10. Agricultural land

Purpose of the Assessment

10.1. This chapter considers and assesses the agricultural resources and receptors that have the potential to be significantly affected during the construction, operation and decommissioning phases of the Proposed Development, particularly the quality of agricultural land, the nature of the soil resource and the scale and nature of the farm holdings within the Potential Development Area.

10.2. This chapter also considers the potential impact of climate change upon agricultural resources and receptors in accordance with the future UKCP09 climatic conditions as set out in **Chapter 23** Climate Change Mitigation & Adaptation of this PEIR.

10.3. The Order Limits include the Main SRFI Site; J15a works and minor highways works, as described within **Chapter 5**, 'Project Description'.

10.4. This chapter identifies the legislative and policy context for the assessment; summarises the extent of the Study Area; summarises relevant consultation; describes the baseline surveys and data, and baseline conditions; describes the methods used to assess the effects of the Proposed Development; identifies relevant embedded mitigation; provides an assessment of likely significant effects during construction, operation and decommissioning, and provides a cumulative assessment (inter and intra project). The chapter also identifies the mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been adopted. Monitoring is identified where necessary, and a summary of the assumptions and limitations of the assessment is also provided.

10.5. This chapter is accompanied by the following appendices and figures:

- Appendix 10.1 - Agricultural Land Classification and Soil Resources
- Appendix 10.2 - Summary of Agricultural Land Classification and Soil Resources
- Figure 10.1 - Observations
- Figure 10.2 - Soil Resources
- Figure 10.3 - Agricultural Land Classification
- Figure 10.4 - Farm Holdings

10.6. This chapter should also be read in conjunction with the following technical chapters of this PEIR: **Chapter 20** Socio-economics (in terms of the effects on existing employment); **Chapter 16** Ecology and Nature Conservation; **Chapter 17** Landscape and Visual; and **Chapter 14** Hydrology, Drainage and Flood Risk and **Chapter 13** Ground Conditions (in terms of the varying functions of soils).

Legislation, Policy and Best Practice

10.7. **Table 10.1** provides a summary of legislation, policy, guidance and best practice of particular relevance to this topic chapter. Further information is then provided below the table.

10.8. As set out at **Chapter 6**, the National Policy Statement for National Networks (NPSNN) provides the principal national policy against which this application for development consent is to be assessed. Other national guidance, such as the National Planning Policy Framework (NPPF) (March 2012), has also been referred to in **Table 10.1** below. However, the NPPF is explicit that it does not contain specific policies for nationally significant infrastructure projects (NSIPs), which are determined 'in accordance with the decision-making framework set out in the Planning Act 2008 and relevant national policy statements for major infrastructure'. However, matters that the decision maker considers important and relevant when making decisions on NSIP applications are also applicable, and may include the NPPF. Other guidance, and local policy, is also referenced below for completeness.

Table 10.1: Relevant legislation, policy, guidance

Legislation/policy/guidance	Key provisions	Relevant section of chapter where key provisions are addressed
European Union Thematic Strategy for Soil Protection (Ref 10.1)	Prevention of soil degradation, preservation of soil functions, and restoration of degraded soils.	This provision has been addressed in Embedded mitigation.
National Networks National Policy Statement, paras. 5.168, 5.176 and 5.179 (Ref 10.2)	Protection of best and most versatile (BMV) agricultural land; good design principles; protection of soils during construction.	These provisions have been addressed in the Method of assessment; in Embedded mitigation; in the Alternative Site Assessment (separate report) and in **Chapter 5** Project Description.
National Planning Policy Framework, paras. 109 and 112 (Ref 10.3)	Protection of BMV agricultural land; protection and enhancement of soil.	These provisions have been addressed in Method of assessment and Embedded mitigation.
Planning Practice Guidance (Ref 10.4)	Indication that the Agricultural Land Classification (ALC) provides a method for assessing the quality of farmland.	This provision is addressed in Baseline surveys and data.
West Northamptonshire Joint Core Strategy Local Plan (Part 1), Policy R2 (Ref 10.5)	Protection of BMV agricultural land.	This provision is addressed in Method of assessment.
Soil Strategy for England (Ref 10.6)	Sustainable management of soil.	This provision is addressed in Embedded mitigation.

The Natural Choice: Securing the Value of Nature (Ref 10.7)	Sustainable management of soil.	This provision is addressed in Embedded mitigation.
Code of Practice for the Sustainable Use of Soils (Ref 10.8)	Sustainable management of soil on construction sites; best practice guidance on handling and storage.	This provision is addressed in Embedded mitigation.

European Union Thematic Strategy for Soil Protection

10.9. There is no adopted legislation at the EU or national level relating to soil protection. The European Union (EU) Thematic Strategy for Soil Protection outlines the condition of soils in Europe and aims to ensure their protection and sustainable use. The overarching aims are to prevent further soil degradation, preserve soil functions, and restore degraded soils to a standard appropriate to their intended use.

10.10. The strategy includes a proposal for an EU Soil Framework Directive which promotes the sustainable use of soil and its protection as a natural and non-renewable resource. However, the proposed Directive was withdrawn in 2014 as it could not be agreed by a qualified majority. In taking its decision, the European Commission stated that it remains committed to the objective of the protection of soil and will examine options on how best to achieve this.

10.11. No direct replacement proposals have yet come forward from the Commission, although Directive 2014/52/EU emphasises that public and private projects should consider and limit their impact on land, particularly in respect of land-take, and on soil, particularly in respect of organic matter, erosion, compaction and sealing (i.e. covering undisturbed natural soils with urban development and infrastructure construction).

National Networks National Policy Statement

10.12. Paragraph 5.168 advises that applicants should take into account the economic and other benefits of BMV agricultural land (Grades 1, 2 and 3a), and that where significant development of agricultural land is demonstrated to be necessary, they should seek to use areas of poorer quality land in preference to that of a higher quality. It also advises that applicants should identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed. Where possible, developments should be on previously developed (brownfield) sites provided that it is not of high environmental value.

10.13. For the decision-maker, paragraph 5.176 advises that the economic and other benefits of BMV agricultural land should be taken into account. The decision-maker should give little weight to the loss of agricultural land in grades 3b, 4 and 5, except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.

10.14. Paragraph 5.179 suggests that applicants can minimise the direct effects of a project on the existing use of the proposed site, or proposed uses near the site by the application of good design principles, including the layout of the project and the protection of soils during construction.

National Planning Policy Framework

10.15. The land use planning context for the consideration of agricultural land and soil resource issues is also provided by national policies for development involving agricultural land set out in the National Planning Policy Framework (NPPF). This guidance is predicated upon principles of sustainable development and requires land use decision makers to take account of the need to protect, and make prudent use of, natural resources. Consequently, it is necessary to have regard to the qualities of the agricultural land and soils involved in development proposals.

10.16. Paragraph 109 of the NPPF identifies the protection and enhancement of soils as a priority in the conservation and enhancement of the natural and local environment. Paragraph 112 then advises that local planning authorities should take into account the economic and other benefits of BMV agricultural land.

10.17. Paragraph 112 of the NPPF goes on to advise that, 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.

10.18. There is no policy in the NPPF on the effect of development on farm holdings, although paragraph 28 emphasises the need to support economic growth in rural areas to create jobs and prosperity by, amongst other means, promoting the development and diversification of agricultural and other land-based rural businesses.

Planning Practice Guidance

10.19. The Planning Practice Guidance (PPG) was first issued in 2014 and repeats guidance in paragraph 112 of the NPPF in respect of the quality of agricultural land.

10.20. The PPG indicates that the ALC provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system, with direction given to Natural England for further information on ALC. The guidance also confirms that Natural England has a statutory role in advising local planning authorities about agricultural land quality issues.

10.21. The guidance also repeats policy in the NPPF in respect of soils and states that the planning system should protect and enhance valued soils because they are an essential finite resource that provides important ecosystem services, such as a growing medium for food, timber and other crops, a store for carbon and water, a reservoir of biodiversity and a buffer against pollution.

West Northamptonshire Joint Core Strategy Local Plan (Part 1)

10.22. Within Policy R2, the protection of BMV agricultural land is amongst the considerations to be taken into account for proposals that sustain and enhance the rural economy.

Soil Strategy for England (2009)

10.23. The inherent quality of soil, as distinct to its agricultural value, is recognised in the Government's Soil Strategy for England which seeks to encourage the sustainable management of soil resources.

The Strategy sets out the Department for Environment, Food and Rural Affairs' (Defra) vision that by 2030 all of England's soils will be managed sustainably and degradation threats will be tackled successfully in order to improve soil quality and safeguard the ability to provide essential services for future generations. The Strategy sets out priorities for action in respect of:

- better protection of agricultural soils;
- protecting and enhancing stores of soil carbon;
- building the resilience of soils to a changing climate;
- preventing soil pollution;
- effective soil protection during construction and development; and
- dealing with the legacy of contaminated land.

The Natural Choice: Securing the Value of Nature (2011)

10.24. The Government's White Paper, The Natural Choice, repeats the aim of the Soil Strategy that, by 2030, England's soils will be managed sustainably and that degradation threats will be tackled successfully, in order to improve the quality of soils and to safeguard their ability to provide essential ecosystem services and functions for future generations. Existing action includes Environmental Stewardship and the cross-compliance conditions that claimants of direct payments have to meet under the Common Agricultural Policy.

Code of Practice for the Sustainable Use of Soils (2009)

10.25. Defra has also published a Code of Practice for the sustainable use of soils on construction sites which is a practical guide to assist the construction industry to protect the soil resources with which it works and achieve good soil management at all stages of the construction process. It advises that the protection, use and movement of soil should be considered from the outset of a development project's planning, through its design and construction phases and on into future maintenance and operation. The code provides practical guidance on the following aspects of the sustainable use of soils on construction sites:

- identifying existing soil resources on site;
- on-site soil management;
- topsoil and subsoil stripping;
- soil stockpiling and placement;
- sourcing, importing and manufacturing topsoil;
- soil aftercare; and
- uses for surplus topsoil.

10.26. Sustainable use and management of soil resources during construction can help with the re-establishment of soil functions following their storage or movement, including food production, habitat provision and support, and natural cycling of elements such as carbon and nitrogen.

Consultation and Scoping

10.27. The Scoping Report outlined the approach to be taken to establishing the baseline agricultural conditions, which was noted and welcomed by the Secretary of State in the Scoping Opinion, particularly in the proposal to undertake new surveys as well as discuss the suitability of existing surveys with Natural England.

10.28. Consultation with Natural England has taken place, with a report provided to Natural England that amalgamates the results of previous surveys undertaken by the former Ministry of Agriculture, Fisheries and Food (MAFF) and Reading Agricultural Consultants with those undertaken in 2017 (Appendix 10.2). The request was made to confirm that the data collected and presented met Natural England's expectations and requirements as expressed in its scoping response of 11 January 2016, and that the results are an accurate representation of the ALC and soil conditions in across the study area. Natural England confirmed on 11 December 2017 that the data collected and presented meets its expectations and requirements, and that the results are satisfactory for impact assessment.

10.29. The Scoping Opinion also indicated that the area of agricultural land to be lost, including the land from within farm holdings, should be set out clearly in the ES (now PEIR), and that the ES (PEIR) should contain an assessment of the impact to agriculture and soils against the policy set out in the National Planning Policy Framework.

Table 10.2: Summary of Scoping Opinion

Scoping Opinion section/paragraph	Summary of issue raised	Relevant section of chapter where key provisions are addressed
Scoping Opinion, para. 3.36	Baseline soils and ALC should be informed by a comprehensive and up-to-date dataset.	This issue has been addressed in Baseline Surveys and Data.
Scoping Opinion, para. 3.37	The ES should set out clearly the area of agricultural land to be lost, including land in farm holdings.	This is addressed in Tables 10.12-10.15.
Scoping Opinion, para. 3.38	The ES should contain an assessment of the impact to agriculture and soils against policy in the NPPF.	This is addressed in Method of Assessment; Assessment of Construction Phase Effects.
Scoping Opinion, Appendix 3 - Natural England response	The ES should consider the extent to which soils will be disturbed/harmed and whether BMV land is involved. An ALC and	This is addressed in Baseline Surveys and Data; Method of Assessment; and Tables 10.12-10.14.

	soil survey should be undertaken if required.	
Scoping Opinion, Appendix 3 – Milton Malsor Parish Council	Comment made that the terminal would swallow up good quality arable land that has been continuously farmed for centuries. Reference made to Milton Malsor Parish Council Neighbourhood Plan referencing a small housing development of 20-30 homes at a defined site at the edge of the village, with the remainder of the parish remaining undeveloped green fields for farming.	This issue is addressed in Baseline Conditions; Assessment of Construction Phase Effects; and Tables 10.12-10.14.
Scoping Opinion, Appendix 3 – Blisworth Parish Council	Point 10 of the response suggests that confirmation should be provided of how the environment will be enhanced by the Proposed Development, by virtue of reference to soils as set out in para. 109 of the NPPF.	This is addressed in Embedded Mitigation; and Assessment of Construction Phase Effects.

10.30. Consultation has occurred and is ongoing with the agricultural landowners and occupiers of the Main SRFI Site as part of the farm impact assessments undertaken.

Study Area

10.31. As the effects on the agricultural resource are concerned with the permanent loss of agricultural land to the Proposed Development, and the temporary and permanent impacts on the undisturbed agricultural soil resources within the Potential Development Area, the study area for this topic is confined predominantly to the Order Limits for the Main SRFI Site and the J15a works. No agricultural land or undisturbed agricultural soils are affected by the minor highway works. The exception is in the assessment of the effect on farm holdings, in which the Study Area includes land farmed by the respective holdings outside the Potential Development Area, in order to assess the ongoing viability of the residual holdings.

Baseline surveys and data

10.32. There is a well-established methodology for classifying the quality of agricultural land, contained in 'Agricultural Land Classification of England and Wales, revised guidelines and criteria for grading the quality of agricultural land' (Ref 10.9), issued by MAFF in 1988 and summarised in Natural England's Technical Information Note (TIN) 049 (Ref 10.10).

10.33. Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. Grade 1 land is 'excellent quality' agricultural land with very minor or no limitations to agricultural use, and Grade 5 is 'very poor quality' land, with severe limitations due to adverse soil, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a ('good quality' land) and Subgrade 3b ('moderate quality' land). BMV land is defined as Grade 1, 2 and 3a.

10.34. Initial assessment has been carried out through desk study and has drawn upon a range of published information, including:

- Provisional ALC mapping (Ref 10.11);
- British Geological Survey (BGS) mapping of bedrock and superficial geology (Ref 10.12);
- the Soil Survey of England and Wales soil association maps (1:250,000 scale) (Ref 10.13);
- climatic data from the Meteorological Office's standard 5km grid point data set (Ref 10.14); and
- detailed ALC survey for 65.8ha of land in the west of the Main SRFI Site undertaken on behalf of MAFF in 1997 at an observation density of one sample per hectare (Ref 10.15).

10.35. A soil and ALC survey of most of the Main SRFI Site was undertaken by Reading Agricultural Consultants in 1999 at a semi-detailed level (i.e. at an overall observation density of one soil profile per 3.5ha) (Ref 10.16).

10.36. Further soil and ALC surveys have been undertaken on the Main SRFI Site and the site of the J15a works between February and June 2017. The locations of these survey observations are presented in **Figure 10.1**. The further surveys ensure that the observation density across the relevant parts of the Potential Development Area is at one observation per hectare, in accordance with the guidance in Natural England's Technical Information Note 049 (Ref 10.10) and to meet the requirement set by Natural England in its response to consultation on the Scoping Report.

10.37. Since completing the soil survey works, approximately 24ha of agricultural land has been incorporated into the J15a site area for ecological mitigation. This land has not been surveyed and has been assessed through desk assessment only.

10.38. The surveys have been carried out in accordance with the ALC guidelines. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120 cm or any impenetrable layer:

- soil texture;
- significant stoniness;

- colour (including local gley and mottle colours);
- consistency;
- structural condition;
- free carbonate; and
- depth.

10.39. Soil Wetness Class (WC) was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15cm thick.

10.40. Soil droughtiness, which is a standard calculation in the ALC guidelines which uses soil and climatic parameters to provide an estimate of likely moisture stress in 'standard' crops due to the crop's requirements for water exceeding the Available Water Capacity of the soil, was investigated by the calculation of moisture balance equations. Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.

10.41. The impact on the farming businesses affected has been informed by the collection of farm-specific data from the farmers and landowners using a questionnaire that covered:

- the area farmed;
- the nature of land tenure;
- the nature and scale of agricultural and diversified enterprises undertaken;
- the labour employed on the farm holding;
- items of fixed farm capital;
- the present means of agricultural access to land; and
- the extent of any agri-environment scheme involvement.

10.42. The questionnaire also considered the likely impacts of the Proposed Development on agricultural holdings and their operations, and potential means by which adverse impacts could be avoided or overcome.

Baseline Conditions

10.43. The Main SRFI Site extends to around 266ha of agricultural land, primarily in arable use. There are gentle undulations in topography with altitudes mostly around 80m to 85m above Ordnance Datum (AOD) but increasing to 95m AOD in the east.

10.44. Land at J15a comprises around 32ha of agricultural land. Topography is level to gently sloping with gradients up to around 3° at altitudes between 70m and 85m AOD. No agricultural land is affected by the minor highway works.

10.45. The local agro-climatic factors for the site have been taken from the Meteorological Office's dataset for ALC (Ref. 10.14) and are given in **Table 10.3**. The climate is temperate, with low rainfall and mild temperatures. Crop moisture deficits are moderate to moderately large. The Field Capacity Day regime (which estimates the duration of the period from the autumn or early winter to spring when the soil moisture deficit is zero) is shorter than is typical for lowland England, which is considered to be favourable for agricultural work.

Table 10.3: Local Agro-climatic Conditions

Criterion	Measurement	
	Main SRFI Site	Junction 15a
Average Annual Rainfall	641mm	631mm
Accumulated Temperatures >0°C	1,390 day°	1,400 day°
Field Capacity Days	137 days	136 days
Average Moisture Deficit, wheat	106mm	108mm
Average Moisture Deficit, potatoes	96mm	101mm

10.46. The Main SRFI Site and the J15a works site are underlain principally by mudstone and siltstone of the Whitby Mudstone Formation. Sandy limestone of the Marlstone Rock Formation and silty and sandy mudstone of the Dyrham Formation are also present in the west of the Main SRFI Site and to the west of J15a. The mapped superficial deposits include boulder clay, glaciofluvial sand and gravel, and alluvium.

10.47. The soil and ALC surveys undertaken have identified three main soil types, the broad locations of which are shown in **Figure 10.2**. Soil profiles of the most extensive type occur in the southern part of the Main SRFI Site and to the immediate south of J15a and typically comprise dark greyish brown, clayey (occasionally fine loamy) upper layers over greyish, predominantly clayey (locally silty clay), gleyed and poorly permeable lower layers. Profiles are most commonly of WC IV, with some of WC III. Poor drainage, seasonal wetness and heavy topsoils limit this soil type to Subgrade 3b. A variant of this type is present, including medium loamy topsoils. Where these profiles are WC III, they are less severely limited, to Subgrade 3a.

10.48. The second main soil type occurs across the Main SRFI Site, though not in one discrete area, and is also present to the south-east of J15a. These soil profiles have similar textures to the first type but become slowly permeable at depth or otherwise lack gleying features. The profiles are well drained or moderately well drained (WC I or II) and are limited mostly to Grade 2 or Subgrade 3a, with rare instances of Grade 1, and also areas of Subgrade 3b where the topsoil is clay.

10.49. In the north of the Main SRFI Site and in the south of the J15a site, the soils are derived from glaciofluvial drift. This third type of soil profile typically comprises dark grey or greyish brown, slightly stony, sandy loam or sandy clay loam upper layers over brown and yellowish brown, slightly stony lower layers of sandy loam, loamy sand or sand.

10.50. There is a slight soil droughtiness limitation from reduced soil profile moisture holding capacity on land in these areas, which limits land to Grade 2 or Subgrade 3a. In the south of the Main SRFI Site, gradients of between 7 and 11° limit the land to Subgrade 3b.

10.51. The soils mapped across the unsurveyed land to the west of the J15a site are of the first and third types. To the north and in the south-western corner, the soil comprises poorly drained clayey profiles, which have been assessed as Subgrade 3b in other areas. In the south of the land parcel, well drained coarse loamy and sandy soils are likely to be of Grade 2 or Subgrade 3a.

10.52. Approximately three-quarters of the agricultural land affected within the Main SRFI Site and the site of the J15a works is moderate quality agricultural land in Subgrade 3b, with most of the remainder in Subgrade 3a and Grade 2, and a very small area of Grade 1 land. The distribution of each grade is shown in **Figure 10.3**.

10.53. Most of the Main SRFI Site is not subject to agri-environment schemes, although parts in the east and west are within Entry Level Stewardship (ELS) which was designed to encourage large numbers of farmers to adopt simple environmental management practices. Environmental Stewardship schemes are closing, with the Countryside Stewardship Scheme (CSS) now the main agri-environment scheme in England. The higher tier and mid-tier options in the CSS are more focussed than Environmental Stewardship, with applications for funding being competitive and the area covered by the scheme less than that covered under Environmental Stewardship. However, four new simpler non-competitive offers have been introduced in 2018 to complement the higher tier and mid-tier options and open up the CSS to more farmers and land managers.

10.54. The Main SRFI Site is owned and occupied by the interests set out in **Table 10.4**. The extent of each land ownership boundary within the Main SRFI Site is shown in **Figure 10.4**.

Table 10.4: Farm Holdings within the Main SRFI Site

Farm name	Farm type	Tenure	Area farmed	Other enterprises
Arm Farm	Arable/Grass	Tenanted	65.8ha	None
Manor Farm	Arable	Share farmed	32.4ha	None
Hill Farm	Arable	Tenanted	197.9ha	None
Lodge Farm	Mixed Arable / Livestock	Owner Occupied	85.0ha	None
Rathvilly Farm	Grazing	Owner Occupied	6.3ha	Buildings let to marquee hire company
Corteenhall Estate	Arable	Owner Occupied	850.0ha	Large estate with a variety of other enterprises including

	wedding and events venue

10.55. The agricultural land at J15a that is proposed for ecological mitigation is owned by Messrs Robinson and Beesley, and is in arable cropping. There are no farming interests affected by the minor highways works.

The climate change influenced baseline conditions

10.56. The baseline for agricultural land quality, soil resources and farm holdings is not anticipated to change between the submission of the PEIR and the anticipated date of commencement of construction.

10.57. Commencement of construction of the Proposed Development would permanently remove the land from agricultural use and production. There would therefore be no influence of climate change on the baseline for agricultural land quality and farm holdings.

10.58. However, soil resources will be re-used on site in the design of the Proposed Development. **Chapter 23** provides the potential future baseline climatic conditions within the East Midlands, based on the UKCP09 data, as a result of the climate change scenario identified as relevant to this PEIR by the National Policy Statement for National Networks. Qualitatively this may result in the following future baseline climatic conditions within the region:

- an increase in annual average temperature;
- more very hot days particularly during long term operation;
- more intense downpours of rain;
- an increase in winter rainfall; and
- an increase in dry spells particularly in summer months.

10.59. The long-term potential effects of climate change on soil are unknown and difficult to quantify, although they could involve:

- soils becoming more susceptible to erosion in longer drier summer months, or more susceptible to waterlogging and anaerobism with more intense or frequent rainfall events; and
- a reduction in the carbon sequestration potential and organic matter content as a result of increased rainfall, periods of drought and higher temperatures.

Method of Assessment

10.60. The methods are considered separately below, for agricultural land, soils and farm holdings.

Agricultural Land

10.61. The sensitivity of agricultural land is assessed according to its grade within the ALC.

Table 10.5: Defining Sensitivity of Agricultural Land

Sensitivity	Definition
High	Grade 1, excellent quality agricultural land
Moderate	Grade 2 and Subgrade 3a, very good to good quality agricultural land
Low	Subgrade 3b and Grade 4, moderate to poor quality agricultural land
Very Low	Grade 5, very poor quality agricultural land

10.62. The magnitude of change to agricultural land is assessed according to the criteria set out in **Table 10.6**. The thresholds for determining the magnitude of change have been derived taking into account the statutory consultation procedures with Natural England for development involving the loss of agricultural land. These require specific consultation with Natural England for non-agricultural development proposals that are not consistent with an adopted local plan and involve the loss of 20ha or more of BMV land.

Table 10.6: Defining Magnitude of Effect for Agricultural Land

Magnitude	Definition of Magnitude
High	The Proposed Development would directly lead to the loss of over 50ha of agricultural land
Medium	The Proposed Development would directly lead to the loss of between 20ha and 50ha of agricultural land
Low	The Proposed Development would directly lead to the loss of between 5ha and 20ha of agricultural land
Very Low	The Proposed Development would directly lead to the loss of less than 5ha of agricultural land

Soils

10.63. The impact on the soil resource is assessed according to the degree to which disturbed soil resources are re-used in a manner that enables the resource to fulfil one or more of the primary soil functions of:

- the production of food and biomass, and the provision of raw materials;
- the storage, filtration and cycling of water, carbon and nitrogen in the biosphere;
- the support of ecological habitats and biodiversity;

- support for the landscape;
- the protection of cultural heritage; and
- the provision of a platform for human activities, such as construction and recreation.

10.64. The sensitivity of the soil resource reflects its textural characteristics and its susceptibility to the effects of handling during construction and the re-instatement of land, as shown **Table 10.7**. The magnitude of change on soil resources takes into account the continued ability of a soil to fulfil its primary functions, as set out in **Table 10.8**. These definitions have been derived from good practice guidance on handling soils, particularly the Defra Construction Code of Practice for the Sustainable Use of Soils (Ref. 10.8).

Table 10.7: Defining Sensitivity of Soil Resources

Sensitivity	Definition
High	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams)
Moderate	Silty loams, medium silty clay loams, medium clay loams and sandy clay loams
Low	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams)

Table 10.8: Defining Magnitude of Effect for Soils

Magnitude	Definition of Magnitude
High	The soil displaced from the Proposed Development is unable to fulfil one or more of the primary soils functions
Medium	The soil displaced from the Proposed Development mostly fulfils the primary soil functions off-site or has a reduced capacity to fulfil the primary functions on site
Low	The soil displaced from the Proposed Development mostly fulfils the primary soil functions on-site
Very Low	The soil retains its existing functions on-site

Farm Holdings

10.65. The impacts on farm holdings relate primarily to the loss of land and other key farm infrastructure (dwellings, buildings and other structures such as irrigation reservoirs and slurry pits) and the fragmentation of land from the residually farmed area.

10.66. The sensitivity of farm holdings is determined by the extent to which they have the capacity to absorb or adapt to impacts, which will be determined primarily by their nature and scale, as set out in **Table 10.9**. In general terms, larger farm holdings will have a greater capacity to absorb impacts and will be less sensitive. Farm types where there is a degree of flexibility in the normal

course of operations, such as combinable arable enterprises and grazing livestock farms, will be less sensitive than those where the operation of the enterprise is dependent on the relationship with key infrastructure, such as dairying, field-scale horticulture and intensive livestock or horticultural production.

10.67. Guideline criteria for determining the magnitude of change caused by the loss of land and/or loss of infrastructure are presented in **Table 10.10**. The magnitude of change to farm holdings to be used in the final assessment of effects then accords with whichever of the impacts is greater. The criteria for assessing sensitivity and magnitude of change have been generated by the authors and applied to other major infrastructure projects.

Table 10.9: Defining Sensitivity of Farm Holdings

Sensitivity	Definition
High	Farms in which the operation of the enterprise is dependent on the spatial relationship of land to key infrastructure, and where there is a requirement for frequent and regular access between the two, or dependent on the existence of the infrastructure itself, e.g. dairying, irrigated arable cropping and field-scale horticulture, and intensive livestock or horticultural production
Moderate	Farms in which there is a degree of flexibility in the normal course of operations, e.g. combinable arable farms and grazing livestock farms (other than dairying)
Low	Off-lying areas of land that are not contiguous with the main farm holding
Very Low	Off-lying areas of agricultural land used for non-commercial purposes

Table 10.10: Defining Magnitude of Effect for Farm Holdings

Magnitude	Loss of land	Loss of farm infrastructure
High	Loss of 20% or more of all land farmed	Direct loss of farm dwelling, building or structure
Medium	10% or more and less than 20% of all land farmed	Loss of or damage to infrastructure affecting land use
Low	5% or more and less than 10% of all land farmed	Infrastructure loss/damage does not affect land use
Very Low	Less than 5% of all land farmed	No impact on farm infrastructure

Duration of Effect

10.68. The anticipated duration of the effects of the Proposed Development on each receptor assessed will be described as:

- short-term (0 to 5 years);
- medium-term (5 to 10 years); or

- long-term (over 10 years).

10.69. Most of the effects on agricultural land and farm holdings will take place at the start of the construction period but will be permanent. The effects on soil resources that are re-used for other purposes within the Proposed Development will be short- to medium-term as the soils will require time to settle; this settlement and stabilisation of the soil normally occurs within a period of around five years from re-instatement, although the structure of the re-instated soil will continue to develop over time.

Significance of effect

10.70. The significance of effect for each receptor is determined by combining the magnitude of the likely effect with the sensitivity of the receptor, as shown in **Table 10.11**.

Table 10.11: Matrix of Assessing Significance of Effect for Agricultural Receptors

Assessing Significance of Effects				
Magnitude of Effect	Sensitivity of Receptors			
	High	**Moderate**	**Low**	**Very Low**
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

10.71. Those effects that are 'moderate' or 'major' will be considered significant in EIA terms.

Embedded mitigation

10.72. Mitigation measures to minimise potentially significant adverse effects on soils relate to recording (within a Soil Resources Management Plan (SRMP)) the existing soil resources of the Main SRFI Site and the land at the J15a works, and setting out measures to ensure that they are handled, stored and replaced according to good practice as set out in the Defra Construction Code of Practice for the Sustainable Use of Soils. In this way, soils that are re-used on the Potential Development Area will be used for their most suitable purposes in the detailed design and will be able to continue to fulfil their various ecosystem functions.

10.73. The SRMP will be based upon the findings of the detailed soil surveys undertaken. The SRMP will confirm the most appropriate re-use for the different types of soils within the Main SRFI site and at J15a. It will aim to re-use as much of the displaced soil resources on-site as is possible in the detailed design of the Proposed Development which includes planted screening mounds, Landscape Zones and a Farmland Bird Mitigation Zone.

10.74. The SRMP will also make provisions for surplus soils displaced by the Proposed Development to be made available for a sustainable use off-site.

10.75. The SRMP will also aim to ensure that the quality of soils retained on-site and exported off-site (if this should become a future requirement) is maintained by following good practice guidance on soil handling and storage, particularly to avoid compaction and biodegradation of soils that are to be retained on site in storage.

10.76. The following assessment assumes that a SRMP forms part of the mitigation for the Proposed Development.

Assessment of Construction Phase Effects

10.77. The anticipated impacts comprise:

- the loss of BMV agricultural land in Grades 1, 2 and 3a;
- the potential damage to and loss of the soil resource; and
- the impacts on the farm holdings occupying the Main SRFI Site and the land affected by the J15a works, particularly in respect of the viability of farming the residual areas of land remaining to the farm holdings. No farmland is affected by the other highways works.

10.78. These impacts primarily occur in the construction phase of the Proposed Development.

10.79. This assessment is made on the basis that all of the agricultural land within the Main SRFI Site and that required for the permanent J15a works will be removed from agricultural production during the construction period, and will remain permanently unavailable to agricultural use thereafter. It is assumed however that the 24ha proposed for ecological mitigation at J15a will remain in or available for agricultural use. The western half will be designed as smaller arable fields separated by new hedgerows and field margins but intended to be used for arable cropping; the eastern half will be used for low intensity livestock grazing.

Agricultural land

10.80. The areas of each grade of agricultural land required within the Main SRFI Site are set out in **Table 10.12**, with the land permanently required for the J15a works in **Table 10.13**. No agricultural land is required for the other associated highways mitigation works. The cumulative areas required for the collective works are set out in **Table 10.14**.

Table 10.12: Area of Agricultural Land Required within the Main SRFI site

ALC Grade	Hectares	% of agricultural land
Grade 1	2	<1
Grade 2	28	11
Subgrade 3a	36	14
Subgrade 3b	200	75
Total agricultural land	266	100

Table 10.13: Area of Agricultural Land Permanently Required for the J15a works

ALC Grade	Hectares	% of agricultural land
Grade 1	-	-
Grade 2	1	13
Subgrade 3a	4	50
Subgrade 3b	3	37
Total agricultural land	8	100

Table 10.14 Cumulative area of Agricultural Land Required

ALC Grade	Hectares	% of agricultural land
Grade 1	2	<1
Grade 2	29	11
Subgrade 3a	40	15
Subgrade 3b	203	74
Total agricultural land	274	100

10.81. Approximately three-quarters of the agricultural land affected by the Proposed Development is classified as Subgrade 3b, which is not BMV land.

10.82. In terms of the identified sensitive receptor, most of the BMV agricultural land affected by the proposed works at the Main SRFI Site is in Grades 2 and 3a. From **Table 10.5**, land of Grades 2 and 3a is a receptor of **moderate** sensitivity. The magnitude of change to BMV land during the construction period is **high** at approximately 66ha (**Table 10.6**), such that the Main SRFI Site will have a direct, permanent **moderate adverse** effect on BMV agricultural land. This is 'significant'.

10.83. The sensitivity of the agricultural land at J15a is **moderate to low**. The magnitude of change to BMV land from the J15a works is **low** at approximately 5ha (**Table 10.6**), such that the J15a works will have a direct, permanent **minor adverse** effect on BMV agricultural land (which is not significant).

10.84. Collectively, the Proposed Development would involve the loss of 274ha of agricultural land, of which 71ha is of BMV quality. The sensitivity is **moderate** and the magnitude of change is assessed as **high**, cumulatively resulting in a direct, permanent, **moderate adverse** effect (which is significant).

10.85. If the Proposed Development were not to progress, the future baseline would not differ from the current conditions, assuming that the present agricultural land management practices also continued.

Soil Resources

10.86. As soil is a finite resource that fulfils many important functions and services for society in addition to the production of food and fibre, it is important that soil resources are protected and used sustainably. Carbon and water storage, and support for ecological habitats and biodiversity, are considered particularly important functions of the soils present within the Order Limits.

10.87. All of the displaced soil resource is proposed to be retained on-site with a proportion to be utilised in the structural landscape zones, predominantly around the periphery of the Proposed Development (the Main SRFI Site).

10.88. The principal direct effect of the Proposed Development at the Main SRFI Site on soil to be utilised within the landscaping scheme will be loss of the ecological functions if it were handled inappropriately (for example, handled or trafficked when wet; and by the mixing of topsoil and subsoil on stripping). The heavy clay loam and clay topsoils, and the heavy clay loam and clay subsoils are particularly vulnerable to damage by smearing and compaction. Biodegradation of topsoil could occur if it is compacted in storage or stockpiled when wet.

10.89. There is currently no provision for the exportation of surplus topsoil, which is anticipated to be generated. Precise volumes are at present unknown, though these will be stated within a SRMP.

10.90. The sensitivity of the soil resource is assessed overall as **high** due to the heavy clay loam and clay textures of the predominant soil type found within the Main SRFI Site. The embedded mitigation relating to soil resources, in particular the handling and restoration of soils, will enable the re-used resource to continue the various ecosystem functions on site within the soft landscaping, principally as a medium for producing biomass; for storing and cycling water and carbon; and for supporting habitats and biodiversity. As such, the permanent magnitude of impact on soils is assessed as **medium** as displaced soils will mostly fulfil the primary soil functions off-site or will have a reduced capacity to fulfil the primary functions on site. The permanent effect on the soil resource is assessed as **moderate adverse** (which is significant).

10.91. The soil resource at J15a also includes fine loamy and clayey textures which are of **high** to **moderate** sensitivity according to **Table 10.5.** If handled, stored and re-used appropriately for ecological mitigation, much of which will continue to be farmed, and in accordance with a SRMP, the magnitude of change is anticipated to be **very low**, resulting in a direct, temporary **negligible to minor adverse** effect (which is not significant).

10.92. The cumulative impact of the Proposed Development on soil resources across the Main SRFI Site and J15a is anticipated to be **moderate adverse** (which is significant).

10.93. Should the Proposed Development not progress, there is not anticipated to be any significant change to the undisturbed soil resource.

Farm holdings

10.94. The impacts on the farm holdings are summarised in **Table 10.15**.

Table 10.15: Summary of Impacts on Farm Holdings

Farm Holding	Sensitivity	Area required (ha)	% of farm holding	Other impacts	Scale of permanent effect
Arm Farm*	Moderate	56.0	High	Unknown	Moderate Adverse
Manor Farm	Moderate	32.4	100 (High)	None (Low)	Moderate Adverse
Hill Farm	Moderate	39.0	22 (High)	None (Low)	Moderate Adverse
Lodge Farm	Moderate	68.0	80 (High)	None (Low)	Moderate Adverse
Rathvilly Farm	Moderate to Low	6.3	100 (High)	None (Low)	Moderate Adverse
Corteenhall Estate*	Moderate	19	Unknown	Unknown	Moderate Adverse

*Holding details not available

10.95. The farm holdings are all assessed as being of **moderate** sensitivity as the land use predominantly comprises combinable arable crops or grazing for sheep and cattle. The sensitivity of Rathvilly Farm is moderate to low as the land is let for both grazing and hay. The Proposed Development would result in the loss of over 20% of the farmable area for all of the holdings affected. The magnitude of change for all holdings is therefore **high**. The Proposed Development would have a direct, permanent, **moderate adverse** effect on each of the affected farm holdings (which is significant).

10.96. Should the Proposed Development not proceed, it is anticipated that the farm holdings would continue to operate as present and that there would be no significant change to the baseline conditions.

Assessment of Operational Phase Effects

10.97. The potential effects to be considered during the operational phase of the development relate to the effects from the Proposed Development on the operations of neighbouring agricultural land.

10.98. Effects on neighbouring agricultural land throughout the Operational Phase of the Proposed Development may relate to such effects as increased local traffic hindering farm vehicle movements, or increased generation of dust which may settle across the neighbouring land. Such effects would be considered as long term, indirect, **minor to negligible adverse** effects (which is not significant).

Assessment of Decommissioning Phase Effects

10.99. It is not known when there will no longer be a need for the Proposed Development and many elements of the development are unlikely to be decommissioned at all. The design life of the warehousing buildings will be in the order of 60+ years (approximately), and the rail infrastructure and civil engineering works will be significantly longer than this. Once the warehouses reach their design life, it is entirely feasible that they will be re-provided in a modern form. Should that occur it would be subject to its own assessment of effects at the relevant time.

10.100. It is likely that there will be no effects on agricultural land or farm holdings resulting from the decommissioning and removal of the Proposed Development as the land will have been considered permanently removed from agricultural production during the construction phase.

10.101. The soil resource retained on site during the Construction Phase would remain to be predominantly of high sensitivity to any subsequent movements during the Decommissioning Phase. The speculative magnitude of change and overall effect on the soil resource is assumed to be similar to that of the Construction Phase.

Climate Change

10.102. As the Proposed Development will involve the loss of the agricultural resource within the Order Limits, the principal consideration will be the resilience of the soil resource remaining within the Potential Development Area to fulfil its various ecosystem functions, such as the storage of water and carbon, and acting as a medium for plant growth.

10.103. The specific impacts of climate change on soil resources are difficult to predict but may include such effects as increased susceptibility to wind erosion through drier periods, and increased susceptibility to waterlogging and development of anaerobic conditions throughout wetter periods, which will subsequently impact on biological and chemical attributes of the soil.

10.104. Soil resources which are disturbed and displaced by the Proposed Development will have lower resilience to these potential impacts of climate change than the undisturbed soil resource would have. This is due to such factors as the structural integrity of soil potentially being lost or reduced during handling, and disturbance of the micro- and macro-biology should soils stored within bunds develop anaerobic conditions.

Assessment of Cumulative Effects

Cumulative Assessment: Intra-Project Effects

10.105. There are no significant cumulative effects arising from the intra-relationship of effects reported in this chapter, particularly on soils and farm holdings, with those reported in other topic areas in this PEIR.

Cumulative Assessment: Inter-Project Effects

10.106. An assessment of the likely significant inter-project cumulative effects on agricultural land quality has been undertaken of the long-list of projects (**Appendix 7.1**) that have been identified as potentially giving rise to significant cumulative effects. The effects on soils are specific to each site as soil textures and other soil characteristics will vary locally, and do not occur cumulatively. The indirect cumulative effects on farm holdings resulting from these proposed sites are also unknown.

10.107. Of the 86 potential projects, 25 have the potential to lead to the cumulative loss of BMV agricultural land in the locality. The remaining 61 projects do not involve the loss of a substantive area of agricultural land (e.g. they are permissions for individual dwellings) or are too distant from the Main SRFI Site (Daventry International Rail Freight Terminal (DIRFT) is 23km; the East Midlands Gateway SRFI is 75km; the East Midlands Intermodal Park is 86km and the A38 Derby Junction is 89 km from the Main SRFI Site).

10.108. Available information on the larger sites within the assessment is as follows:

- The Northamptonshire Gateway site (Cl 2) occupies approximately 241ha of agricultural land to the immediate east of Rail Central and includes proposals for a bypass. Detailed survey data collected in 2017 shows the main site to comprise approximately 12ha of Grade 2, 19ha of Subgrade 3a and 141ha of Subgrade 3b land. There will be cumulative effects on Lodge Farm from this development. The route of the proposed Roade Bypass includes around 2ha of Subgrade 3a and 21ha of Subgrade 3b;

- Northampton South SUE (Cl 4) is predominantly of Subgrade 3b with 13ha of BMV land in Grades 2 and 3a;

- Towcester South SUE (Cl 6) includes 92ha of Subgrade 3b and 76ha of Subgrade 3a;

- Northampton Upton Park SUE (Cl 9) includes a narrow strip of Subgrade 3b quality land. The majority of this site has not been assessed;

- Northampton Norwood Farm/Upton Lodge SUE (Cl 10) is a mix of Subgrade 3a (28ha) and Subgrade 3b (72ha);

- The A45 Daventry Development Link Road (Cl 79) includes 52ha of Grades 2 and 3a and 57 ha of Grades 3b and 4.

10.106. Collectively, these sites extend to over 800 hectares of agricultural land. The magnitude of effect is **high**, on land of **moderate** to **low** sensitivity. The cumulative impact of these additional proposed sites on BMV agricultural land, taking into consideration the Proposed Development, remains to be a **moderate adverse** effect (which is significant).

Mitigation

10.107. It is not possible to mitigate the direct loss of agricultural land in the same location and to the same extent.

10.108. The mitigation measures applicable to the soil resource are contained within the embedded mitigation, in particular with respect to the development of a SRMP. The soil resources survey undertaken identifies three main soil types, for which broad recommendations for planting suitability are made. The survey report also sets out likely issues that may arise through handling soil in inappropriate conditions, for example when soils are plastic and wet, and goes on to advise on appropriate handling practices in a general context.

10.109. Mitigation measures for agricultural land, soil resources and farm holdings are set out in **Table 10.16**.

Table 10.16: Proposed Mitigation Measures

Potential Effect	Proposed Mitigation	Means of Implementation	Method for securing mitigation and DCO reference (where applicable)
Loss of agricultural land	None available	None	N/A
Loss of or damage to soil resources	Implementation of a SRMP, including best practice guidance on soil handling and storage	Embedded mitigation	To be confirmed
Loss of farmable area and/or farm infrastructure	No universally applicable mitigation	Private negotiation	N/A

Residual Effects

10.110. As no measures are available for the mitigation of the permanent loss of agricultural land, the effect remains as **moderate adverse**, which is significant.

10.111. As the mitigation for the protection of soil resources is embedded within the Proposed Development, the residual effect remains as **moderate adverse**, which is significant.

10.112. Mitigation of the effects on individual farm holdings are matters of private negotiation and therefore cannot accurately be defined in the scope of this assessment. The residual effects of the Proposed Development on the three key receptors are given in **Table 10.18**.

Table 10.18 Summary of Residual Effects

Description of impact	Significance of effect	Possible mitigation measures	Residual effect
Loss of agricultural land	Moderate adverse	None	Moderate adverse

Loss of or damage to soil resources	Moderate adverse	No additional mitigation	Moderate adverse
Loss of farmable area and/or farm infrastructure	Moderate adverse	Private financial negotiations	Moderate adverse

Monitoring

10.109. Restored soils will require on-going, post-construction monitoring to ensure that they have been restored to a high standard and are able to fulfil their anticipated ecosystem functions. Such monitoring should entail annual site visits during which soil profiles are observed and the physical characteristics assessed. Monitoring the development of soil structures, establishment of drainage channels and identifying compaction issues will enable the determination of any necessary remedial works.

Limitations and Assumptions

10.110. Access has been made available to all of the previously un-surveyed Main SRFI Site and some of the agricultural land required for the J15a works for the soil and ALC survey, where the density of sampling has met Natural England's requirements. Some land at J15a has not been surveyed in detail but there is a high level of confidence from mapped information and site observation that the soils and agricultural land quality is similar in this area to elsewhere on the Main SRFI Site and on land surrounding J15a. In any event, this land is proposed for ecological mitigation and will remain available for agricultural use.

10.111. The assessment of impacts on farm holdings has been made from information gathered directly from four of the holdings affected. The data received from the farmers and landowners has not been verified by any other means. Where the data was not made available, the effects of the Proposed Development have been informed by publicly-available sources of information.

References

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Ref 10.3 Department of Communities and Local Government (2012). *National Planning Policy Framework*

Ref 10.4 Department for Communities and Local Government. *Planning Practice Guidance*

Ref 10.5 West Northamptonshire Joint Strategic Planning Committee, 2014, '*West Northamptonshire Joint Core Strategy Local Plan (Part 1)*'

Ref 10.6 Department for Environment, Food and Rural Affairs (2009). S*oil Strategy for England – Safeguarding Our Soils.*

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