

14. Soils and Agricultural Land

14.1. Introduction

- 14.1.1. This chapter assesses the effects of the Proposed Development on soils and agricultural land. In particular it identifies and assesses the likely significant effects resulting from the Proposed Development on soil resources and loss of Best and Most Versatile (BMV) agricultural land.
- 14.1.2. The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the Site and surroundings, the potential direct, indirect and cumulative effects of the Proposed Development, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects.
- 14.1.3. This chapter has been prepared by Land Research Associates Limited.

14.2. Assessment Approach

Methodology

- 14.2.1. The approach used in this ES Chapter to identify likely significant environmental effects on agriculture and soil resources has been developed over a number of years utilising available guidance including Natural England consultation thresholds (TINO49)¹ and IEMA guidance along with professional judgement.
- 14.2.2. The study area relevant to this assessment comprises all of the agricultural land within the Site, extending to 18.96 ha (the mapping shown at **Figure 14.1 'Agricultural Land Classification'** is rounded to the nearest decimal place).

Baseline Data

- 14.2.3. The collection of soil resources and agricultural land quality information for the site involved a desk study. Data sources used in the desk study include the following:
- British Geological Survey (BGS) mapping (at 1:50,000 scale);
 - National Soil Mapping (at 1:250,000 scale);
 - Natural England available Agricultural Land Quality mapping; and
 - Meteorological Office climatological data.
- 14.2.4. The desk study showed that the entire Application Site has been surveyed by the former Ministry of Agriculture, Fisheries and Food (MAFF) to current (post-1988)².

¹ Natural England (2009) Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land [online] available at: <https://publications.naturalengland.org.uk/publication/35012> [last accessed 7th March 2025].

² ADAS Statutory Resource Planning Team (1994), Agricultural Land Classification detailed Post 1988 ALC survey, Stapleford, Toton Sidings (ALCC10194) [online] available at: [Agricultural Land Classification detailed Post 1988 ALC survey, Stapleford, Toton Sidings – ALCC10194](#) [last accessed 5th March 2025].

Soils and Agricultural Land

Receptor Sensitivity

- 14.2.5. All natural soils are finite resources, but where sites are to be developed, their quality as a resource for reuse varies. Medium and coarse loamy soils are regarded to be of higher value for reuse and so of the highest sensitivity. These soils are most effective at managing surface water run-off (i.e. mitigating flood risk) and are of highest quality for reuse in planting schemes (i.e. the most likely to meet British Standards for topsoil (BS 3882:2015) and subsoil (8601:2013) criteria for use at other sites). Lower quality soils such as sandy or clayey topsoils are susceptible to damage and less valuable if lost.
- 14.2.6. Permeable coarse or medium textured subsoils are reusable for planting schemes (e.g. to support tree growth) and have a greater function in mitigating the effects of flooding than heavy and slowly permeable subsoils. In some instances, soils have important properties which make them able to support rare habitats (e.g. species diverse calcareous grassland or lowland heath habitats).
- 14.2.7. Grade 1 and 2 agricultural land is the highest quality land producing a wide range of crops of high yields. It is not common and considered high sensitivity. Subgrade 3a land is relatively common resource in the Nottinghamshire region and is therefore considered of medium sensitivity. The loss of lower quality land (Subgrade 3b, Grade 4 and 5) is considered of lower importance under the planning system of England and Wales.
- 14.2.8. The sensitivity criteria used in assessing the effects upon the two receptors are summarised in **Table 14.1**.

Table 14.1: Sensitivity criteria

Receptor	Sensitivity		
	High	Medium	Low
Agricultural Land Quality	Grades 1 & 2	Subgrade 3a	Subgrade 3b, grades 4 and 5
Soil Resource	Permeable coarse loamy and medium loamy soils, or other soils capable of supporting valuable habitats	Fine textured or sandy topsoils not capable of supporting valuable habitats Mixed permeable and slowly permeable subsoils	Damaged or contaminated soils Slowly permeable subsoils

Magnitude of Impact

- 14.2.9. The magnitude of impact on soil resource considers both the impact on topsoil and subsoils. In terms of topsoil, the assessment of magnitude assumes that, as a valuable finite resource, the requirement is to protect from damage so the resource is not lost. However, since built developments often generate large surpluses of topsoil, the primary requirement is considered to be that sufficient topsoil should be protected to complete all on-site

landscaping/greenspace requirements (provided the baseline resource is suitable for the proposed use). Failure to do so is regarded as a major adverse impact due to the loss of topsoil from the site from which the scheme in question is being assessed. If all topsoil is protected from damage and integrated into the scheme being assessed, the effect is regarded as negligible. If more than 50% of topsoil is identified for reuse, losses below this figure are regarded as minor adverse. Losses between 50 and 80% of the site in question are considered moderate adverse as useable resource is available but adaptations will be required to complete landscaping. In terms of subsoils, it is acknowledged that subsoil compaction under greenspace areas can increase surface water flood risk (and is not typically accounted for in Sustainable Drainage System (SuDS) design). Severe compaction is also likely to adversely affect the success of landscaping schemes. Therefore, magnitude is considered as a percentage of the area of the site in question to be developed. For example, compaction of greater than 10% of the site in question is considered as major adverse as it is likely to result in tangible increases in runoff volumes (which could in turn affect the efficacy of SuDS design capacity).

14.2.10. The magnitude of effect on BMV land will depend on the amount lost as a result of a development project. Schedule 4, paragraph (y) of *The Town and Country Planning (Development Management Procedure) (England) Order 2015* only requires Natural England to be consulted (on behalf of the Secretary of State for the Environment, Food and Rural Affairs) on development that is not in accordance with the development plan and that involves the loss of greater than 20 ha of Grades 1, 2 or 3a agricultural land. Consequently, the magnitude of losses smaller than this threshold is considered to have a minor effect on the national stock of BMV land. Losses of over 80 ha of BMV land are equivalent to the size of a medium to large farm and consequently the magnitude of effect is considered to be major adverse.

14.2.11. Therefore, the judgement-based classification that is used in this ES Chapter is set out in **Table 14.2 below**:

Table 14.2: Judgement-based criteria.

Receptor	Magnitude			
	Major	Moderate	Minor	Negligible
Agricultural Land Quality	Irreversible loss of >80 ha of BMV land.	Irreversible loss of >20 and <80ha of BMV land.	Irreversible loss of >5 and <20 ha of BMV land.	Irreversible loss of <5 ha of BMV land Loss of non-BMV land.
Soil Resource	Loss of >80% of topsoil resources and insufficient topsoil protected for on-site uses. OR*	Loss or irreversible damage to >50–<80% of topsoil resources. OR	Loss or irreversible damage to <50% of topsoil resources. OR Compaction of <5% of subsoils	Only minor disturbance of soils within the site.

Soils and Agricultural Land

Receptor	Magnitude			
	Major	Moderate	Minor	Negligible
	Subsoil compaction of >10% of site	Compaction of 5–10% of subsoils.		

Assessment of Significance

14.2.12. The significance of an effect from a development project can be:

- Adverse, causing significant negative effects on a receptor;
- Beneficial, resulting in advantageous or positive effects on a receptor; or
- Negligible, having no effect on a receptor.

14.2.13. Effects that are deemed to be significant for the purposes of this assessment are those that are described as being major or moderate adverse which has been measured by Natural England (consultation thresholds of loss greater than 20 ha) and available guidance. The significance criteria applied in the assessment is set out in **Table 14.3** below which combines the assessment of magnitude and sensitivity.

Table 14.3: Significance Criteria

Magnitude	Sensitivity			
	High	Medium	Low	Negligible
Major	Major	Major	Moderate	Minor
Moderate	Major	Moderate	Minor	Negligible
Minor	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Legislative and Policy Framework

National Planning Policy

- 14.2.14. The National Planning Policy Framework (NPPF, 2024) sets out the Government's planning policies for England and how these are expected to be applied. Of relevance to this assessment, Paragraph 187 states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land..."

Paragraph 188 states:

"Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries".

Footnote 65 states that:

"Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality."

The Local Plan

- 14.2.15. There are no relevant policies in the Broxtowe Borough Council relating to soil resources or agricultural land quality.

Limitations to the Assessment

- 14.2.16. There are no limitations to this assessment.

14.3. Baseline Conditions

Site Description and Context

- 14.3.1. The study area comprises 18.9 ha of arable land lying to the east of a railway line and to the north-west of Toton.
- 14.3.2. Agricultural land quality has been identified as a sensitive receptor as losses of high quality productive agricultural land has the potential to have significant effects on food production capacity.

Soils and Agricultural Land

- 14.3.3. Soil as a resource has been identified as separate sensitive receptor due the natural capital of soils (i.e. as physical material which may support green infrastructure or the capacity to absorb rainfall and mitigate flooding) that is separate from the capability of land to grow crops

Baseline Survey Information

- 14.3.4. The desk study found the Site to comprise a mixture of permeable and slowly permeable soils. These soils give land of BMV agricultural quality Grade 2, Subgrade 3a and lower quality Subgrade 3b land. The agricultural quality of the land is primarily limited by wetness. A small part of the Site comprises non-agricultural land formed of woodland and concrete pad. The distribution of land grades is shown on the map **Figure 14.1 'MAFF Post 1988 Agricultural Land Classification'** and the respective areas are shown in **Table 14.4** below.

Table 14.4: Areas occupied by the different land grades comprising the study area

Grade/subgrade	Approximate Area (ha)	Approximate Area (%)
Grade 2	0.8	4
Subgrade 3a	0.9	5
Subgrade 3b	16.8	89
Non agricultural	0.4	2
Total	18.9	100

14.4. Assessment of Likely Significant Effects

Construction

Soil resources

- 14.4.1. The Proposed Development could potentially result in the loss of all topsoils within the development platform areas during stripping and stockpiling if not carefully managed, meaning insufficient resources are available to assist with the landscaping strategy. These would be permanent effects.
- 14.4.2. The proportion of built form comprising the Proposed Development takes approximately 70% of the area of the Site, the remaining 30% is set for green infrastructure including public open space, and SuDS. There is a risk that the subsoils within the infrastructure areas become compacted through handling and construction plant traversing the Site. Such compaction could adversely affect drainage (beyond that mitigated by the drainage strategy forming part of the Proposed Development, **see Appendix 12.1**). It would also restrict rooting depth and affect the success of proposed planting schemes within these areas of the Site. There is the potential for all topsoils to be damaged
- 14.4.3. The soil resources within the Site are mixed permeable and slowly permeable soils and are therefore considered to be of medium sensitivity. The potential loss of all topsoil resources within the areas to be developed (70% of the site) and compaction of 10% of subsoils within areas retained as greenspace is assessed as comprising a major magnitude. The significance of the effect is therefore assessed as **major adverse** prior to mitigation and therefore significant.

Agricultural Land Quality

- 14.4.4. The Site is likely to comprise a mixture of BMV quality land, and poorer quality land which would be affected by the Proposed Development. In accordance with the criteria set out in **Tables 14.1 – 14.3**, the effects can be described as follows:
- A negligible magnitude loss of 0.8 ha of high sensitivity Grade 2 BMV agricultural quality land that equates to a **minor adverse** impact
 - A negligible magnitude loss of 0.9 ha of medium sensitivity Subgrade 3a BMV agricultural quality land that equates to a **negligible** impact (not significant)
 - A minor magnitude loss of 16.8 ha of negligible sensitivity Subgrade 3b non-BMV agricultural quality land that equates to a **negligible** impact (not significant).

Operation

Soil resources

- 14.4.5. The effect of soil compaction caused during the construction phase is likely to persist during the operational phase of the Proposed Development; although over time some recovery of soil function could occur in proposed landscaped. Damage or loss of soil resources during this phase may therefore persist post completion. The significance of the effect is therefore assessed as **major adverse** prior to mitigation and therefore significant in EIA terms.

Agricultural Land Quality

Soils and Agricultural Land

14.4.6. The loss of agricultural land is a permanent effect and remains as set out above .

14.5. Mitigation, Enhancement and Residual Effects

Mitigation

Soil resources

14.5.1. Mitigation for potential loss or damage to soil resources is available in the form of a Site-specific Soil Management Plan (SMP) that can form part of a wider Construction Environmental Management Plan (CEMP) in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Defra 2009. The CEMP / SMP should be prepared in the enabling stages and used throughout construction phase. The SMP should include:

- Depth and method of topsoil stripping and stockpiling;
- Identification of landscaping topsoil requirements and assessment of suitability and availability of on-site resources;
- Means of subsoil protection from compaction damage (specific pathways and restricted areas for construction traffic) and remedial measures (such as ripping/subsoiling) to remove damage.

14.5.2. Adherence to the site-specific SMP will seek to protect soil resources and ensure they can perform their ecosystem services and remain suitable for landscaping. The topsoils may also be sustainably re-used for landscaping and habitat creation on the northern-site parcel if required and pending suitability. Following the implementation of mitigation, the residual effect is assessed as **negligible** and therefore not significant in EIA terms.

Agricultural Land Quality

14.5.3. There is no mitigation possible for the permanent loss of BMV land.

Table 14.5: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	CEMP / SMP			X

Residual Effects

Soil resources

14.5.4. Soil functions could be severely compromised over developed parts of the Site through sealing by roads and buildings. However, if a SMP is implemented and a re-use strategy for the stripped topsoil resources is applied, this will result in protection of all topsoil resources on the Site and maintenance of non-sealed subsoil function. The effects after the implementation of a CEMP / SMP (secured via condition) are therefore assessed as **negligible** and therefore not significant in EIA terms.

Agricultural Land Quality

- 14.5.5. The **negligible** magnitude loss of 0.8 ha of high sensitivity Grade 2 and **negligible** magnitude loss of 0.9 ha of medium sensitivity Subgrade 3a BMV agricultural land is permanent and remains minor adverse overall. The loss of BMV land is therefore not significant in EIA terms. The loss of the remainder of the land comprising the Site is also considered to be **minor adverse** as set out above.

14.6. Cumulative and In-Combination Effects

- 14.6.1. Soil and agricultural land loss from an individual site should be considered on a site-by-site basis (against the benefits of the scheme being assessed) and therefore it is not considered there are any relevant cumulative effects to the Proposed Development.

14.7. Summary**Introduction**

- 14.7.1. This Chapter assesses the potential impacts of the Proposed Development to two sensitive receptors: soil resources and BMV agricultural land.

Baseline Conditions

- 14.7.2. The Site is made up of a mixture of permeable loams and slowly permeable soils. They give BMV land of Grade 2 (0.8 ha), Subgrade 3a (0.9 ha) and Subgrade 3b (16.8 ha) quality. The remainder of the Site comprises non-agricultural land.

Likely Significant Effects

- 14.7.3. The Proposed Development has the potential to cause the loss of all topsoil within the development area and compaction of the subsoil within landscaping areas of the Site – a potential **major adverse** impact prior to the implementation of mitigation measures.
- 14.7.4. The Proposed Development is estimated to result in the negligible magnitude loss of BMV Grade 2 (0.8 ha) and Subgrade 3a (0.9 ha) agricultural land – overall a permanent **minor adverse** impact that is not significant.

Mitigation and Enhancement

- 14.7.5. The soil resources can be protected through adherence to a Site-specific Soil Management Plan (SMP) that can form part of a wider CEMP (secured via planning condition). This will reduce the potential effect of the Proposed Development to **negligible**. There is no possible mitigation for the permanent loss of agricultural land, however given the limited amount that will be lost is considered **minor adverse**.

Conclusion

- 14.7.6. The Proposed Development will have a **negligible** effect to soil resources and a **minor adverse** effect to agricultural land quality. There are no significant effects of the Proposed Development.

Soils and Agricultural Land

14.7.7. **Table 14.6** provides a summary of effects, mitigation and residual effects.

Table 14.6: Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Soil resources	Damage through soil handling	Temporary/ Permanent	Medium	Major	United Kingdom	Major Adverse (Significant)	Implement SMP	Negligible (not significant)
BMV agricultural land	Loss through development	Permanent	High and medium	Negligible	United Kingdom	Minor adverse	None	Minor adverse (not significant)
Operation								
Soil resources	Damage through soil handling	Temporary/ Permanent	Medium	Major	United Kingdom	Major Adverse (Significant)	Implement SMP	Negligible (not significant)
BMV agricultural land	Loss through development	Permanent	High Medium	Negligible	United Kingdom	Minor adverse	None	Minor adverse (not significant)
Cumulative and In-Combination								
N/A	-	-	-	-	-	-	-	-