20 ha, the residual effect of the loss is **not significant**.

8.2.8 It should be noted that the assessment assumes that the fibre pits and link boxes are *not* fenced off, and that therefore the permanent loss of land is restricted to the area of the infrastructure only. However, given the scale of the predicted permanent loss (less than 1 ha) in relation to the 20 ha threshold, any additional losses due to fencing-off (permanent exclusion of land from agricultural use) would not be of a scale whereby the 20 ha threshold was exceeded.

Disturbance to Soil Resources

8.2.9 Any maintenance or remedial works conducted during the operational lifetime of the proposed AC cable route, requiring the disturbance (excavation) of soil resources would be expected to be subject to appropriate good practice mitigation measures, such as those set out in Section 7 and the SHSP. Therefore, the magnitude of impact would be reduced to **negligible** (Table 20.6) and the residual impact to the **low sensitivity** soils would be **negligible** and **not significant** (Table 20.7).

Loss of Soils Resources

8.2.10 As described in paragraph 6.3.14, there is the potential for loss of soil resources to occur during maintenance or remedial works conducted during the operational lifetime of the proposed AC cable route. However, these works would be expected to be subject to appropriate good practice mitigation measures, such as those set out in Section 7 and the SHSP and therefore (as for the construction phase of the route) the magnitude of impact would be reduced to negligible (Table 20.6) and the residual effect to the **low sensitivity** soils within the proposed AC cable route would be **negligible** and **not significant** (Table 20.7).

9 Cumulative Effects

9.1 Introduction

9.1.1 Cumulative effects have been considered both in terms of the cumulative effects of the various elements of the UK Onshore Scheme (Intra-project effects) and the cumulative effects of the proposed converter station, permanent access road and proposed AC cable with other developments proposed in the vicinity (Inter-project effects).

9.2 Intra-project Effects

9.2.1 Effects associated with Agriculture and Soils are not considered relevant to assessing the likely intra-project effects of various sources of impact upon single receptors; for example, the combined effects of noise, dust and visual effects on one receptor. There are thus no intra-project cumulative effects anticipated between land use, soil resources or AES; and other potential environmental effects which may occur as a consequence of the proposed converter station, permanent access road and proposed AC cable route.

9.2.2 However, intra-project effects to land use, soil resources or AES are considered to potentially occur as a result of the proposed converter station, permanent access road and proposed AC cable installation in combination with the proposed DC cable installation.

9.2.3 The assessment of disturbance to, and loss of, soil resources is considered to be site specific. As no area of soil resource within the Planning Application Boundary would be subject to works/disturbance as a result of more than one element of the UK Onshore Scheme, intra-project cumulative effects would not occur.

9.2.4 Similarly, the assessment of intra-project effects is not considered relevant to AES, as no individual AES within the Planning Application Boundary would be impacted by more than one element of the UK Onshore Scheme; proposed converter station, permanent access road; proposed AC cable route and proposed DC cable route.

9.2.5 The only permanent BMV land take as a result of the UK Onshore Scheme is due to the proposed converter station, permanent access road and proposed AC cable; as there is no permanent land take as a result of installation of the DC cable (Chapter 9; ES-2-B.05). As a result, there is no potential for intra-project effects to permanent BMV land take to arise as a result of the proposed DC cable in combination with the proposed converter station, permanent access road and proposed AC cable route presented in this chapter. The loss of BMV land for the UK Onshore Scheme as a whole however, remains significant, as losses due to the proposed converter station and permanent access road and AC cable exceed the 20 ha threshold, as defined in paragraph 2.7.5.

9.3 Inter-project Effects

9.3.1 A list of 17 developments to be considered cumulatively with the proposed converter station, permanent access road and proposed AC cable route has been agreed by NGVL, details of the schemes are presented in Table 20.17. The process of project development screening for cumulative assessment is detailed in Chapter 28 (ES-2-D.01).

9.3.2 The proposed converter station, permanent access road and proposed AC cable would permanently remove 21.1 ha (best case) or 31.9 ha (worst-case) of BMV land from agricultural use; and as there is no permanent loss of BMV agricultural land due to the proposed DC cable installation, this also represents the total permanent loss of BMV land due to the UK Onshore Scheme as a whole. There is the potential for the 17 considered developments to also permanently remove BMV land from agricultural use and for cumulative effects on land use to occur. The data are presented in Table 20.17.

Table 20.17: Cumulative Permanent Loss of BMV land

Planning reference	Notes	Within the OL of the Converter Station, access track or AC cable elements (Y/N)	Permanent BMV loss (ha)*
5	This project proposes the erection of a new grain store to be located immediately adjacent to the west of the proposed DC cable route, at Six Hundreds Drove, within the boundary of the Heckington Fen Wind Farm (replacing an existing building structure with a slightly larger building.)	N	0
6	This project comprises 22 wind turbines of a maximum height (to blade tip) of 125 m. This project is located to the immediate west of the proposed DC cable route north of the A17.	N	8.36
12	This project proposes to replace approximately 1.3 km of existing overhead power lines on wood poles to match existing circuits. This project would extend across the working width of the proposed DC cable route (in Route Section 4) at Sutterton Drove, Amber Hill.	N	0
20	This project is still in the pre-planning phase. It proposes the erection of up to eight poultry sheds on arable land. This project is located adjacent to project ID 23 (as described above), on the B1192 south of the proposed DC cable route. The sheds are likely to be 24.4 m x 91.4 m.	N	1.78

Table 20.17: Cumulative Permanent Loss of BMV land			
Planning reference	**Notes**	**Within the OL of the Converter Station, access track or AC cable elements (Y/N)**	**Permanent BMV loss (ha)***
23	This project proposes the development of a 499 kW anaerobic digestion plant to be located adjacent to the B1192, approximately 300 m south of the proposed DC cable route.	N	0
26	This project proposes the erection of 16 biomass boilers and associated fuel silos for the heating of existing adjacent poultry units on existing hardstanding. This project is located to the north of the proposed DC cable route, immediately adjacent to the B1192 (a proposed access route to the proposed DC cable route).	N	0
39	This project proposes the installation of a solar farm consisting of up to 19,230 solar panels and an access track to the site from Folly Lane. The project access overlaps the proposed DC cable route north of the proposed TCC (S4) (in Route Section 3). An area of 8.26 ha of agricultural land would be temporarily lost, however sheep will be allowed to graze in between and beneath the solar panel arrays, therefore agricultural use has the potential to continue.	N	0
44	This project includes for the development of three containers with flues, within which nine biomass boilers would be located along with associated buffer tanks (one per biomass boiler) on existing hardstanding. This project is located to the immediate west of the proposed DC cable route at Keal Cotes.	N	0
45	This project comprises the development of a poultry feed unit, as well as two silos (for feed) and an access road to the facility. This project is located adjacent to the proposed DC cable route at Keal Cotes (Route Section 3).	N	0.36
48	This project has submitted a Screening Opinion request for the development of a 2 MW solar park to be located southwest of Mavis Enderby. It is located approximately 900 m from the	N	0

Table 20.17: Cumulative Permanent Loss of BMV land			
Planning reference	**Notes**	**Within the OL of the Converter Station, access track or AC cable elements (Y/N)**	**Permanent BMV loss (ha)***
	proposed DC cable route. An area of 4 ha of agricultural land would be temporarily lost during construction only. Land between and beneath the panel arrays would be returned to agricultural use during operation (grazed).		
49	This project includes for the installation of a solar array consisting of 460 122 kWp panels. The project is located approximately 800 m to the west of the proposed DC cable route, south of Sutterby (in Route Section 2). An area of 0.2 ha of agricultural land would be temporarily lost during construction only. Land between and beneath the panel arrays would be returned to agricultural use during operation (grazed).	N	0
50	This project proposes the development of 192 ground mounted solar panels on existing hardstanding located within close proximity (approximately 200 m) to the proposed DC cable route to the southwest of Ulceby Cross (in Route Section 2).	N	0
51	This project proposes the development of 6,000 PV solar panels with the capability of producing 1.5 MW of electricity on non-agricultural land located to the northeast of Driby Top and is approximately 800 to 900 m from the proposed DC cable route.	N	0
58	This project comprises the erection of an 11 kV overhead power line approximately 700 m to the north of the proposed DC cable route at its closest point. The project is approximately 3.1 km in length located north of Markby on the A1111. The land take from wood pole considered negligible.	N	0
59	This project proposes the development of a free range poultry unit as well as two silos for the storage of feed. An access road is also proposed to be developed. This project is located approximately 100 m from the south of	N	0.32

Table 20.17: Cumulative Permanent Loss of BMV land			
Planning reference	**Notes**	**Within the OL of the Converter Station, access track or AC cable elements (Y/N)**	**Permanent BMV loss (ha)***
	the proposed DC cable route, to the west of the access point from Crawcroft Lane (in Route Section 1). Access will transect OL of the proposed DC cable element of the UK Onshore Scheme.		
61	This project comprises approximately 1 km of overhead power line on wood poles. The project is located immediately to the east of the A52 and crosses the proposed DC cable route in a north-south axis to the eastern side of the proposed Temporary Construction Compound (TCC) (S1). The OHL will transect OL of the proposed DC cable element of the UK Onshore Scheme.	N	0
67	The Triton Knoll Electrical System is the onshore component of the Triton Knoll Offshore Wind Farm, which consists of 288 wind turbines located approximately 32 km from Lincolnshire coast. The onshore component of the project consists of an underground cable connecting the offshore array to the National Electricity Transmission System (NETS) at the existing Bicker Fen 400 kV Substation.	N	36.30 ha
*None of the available project information provided a breakdown of permanent agricultural land loss into areas of BMV and non-BMV, therefore to present a worst-case scenario, it is assumed that all land considered for development is BMV land.			

9.3.3 As shown in Table 20.17: Cumulative Permanent Loss of BMV land only five of the considered developments would potentially result in the permanent loss of BMV land. None of the available project information for these five proposed developments provided a quantification of BMV and non-BMV coverage, and therefore to present a worst-case scenario, it is assumed that all land is of BMV quality. The combined BMV loss for the five developments is therefore considered to be 47.12 ha; of which 36.3 ha occurs as a consequence of the Triton Knoll Electrical System. Therefore, the loss of BMV land due to Triton Knoll Electrical System is, on its own, significant, based upon the criteria presented in paragraph 2.7.5.

9.3.4 The cumulative loss of BMV land due to the considered developments and the UK Onshore Scheme would be 68.2 ha (best-case) or 79.0 ha (worst-case); depending upon whether restored

land within the proposed converter station site was returned to agricultural use. In either case, based upon the criteria presented in paragraph 2.7.5, the loss of BMV land due to the 18 considered developments results in a **significant cumulative effect.**

9.3.5 When considered in the wider context of the availability of BMV land within SHDC and BBC where the majority of this permanent land take would occur (over 98 % of agricultural land, 106,279.8 ha, within these two administrations is Grade 1 or 2, see Table 20.8) the worst case cumulative loss is only a small percentage (approximately 0.08 %) of the total BMV land available. In the absence of digital soils data for the whole of SHDC and BBC, as discussed in Appendix 9.1 (ES-4-B.05), the Provisional Mapping cannot provide a distinction between Subgrades 3a and 3b. Therefore, to provide a worst-case scenario, it is assumed that for this assessment, all Grade 3 land in these districts is Subgrade 3b. Thus, the percent of BMV lost from the wider area as presented above will provide a worst-case, as the total amount of available BMV land in SHDC and BBC will certainly be greater if the area of Subgrade 3a was known.

9.3.6 As described in paragraphs 9.2.3 and 9.2.4, the assessment of (disturbance and loss) effects to soil resources and AES eligibility are considered to be site specific. As such the assessment of inter-project effects (the effect of more than one development upon a single environmental factor) is not considered relevant to these receptors as no area of soil resource or individual AES within the proposed converter station, permanent access road or proposed AC cable ZoI would be impacted by any of the 18 considered developments. However, it is noted that in order to conform with planning policy and good practice guidance, all developments would be expected to apply similar measures to ensure that the disturbance and loss of soil resources was reduced to a level where it was acceptable in planning terms; and land restoration would achieve a standard which would allow AES eligibility to be reinstated. For example, as a requirement of the Development Consent Order (DCO) Triton Knoll Electrical System have produced a Soil Management Plan.

10 Summary of Assessment

10.1 Overview of Baseline Conditions

10.1.1 Potential impacts to agricultural and soil receptors as a result of the proposed converter station, permanent access road and proposed AC cable route have been identified, and could include the loss of agricultural land, the disturbance and loss of soil resources, the impact to AES eligibility; and in the case for the proposed converter station and permanent access road, also impact the agricultural landholding.

10.1.2 Whilst these impacts cannot be avoided, with the implementation of suitable mitigation measures, the magnitude of effects can be reduced and the impacts can be managed.

10.1.3 Mitigation will be implemented through embedded construction measures in the SHSP, including best practice measures in accordance with the soil quality related industry good practice guidance (Ref: 20-4 and Ref: 20-13).The implementation of the SHSP will ensure the maintenance of soil volumes and soil quality during construction activities, with topsoil replaced to the same depths as the original soil profile; and subsoil replaced to the same depths as the original soil profile where possible owing to the placement of cable infrastructure (see paragraph 3.3.12) to ensure that the ALC status of land is restored to the pre-commencement condition.

10.1.4 The short-term impacts on agricultural land quality and soil resource will be temporary and can be fully mitigated by the adoption of best practice measures, ensuring the **residual temporary effects are not significant.**

10.1.5 The permanent loss of BMV agricultural land due to the proposed converter station and permanent access road will exceed 20 ha. Although this loss is **significant,** there is a predominance of BMV land within Lincolnshire. The iterative design process did consider BMV land and promoted the development of the converter station on the proposed site which contains lower graded land than other options put forward at the siting stage of the project. Additionally, the permanent infrastructure has been micro-sited to avoid development of Grade 1 land as far as practicable, instead focussing development on non-agricultural land, non-BMV subgrade 3b and Grade 2 land.

10.2 Overview of Residual Effects

10.2.1 The summary of residual effects for the proposed converter station site and permanent access road are listed in Table 20.18 and Table 20.19.

10.2.2 The summary of residual effects for the proposed AC cable route are listed in Table 20.20 and Table 20.21.

Residual Effects in South Holland District Council

10.2.3 The only significant residual effect in the administrative area of SHDC is the permanent loss of BMV agricultural land. This permanent loss of BMV agricultural land is primarily due to the proposed converter station being greater than 20 ha (18.8 ha or 29.7 ha depending upon the scale of reinstatement to agricultural use post-construction); although further, very small scale, losses are predicted as a result of fibre pits and link boxes on the proposed AC cable route.

10.2.4 Although this loss is significant, permanent built development within the proposed converter station site has been directed on to land of moderate quality non-BMV land and BMV land of very good quality (Grade 2), avoiding areas of excellent quality Grade 1 land. Therefore, impacts to BMV land within SHDC have been mitigated as far as possible through careful and considered design.

Residual Effects in Boston Borough Council

10.2.5 There will be no significant residual effects on agriculture and soil receptors in BBC.

10.3 Overview of Cumulative Effects

Intra-project Effects

10.3.1 There will be no intra-project cumulative effects a result of the DC cable installation in combination with the proposed converter station, permanent access road and AC cable installation.

Inter-project Effects

10.3.2 The only significant inter-project effect is the cumulative permanent loss of BMV agricultural land, which exceeds the 20 ha threshold criteria set out in paragraph 2.7.5. The total worst case predicted permanent BMV loss for the proposed converter station, permanent access road and AC cable route (31.9 ha); the five considered developments resulting in permanent agricultural land take (47.1 ha) would be 79 ha.

10.3.3 Although this potential cumulative permanent loss of BMV land is significant, given the predominance of BMV land (Grade 1 and 2) within Lincolnshire, the loss represents 0.03 % of the available BMV land within Lincolnshire (as discussed in p

10.3.4 Paragraph 9.3.4, the percent of BMV lost from the wider area as presented above will provide a worst case, as the total amount of BMV land in Lincolnshire will certainly be greater if the area of Subgrade 3a was known). This scale of permanent BMV loss in context with the local environment, is therefore low.

Table 20.18: Summary of Temporary Residual Effects (Converter Station and Access Road)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Agricultural Land	NA	Temporary loss of BMV agricultural land.	NA	No
Disturbance to Soil Resources	Low	Correct handling and storage of soils during construction mitigating damage to the structure, function and resilience of the soil resource.	Negligible adverse	No
Loss of Soil Resources	Low	Correct handling and storage of soils during construction resulting in over 95 % of soil resources being retained on site and suitable for reuse.	Negligible adverse	No
Agri-Environment Schemes	Low	Good quality restoration after construction. Temporary change in AES eligibility.	Negligible adverse	No
Agricultural Landholding A: Scenario 1	Medium	Between 5 and 9.9 % of landholding experiences a temporary change in land use from agricultural to non-agricultural. Site specific mitigation to minimise the magnitude of impact.	Negligible adverse	No
Agricultural Landholding A: Scenario 2	Medium	Less than 1 % of landholding experiences a temporary change in land use from agricultural to non-agricultural.	Negligible adverse	No
Agricultural Landholding B	Medium	Less than 1 % of landholding experiences a temporary change in land use from agricultural to non-agricultural.	Negligible adverse	No

Table 20.19: Summary of Long-term Residual Effects (Converter Station and Access Road)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Agricultural Land	NA	Permanent loss of BMV agricultural land due to the proposed converter station and permanent access road will exceed 20 ha.	NA	Yes

Table 20.20: Summary of Temporary Residual Effects (Proposed AC cable route)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Agricultural Land	NA	Temporary loss of BMV agricultural land.	NA	No
Disturbance to Soil Resources	Low	Correct handling and storage of soils during maintenance or remediation works mitigating damage to the structure, function and resilience of the soil resource.	Negligible adverse	No
Loss of Soil Resources	Low	Correct handling and storage of soils during maintenance or remediation works resulting in over 95 % of soil resources being retained on site and suitable for reuse.	Negligible adverse	No

Table 20.21: Summary of Long-term Residual Effects (Proposed AC cable route)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Agricultural Land	NA	Permanent loss of BMV agricultural land does not exceed 20 ha.	NA	No

Table 20.21: Summary of Long-term Residual Effects (Proposed AC cable route)				
Description of Receptor	**Value / Sensitivity**	**Description of Residual Effect**	**Significance**	**Significant**
Disturbance to Soil Resources	Low	Correct handling and storage of soils during construction mitigating damage to the structure, function and resilience of the soil resource.	Negligible adverse	No
Loss of Soil Resources	Low	Correct handling and storage of soils during construction resulting in over 95 % of soil resources being retained on site and suitable for reuse.	Negligible adverse	No

11 References

Ref: 20-1: MAFF (1988) 'Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

Ref: 20-2: Department for Communities and Local Government (2012) The National Planning Policy Framework.

Ref: 20-3: NGVL Soil Handling and Storage Protocol, VKL-08-39-G500-026

Ref: 20-4: DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. pp64. Accessed on 03/02/2016. Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf.

Ref: 20-5: Knox et al. (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147'.

Ref: 20-6: National Soil Resources Institute, Cranfield University 1:250,000 scale National Soil Map, digital dataset (Landis NATMAP dataset).

Ref: 20-7: MAFF (1993). 1:250,000 "Provisional Agricultural Land Classification Sheet, Eastern Region".

Ref: 20-8: Soil Survey of England and Wales (1984) Soils and their Use in Eastern England and accompanying 1:250,000 map Sheet 4.

Ref: 20-9: Met Office, (1989). Climatological Data for Agricultural Land Classification.

Ref: 20-10: Agri-Environment Schemes identified using MagicMap.

Ref: 20-11: Natural England strategic 1:250,000 scale Predictive 'Likelihood of best and most versatile land' mapping.

Ref: 20-12: Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y),

Ref: 20-13: MAFF (2000). Good Practice Guide for Handling Soils. Available at: http://www.persona.uk.com/a5dunstable/deposit-docs/DD076-DD100/DD-093.pdf [Accessed 26 January 2016].

Ref: 20-14: DECC (2011). Overarching National Policy Statement for Energy (EN-1). pp121. Accessed 09/02/16. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 16/05/2017].

Ref: 20-15: National Policy Statement for Electricity Networks Infrastructure (EN-5). pp32. Accessed 09/02/16. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf [Accessed 16/05/2017].

Ref: 20-16: Department for Communities and Local Government (2016) The National Planning Policy Guidance (NPPG). Available at https://www.gov.uk/government/collections/planning-practice-guidance [Accessed 26/03/2017].

Ref: 20-17: DEFRA (2009a). The National Strategy for England; Safeguarding our Soils. Available at: https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england [Accessed 16/05/2017].

Ref: 20-18: Boston Borough Council (1999). Boston Borough Local Plan and list of Saved Polices. Available at: http://www.boston.gov.uk/index.aspx?articleid=3736 [Accessed 16/05/2017].

Ref: 20-19: Boston Borough Council (2006). Boston Borough Interim Plan (Non-Statutory Development Control Policy). Available at: http://www.boston.gov.uk/index.aspx?articleid=3736 [Accessed 16/05/2017].

Ref: 20-20: South East Lincolnshire Joint Strategic Planning Committee (March 2017). South East Lincolnshire Local Plan 2011 – 2036, (Publication Version). Available at: http://www.southeastlincslocalplan.org/wp-content/uploads/2017/03/Publication-version-text.pdf [Accessed 16/05/2017].

Ref: 20-21: South Holland District Council (2006). South Holland Local Plan. Available at: http://localplan.sholland.gov.uk/text/03_sg_corestrat.htm [Accessed 16/05/2017]

CONTACT US

You can find out more information by:

calling our freephone number:
0800 731 0561

Sending an email to:
vikinglink@communityrelations.co.uk

Writing to our freepost address at:
FREEPOST VIKING LINK

Visiting our website at:
www.viking-link.com

If you, or someone you know, would like information in Braille, audio, large print or another language, please call us on the freephone number above.