16 SOILS AND AGRICULTURE

16.1 Introduction

16.1.1 This chapter reports the likely significant effects of the proposed development in terms of soil and agricultural land in the context of the site and surrounding area. It considers the likely significant effects due to soil damage or loss, and the loss or change in the agricultural potential of the land. The proposed development involves the construction of a factory building, assembly and warehouse building, office building, ancillary MEP plant rooms, gatehouse, car parking provision, bicycle and motorcycle shelter, high voltage (HV) substation, landscaping and drainage. This chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment and reference should be made to Chapter 1 to 5 of this Environmental Statement (ES), as well as Chapter 20: Summary of Effects and Chapter 19 Cumulative Effects.

16.2 Legislation, Policy and Guidance

16.2.1 The relevant legislation, policy and guidance are listed below.

Legislative Framework

16.2.2 The relevant legislative framework is summarised as follows:

- The Town and Country Planning (Development Management Procedure) (England) Order 2015.
- The Town and Country Planning (Environmental Impact Assessment (EIA) Regulations 2017.

Planning Policy

16.2.3 The applicable planning policy is summarised as follows:

National Planning Policy

16.2.4 Under Section 15 of the NPPF 2023[1]: Conserving and enhancing the natural environment, paragraph 180 states that *'planning policies and decisions should contribute to and enhance the natural and local environment by:*

[1] Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework (NPPF). Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2. Accessed December 2023.

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, and of trees and woodland;

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate".

16.2.5 The footnote to Paragraph 181 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".

16.2.6 The Planning Practice Guidance (PPG), which accompanies the NPPF, is split into a number of guidance notes. Guidance on soils and agricultural land is found in the Planning Practice Guidance for the Natural Environment 2019 (PPGNE)[2] under the heading Agricultural Land, Soil and Brownfield Land of Environmental Value. This advises that the agricultural land classification (ALC) be used to assess the quality of farmland to enable informed choices to be made about its future use within the planning system; and explains that the ALC places agricultural land into five grades with Grade 3 subdivided into 3a and 3b. The best and most versatile (BMV) land is defined as Grades 1, 2 and 3a. The PPGNE states that "*planning policies and decisions should take account of the economic and other benefits of the best and most versatile agricultural land*". Therefore, knowledge of the ALC grading of the site is necessary to be able to determine whether the requirements of planning policy are being met.

[2] Planning Practice Guidance for the Natural Environment 2019 (PPGNE) Available at: https://www.gov.uk/guidance/natural-environment. Accessed September 2023.

16.2.7 The PPGNE[2] also recognises soil as an essential natural capital asset that provides important ecosystem services (e.g. as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution). It also recommends Defra's Code of Practice for the Sustainable Use of Soils on Construction Sites[3] as a useful tool when setting planning conditions for development sites as it provides advice on the use and protection of soil in construction projects, including the movement and management of soil resources.

16.2.8 Under the Town and Country Planning (Development Management Procedure) (England) Order 2015 (DMPO), Natural England is a statutory consultee on development that would lead to the loss of over 20ha of BMV agricultural land (i.e. land graded as 1, 2 and 3a in the ALC system), where this is not in accordance with an approved plan.

Local Planning Policy

16.2.9 The Sunderland City Council's Core Strategy and Development Plan (2015 -2033)[4] was adopted in January 2020 and reflects the NPPF in Policy NE12 (Agricultural Land), which states that "…*development which would result in the loss of best and most versatile agricultural land should be considered in the context of the agricultural land's contribution in terms of economic and other benefits*".

16.2.10 Soils are considered under the term 'geodiversity' as stated in Paragraph 10.8. Policy NE2 (Biodiversity and Geodiversity) states that "…*where appropriate development must demonstrate how it will avoid (through locating on an alternative site with less harmful impact) or minimise adverse impacts on biodiversity and geodiversity in accordance with the mitigation hierarchy*".

Guidance

16.2.11 The applicable guidance is summarised as follows:

- DEFRA (2009). Code of Practice for the Sustainable Use of Soils on Construction Sites[3].
- Ministry of Housing, Communities and Local Government (2019). Planning Practice Guidance: Natural Environment[2].

[3] Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf. Accessed September 2023.

[4] Sunderland City Council (2020) Core Strategy and Development Plan (2015-2033). Available at: https://www.sunderland.gov.uk/media/22171/Core-Strategy-and-Development-Plan-2015-2033/pdf/CSDP_2015-2033.pdf?m=637159725864470000. Accessed September 2023.

- Natural England (2012). Technical Information Note 049 (TIN049) Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land[5].
- Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings[6].
- HM Government (2011). The Natural Choice: securing the value of nature[7]; and
- Institute of Environmental Management and Assessment (2022). A New Perspective on Land and Soil in Environmental Impact Assessment[8].

16.2.12 The Institute of Environmental Management and Assessment (IEMA) issued their new guidance document 'A New Perspective on Land and Soil in Environmental Impact Assessment' on 17 February 2022. This document comprises the first published guidance on the consideration of soils and land in EIA but does not include a methodology for how such an assessment should be undertaken. The guidance aims to advocate *"…a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils"*.

16.2.13 The assessment methodology presented below contains a hybrid approach to the assessment, including the IEMA guidance where appropriate. Combining both, the assessment is able to distinguish between temporary and permanent impacts of the development on soil functions and agricultural land loss. Consequently, stated measures to prevent soil loss and damage due to the proposed development also mitigate against impacts to soil function and ecosystem services and preserve natural capital.

16.3 Assessment Methodology and Significance Criteria

16.3.1 The baseline information for soils and agricultural land was obtained through detailed desk study, a detailed post 1988 ALC report and a soil verification survey that was conducted by Wardell Armstrong in July 2023 by an experienced and competent soil surveyor. The survey results are provided in Appendix 16.1. A total of 14 points were surveyed, with 12 auger cores taken using a 70 mm diameter hand-held Edelman

[5] Natural England, (2009). Technical Information Note 049 (TIN049): Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land. Available at: https://www.iow.gov.uk/azservices/documents/2782-FE14-Natural-England-TIN049-Agricultural-Land-Classification.pdf Accessed September 2023.

[6] Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings. Available at: https://www.quarrying.org/soils-guidance Accessed September 2023.

[7] HM Government (2011). The Natural Choice: securing the value of nature. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228842/8082.pdf.

[8] Institute of Environmental Management & Assessment (IEMA) (2022). A New Perspective on Land and Soil in Environmental Impact Assessment. Available to access through: https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils.

auger capable of sampling to a maximum depth of 120 cm. This was supported by the assessment of two strategically placed soil profile pits that were excavated using a spade to a maximum depth of 80 cm, which is sufficient to evaluate the full soil profile (given the nature of the soil present on the site).

16.3.2 The purpose of the survey was to verify the detailed ALC survey conducted in 1996, provide details of soil profile characteristics and to inform the ALC assessment. In addition to the survey, baseline information was also sourced from the following:

- MAFF (1993). 1:250,000 Provisional Agricultural Land Classification, Defra (2017)[9].
- Likelihood of Best and Most Versatile Agricultural Land - Strategic scale map, North East (ALC013) [10].
- Met Office (1989) Climatological Data for Agricultural Land Classification: Grid point datasets of climatic variables at 5km intervals for England and Wales[11].
- Soil Survey of England and Wales (1984) Soils and their Use in Northern England with accompanying 1:250,000 map, Sheet 1[12].
- Google Earth[13].
- Knox et al (2015) 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report'[14].
- ADAS (1996) Agricultural Land Classification Report City of Sunderland Unitary Development Plan (UDP) (Land North of A1290).

Scope of the Assessment

16.3.3 The proposed development will occupy agricultural land and may result in a change in its agricultural potential. Construction works will have a direct and potentially permanent impact on the agricultural potential of the land although it is currently managed to prioritise nature conservation as it is part of the ELMA..

[9] MAFF (1993). 1:250,000 Provisional Agricultural Land Classification. Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc.
[10] Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map North East region (ALC013). Available at: https://publications.naturalengland.org.uk/category/5208993007403008.
[11] Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales. Available at https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification.
[12] Soil Survey of England and Wales (1984). Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1.
[13] Google Earth (©2022). Available at: https://earth.google.com/web/.
[14] Knox et al. (2015) 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report.' Available at https://www.theccc.org.uk/wp-content/uploads/2015/06/Cranfield-University-for-the-ASC.pdf.

16.3.4 The potential impact as a result of activities associated with the construction of the proposed development upon the agricultural land and soil resources present has, therefore, been considered. This has been done via an assessment of the quantity and quality of the agricultural land that may be affected, as well as the sensitivity of the soil receptor (i.e. resistance and resilience of the soil environment in terms of susceptibility to erosion and / or presence of organic soils / peat and the degree of loss of soil resource) that may be affected.

Effects Not Considered within the Scope

16.3.5 As the proposed development will result in a complete or altered change in land use for all the agricultural land following construction, there is no potential for further loss of agricultural land during operation.

Extent of the Study Area

16.3.6 The study area for the agricultural land quality and soil survey comprised the majority of the site boundary and a total of 42.39 hectares (ha) was surveyed to support this ES chapter. This is illustrated in the 2023 ALC Report within Appendix 16.1 of this ES.

Assessment Methodology

16.3.7 The method of baseline data collection and assessment is in accordance with current guidance and industry best practice.

Significance Criteria

16.3.8 Effects that are deemed to be 'Significant' in EIA terms for purpose of this assessment are those that are described as being Moderate or Major impacts. Effects that are determined to be Minor or Negligible impacts are considered to be 'Not Significant'.

16.3.9 To provide context and inform the assessment, ALC is considered for the wider area surrounding the site; based on the geographic extent of the administrative boundary of Sunderland City Council (SCC) and DEFRA's Provisional 1:250,000 scale ALC Mapping. Whilst the scale of the provisional mapping is not accurate at the field level (i.e. it does not pick up variations in ALC grade for areas <80 ha) and it does not account for Subgrades of 3a and 3b, it does provide an indication of the predominant ALC grading in the wider area. Where necessary, a breakdown of Grade 3 land has assumed a conservative 50:50 split of 3a (BMV) and 3b (non-BMV).

16.3.10 The assessment methodology draws upon the 2022 IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment' to assess the

potential impacts on soils and agricultural land. This is the first published guidance on the consideration of soils and land in EIA process, however it does not include a methodology for how such an assessment should be undertaken. The aim of the guidance is to encourage "*…a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils*".

16.3.11 The assessment methodology presented below reflects the most up to date industry guidance on assessing the impacts on land and soils in EIAs, which also encompasses all the ecosystem services that soils provide. The receptors identified for the proposed development in this ES chapter are:

- land; and
- soil resources.

16.3.12 The construction of the proposed development would result in the loss of agricultural land within the site due to built development that would permanently change agricultural / nature conservation land to non-agricultural use. There is also the potential for damage and loss of soil resource within the site as a result of unsuitable handling, storage and management practices during construction. Therefore, the potential impact upon the land surface and soil resource as a result of the activities associated with the construction of the proposed development has been considered.

16.3.13 The next section details the sensitivity criteria and factors for magnitude of change for each of the two receptors, which are presented and discussed separately (1. Land; 2. Soil Resource). The matrix for the assessment of effects is provided in Table 16.6 and this was used to establish the significance of the potential effect(s) for all identified receptors.

Land

16.3.14 Table 2 of the IEMA guidance covers a wide range of soil functions and most cannot be appropriately placed into discrete categories for the assessment process. Therefore, assigning sensitivity involves consideration of all the available information and an element of professional judgement.

16.3.15 The land uses within the site are currently agriculture/ nature conservation and all of soils under consideration are mineral. Based on the IEMA system the sensitivity of soils will be based on the land's ability to provide food and fuel. This has been assessed using the ALC system, with higher grades assigned higher sensitivities. The receptor sensitivity criteria for 'Land' are outlined in Table 16.1, below.

Table 16.1: Receptor Sensitivity (Land)		
Receptor	**Sensitivity**	**Justification**
Soils supporting agricultural land quality of Grade 1 and 2	**Very high**	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown (commonly including top fruit, soft fruit, salad crops and Winter harvested vegetables). Yields are high and less variable than on land of lower quality. Land with minor limitations that affect crop yield, cultivations or harvesting. Grade 2 may comprise soils that show difficulties with the production of more demanding crops (e.g., Winter harvested vegetables and arable root crops). The level of yield is generally high, but may be lower or more variable than Grade 1.
Soils supporting agricultural land quality of Subgrade 3a	**High**	Land capable of consistently producing moderate to high yields of a narrow range of arable crops (especially cereals) or moderate yields of a wide range of crops (including cereals, grass, oilseed rape, potatoes, sugar beet) and the less demanding horticultural crops.
Soils supporting agricultural land quality of Subgrade 3b	**Medium**	Land capable of producing moderate yields of a narrow range of crops (principally cereals and grass) or lower yields of a wider range of crops or high yields of grass that can be grazed or harvested over most of the year.
Soils supporting agricultural land quality of Grade 4 and 5	**Low**	Land with severe limitations that significantly restrict the range of crops and / or level of yields. Is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high, but there may be difficulties in utilisation.
Soils in non-agricultural or urban areas	**Negligible**	As per 'Low' sensitivity, but with indirect, tenuous and unproven links between sources of impact and soil functions (i.e., non-agricultural or urban). Built-up or 'hard' uses with relatively little potential for a return to agriculture.

16.3.16 The magnitude of change criteria for the receptor 'Land' is shown in Table 16.2, below, which has been adapted from Chapter 9: Table 3 of the IEMA guidance.

Table 16.2: Magnitude of Change (Land)	
Magnitude	**Justification**
High	Permanent, irreversible impact on one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Medium	Permanent, irreversible impact on one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Low	Permanent, irreversible impact on over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features.
Negligible	No discernible impact or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.
**Temporary developments can result in a permanent impact if resulting disturbance or land use change results in permanent damage to soils.*	

Soil Resource

16.3.17 The impact of permanent and temporary development resulting from the proposed development will be assessed in terms of the identified soil resources, their sensitivity, and the degree of damage and loss of soil resource. The assessment criteria combine standard industry approaches, the IEMA guidance and professional experience.

16.3.18 The sensitivity of soil resources to disturbance is based on how susceptible the soils are to damage when disturbed and includes the assumption that good working

practice, such as that set out in the 2009 DEFRA guidance and 2021 Institute of Quarrying guidance is followed. The sensitivity criteria also explore how soils with different inherent properties will have differing resilience to disturbance, and the impacts from construction may be more severe in certain situations. The receptor sensitivity criteria for the 'Structural Damage' to soil resources are shown in Table 16.3, which has been adapted from Chapter 9: Table 4 of the IEMA guidance.

Table 16.3: Receptor Sensitivity (Soil Resources – Structural Damage)		
Receptor	**Sensitivity**	**Justification**
Soils with low resilience to structural damage	**High**	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCDs) are 150 or greater. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater. All soils in wetness class (WC) WCV or WCVI.
Soils with medium resilience to structural damage	**Medium**	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225. Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Soils with high resilience to structural damage	**Low**	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

16.3.19 Where soils are left exposed, the sensitivity of soil resources to loss is considered in relation with impacts of environmental factors, such as wind and water. The unit used to gauge this impact is soil erodibility, which 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). The sensitivity levels on erosion used for this assessment stem from the sensitivity classification compiled by Cranfield University[14].

16.3.20 The receptor sensitivity for loss of soil is shown in Table 16.4, below.

Table 16.4: Receptor Sensitivity (Soil Resources – Loss)		
Receptor	**Sensitivity**	**Justification**
Soils with high risk of erosion and organic soils (peat)	**High**	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g., use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. 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 (organo-mineral soils:	**Medium**	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g., when above their plastic limit – the moisture state where soil begins to behave as a plastic material).

Table 16.4: Receptor Sensitivity (Soil Resources – Loss)		
Receptor	**Sensitivity**	**Justification**
i.e., peaty soils or peaty gleys, peat < 50 cm)		The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	**Low**	These soils are generally more resistant to damage and may be appropriately managed by standard good practice construction measures.

16.3.21 Soils of differing texture and structural development may be subject to a range of potential impacts during and following reinstatement. For example, the incorrect handling / reinstatement of a heavy textured (clay rich) soil whilst in a plastic state may cause permanent or semi-permanent soil compaction. The resulting soil profile will have a reduced natural drainage compared to the undisturbed soil profiles and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Whereas sandy soils are more resistant to compaction pressures and have a greater capacity to recover from compaction without intervention or management. Sandy soils will also remain more permeable if compaction does occur and the drainage potential of these soils is, therefore, more easily maintained upon reinstatement.

16.3.22 It is assumed that soils currently designated to non-agricultural classes, including urban and non-agricultural land, are not exposed to loss and damage as standard best practice is already in place to maintain and secure their soil function. Therefore, the area considered for impact on receptors of soil resources only concerns soils currently under agricultural use.

16.3.23 For 'Damage to Soil Resources', the footprint of proposed hardstanding (damage through soil handling) under the proposed development is considered. Whereas the area of soils left in-situ is considered for the potential for 'Loss of Soil Resources'. The ratio between the two receptors constitutes a single magnitude of change that will be applied to both analyses. The area that is affected by the respective receptor category is expressed in the percentage of agricultural land onsite.

16.3.24 The magnitude of change criteria for soil resources (i.e. damage to soil resources and loss of soil resources) is shown in Table 16.5, below, which has been adapted from Chapter 9: Table 3 of the IEMA guidance.

Table 16.5: Magnitude of Change (Soil Resources)		
Magnitude	**Damage to Soil Resources**	**Loss of Soil Resources**
High	Permanent change to soil quality of > 75 % of the soil resource.	< 25 % of soil resources retained in-situ.
Medium	Permanent change to soil quality of 25 - 75 % of the soil resource.	25 - 75 % of soil resources retained in-situ.

Low	Permanent change to soil quality of 5 - 25 % of the soil resource.	75 - 95 % of soil resources retained in-situ.
Negligible	Permanent change to soil quality of < 5 % of the soil resource.	> 95 % of soil resources retained in-situ.

Level of Effects

16.3.25 The classification of effects for loss of land (agricultural), and loss and damage of soil resources, has been assessed using Table 16.6. Where effects are determined as Major or Moderate, the impact will be considered as Significant in EIA terms. Where impacts are determined as Minor or Negligible, the effect will be considered Not Significant in EIA terms. Where impacts are Minor to Moderate they may be significant in EIA terms and professional judgement and sound reasoning will be used to determine the significance.

Table 16.6: Level of Impactss

		Magnitude of Change				
		High	**Medium**	**Low**	**Negligible**	**No Change**
Sensitivity/ value of receptor	**Very High**	Major (Significant)	Major (Significant)	Major or Moderate (Significant)	Minor (Not Significant)	Neutral (Not Significant)
	High	Major (Significant)	Major or Moderate (Significant)	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Neutral (Not Significant)
	Medium	Major or Moderate (Significant)	Moderate (Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
	Low	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
	Negligible	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)

**Professional judgement will be used to determine the significance of the effect in the particular circumstances.*
***Note: Major, Moderate or Minor effects have the potential to be adverse or beneficial**.*

Baseline Conditions

16.3.26 The site is located on land associated parcel of land west of International Advanced Manufacturing Park (IAMP), East Boldon (SR5 3FH) at approximate national grid reference NZ 33097 58838 and is situated within the administrative area of SCC.

16.3.27 The site comprises an area of agricultural / nature conservation land located to the north and west of the AESC Plant 2 (IAMP ONE Phase Two) development and the overall area within the application redline boundary of the site is 42.39 hectares (ha) in size.

Agricultural Land Classification

The Provisional 1:250,000 ALC mapping indicates that agricultural land within the site is ALC Grade 3 (Good to Moderate). The Natural England BMV likelihood mapping shows the site to be in an area of low (<= 20 % area BMV) likelihood BMV, with a small section of high likelihood of BMV land (>60 % area BMV) at the north west section of the site.

16.3.28 The post 1996 ALC report shows the site to be predominantly comprised of Subgrade 3b agricultural land, with a section of Subgrade 3a agricultural land located in the northwest of the site. The 2023 verification survey confirmed the presence of Subgrade 3a and Subgrade 3b land on the site, however Subgrade 3a was predominant there due to the presence of Wetness Class III soils and the depth to slowly permeable and gleying.

16.3.29 A more detailed description of the ALC gradings and the distribution of the gradings within the site is provided in Appendix 16.1). A summary of the ALC gradings for the survey boundary from the 2023 verification survey are shown in Table 16.7.

16.3.30 As illustrated by Figure 16.1 Agricultural Land Classification, the site falls within ALC Subgrade 3a (23.93 ha, 56.5% of the site) towards the north of the site and ALC Subgrade 3b (17.31 ha, 40.8% of the site) in the south of the site, plus smaller areas of Subgrade 3b in the north and northeast of the site and a small area of non-agricultural land (1.15 ha, 2.7%). The main limitation for the majority of the site is Wetness. Droughtiness limited one survey point to Subgrade 3b, and two points were limited to Subgrade 3a due to a combination of Wetness and Droughtiness.

Table 16.7: Summary of ALC within the Survey Area

ALC or other land category	Area (ha)	Percentage %
Subgrade 3a (good)	23.93	56.5
Subgrade 3b (moderate)	17.31	40.8
Non-agricultural	1.15	2.7
Total	42.39	100%

16.3.31 The soils across the site belong to the Foggathorpe 1 soil association and ranged in texture between medium to heavy clay loams and clays, with fine sandy loam and sandy clay loam textures also recorded.

Regional Context of BMV Agricultural Land

16.3.32 Presented values for the impact on BMV agricultural land as a result of the various aspects of the proposed development should be considered only within their respective context. To provide context, Table 16.8, below, provides a breakdown of

the ALC gradings within the administrative area of SCC, taken from the Provisional 1:250,000 scale ALC mapping provided by Defra.

Table 16.8: Provisional ALC gradings within Sunderland City Council		
ALC Grade (Provisional)	Area (ha)	%
Grade 3	5,424.7	39.3
Non-Agricultural	107.3	0.8
Urban	8,242.9	59.8
Total	13,774.9	100

16.3.33 As shown in Table 16.8 for the Provisional ALC gradings for Grade 3 (Good to Moderate quality), the data does not differentiate between Subgrade 3a (good quality, BMV) and Subgrade 3b (moderate quality, non-BMV) and, therefore, does not accurately identify the coverage of BMV land. Using the preliminary ALC mapping and the proposed (50:50) method to subdivide Grade 3 BMV agriculture land within the administrative boundaries of SCC, the coverage of ALC gradings is indicated within Table 16.9, below.

Table 16.9: Refined ALC grading area within Sunderland City Council		
ALC Grade	Area (ha)	%
3a	2,712.35	19.65
3b	2,712.35	19.65
Non – agricultural*	8,350.2	60.6
Total	**13,774.9**	100
*Non-agriculture includes non-agriculture, open land, urban area, other, and un-surveyed areas.		

16.3.34 Based on this assessment, approximately 19.65% of the land within the administrative boundaries of SCC is classed as BMV land.

Soil Resources

16.3.35 The Soil Survey of England and Wales (1984) indicates the site is within the Foggathorpe 1 (712h) association. A summary of the characteristics of this soil association is provided in Table 16.10, below. A detailed description of the specific soil profiles observed within the site are described in the ALC Report for the site in Appendix 16.1 of this ES.

Table 16.10: The Soil Associations based on the Soil Survey of England and Wales (1984)	
Soil Association	**712h Foggathorpe 1**
Geology	Glaciolacustrine drift and till.
Soil Series	Foggathorpe, Hallsworth, Dunkeswick
Soil characteristics	The Foggathrope 1 soil association consists of slowly permeable seasonally waterlogged clayey and fine loamy over clayey soils, often stoneless. Pelo-stagnogley soils present. Dominated by seasonally waterlogged clayey, often stoneless soils in till and glaciolacustrine clay. Occurs on flat land where lacustrine clay overlies the till. Elevation varies from around 6m above ordnance datum (AOD) at the coast to 150m AOD on higher ground. The clayey

	texture and surface wetness of the Foggathorpe and Hallsworth series restrict cropping to grass and barley. Much of the land is characterised by rough grazing, particularly on wetter ground where reseeding is difficult
Soil Water Regime	Foggathorpe 1 soils experience seasonal, sometimes severe, waterlogging. Without artificial drainage the soils are seasonally waterlogged for long periods in winter (Wetness Class IV). Drainage is essential if lands are to be used other than in summer.
Erodibility	Very small risk from water

Typical Soil Profile Observed

16.3.36 Topsoil across the site is typically characterised by a stoneless to slightly stony very dark greyish brown, medium clay loam (sandy clay loam fine sandy loam, heavy clay loam also recorded) extending to an average depth of 31 cm. The topsoil is typically a moderately developed, medium sub-angular blocky structure of friable to firm ped strength with no mottling or ferri-manganiferous concentrations.

16.3.37 Upper subsoil across the site is typically characterised by a stoneless to very slightly clay (heavy clay loam, medium clay loam and sandy clay loam textures also recorded) extending to an average depth of 53 cm. The upper subsoil is typically a weakly developed, coarse, angular blocky structure, with firm to very firm ped strength). Ferri-manganiferous concentrations and ochreous mottles were common (brown and grey mottles also found) in the upper subsoil.

16.3.38 Lower subsoil across the site is typically characterised by a very slightly stony brown clay (sandy clay loam at one point) extending to an average depth of 77 cm, with common ochreous mottles and ferri-manganiferous concentrations. The lower subsoil is typically characterised by a weakly developed (moderate at five points), coarse (medium ped size at five points), prismatic structure, of firm to very firm ped strength.

16.3.39 A second lower subsoil horizon was recorded at five locations and is typically characterised by a very slightly stony, very dark greyish brown clay extending to an average depth of 84 cm with few ochreous mottles and common ferri-manganiferous concentrations. The second lower subsoil horizon is typically characterised by a weakly developed, coarse, prismatic structure of very firm ped strength.

16.3.40 For the purposes of this assessment, the topsoil of the site is best described as a medium clay loam with one occurrence of each of the following textures: heavy clay loam, sandy clay loam and fine sandy loam. Subsoils are best described as heavy clay loam and clay textures with one occurrence of each of the following textures: medium clay loam and sandy clay loam.

Agroclimatic Data

16.3.41 Table 16.11 details the site-specific values derived from agroclimatic data interpolated between nearby meteorological stations. This is then used to establish whether the agricultural land quality of the site is limited by climate and, in conjunction with soil profile characteristics, wetness and droughtiness. It is found that the climate is not a limitation for the site with wetness being the most limiting factor, which limited the site to Subgrade 3a and Subgrade 3b. Droughtiness limited one survey point to Subgrade 3b, and two points were limited to Subgrade 3a due to a combination of Wetness and Droughtiness.

Table 16.11: Interpolated Agroclimatic Data for the Site	
Average annual rainfall (mm)	633
Accumulated Temperature (^{0}C)	1319
Field Capacity Duration (FCD) (days)	156
Moisture Deficit Wheat (mm)	96.9
Moisture Deficit Potatoes (mm)	84.4

16.4 Design Solutions and Assumptions

16.4.1 Table 16.12 presents the land-take for different aspects of the proposed development based upon the Proposed Site Plan (Drawing Number 201-P02).

16.4.2 Direct impacts upon the soils by stripping, temporary stockpiling or storage would be associated with areas of building, structures and hardstanding (referred to here as 'built infrastructure'). Using the breakdown in Table 16.12, the total area of proposed built infrastructure was estimated to be circa 24.37 ha of the site area, which constitutes 57.5% of soils onsite. Of this figure, 11.18 ha (26.4%) is Subgrade 3a (BMV) agricultural land,12.76 ha (30.1%) is Subgrade 3b (non-BMV) agricultural land and 0.42 ha (0.99%) is non-agricultural land. Most of the built infrastructure elements occur on Subgrade 3b agricultural land and, where it occurs on Subgrade 3a land, it is assumed that this is unavoidable due to the site layout and design constraints.

16.4.3 The term 'green spaces' has been used for the purposes of this assessment to account for the soft landscaping areas identified within the Proposed Landscape Plan. Green spaces outlined in the Proposed Landscape Plan include proposed shade tolerant neutral grassland, proposed ornamental shrub/ herbaceous planting, proposed species rich neutral grassland, proposed flood meadow, and proposed hedge planting. Additionally, the majority of land retained for green spaces on the site is Subgrade 3a and, as such, the permanent loss of BMV land has been avoided. The retained grassland areas occupy circa 18.02 ha of the site (42.5% of the site). Of this figure,

12.75 ha (30.1% of the site) is Subgrade 3a agricultural land, 4.55 ha (10.7% of the site) is Subgrade 3b agricultural land and 0.72 ha (1.7% of the site) is non-agricultural land.

16.4.4 Incorrect handling and storage of disturbed soils has the potential to lead to the loss of or damage to soil resources. A Soil Management Plan has been prepared (see Appendix 16.2) to ensure that all construction practices will adopt best practice guidance to ensure the soil resources and retained vegetation areas are protected. The following good practice guidance will be adopted:

- DEFRA (2009). Code of Practice for the Sustainable Use of Soils on Construction Sites
- Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings
- British Society of Soil Science's (2022) Working with Soil Guidance Note on 'Benefitting from Soil Management in Development and Construction'[15];

16.4.5 The assessment below assumes that all topsoil arising from the project will be reused in a sustainable fashion that will preserve core soil functions.

Table 16.12: Land use breakdown for the Site in hectares

Land Use	Subgrade 3a	Subgrade 3b	Non-agricultural	Subtotal	Percent of Site Covered
Permanent/ Long term temporary Development (Built Environment)					
Buildings	5.48	7.78	0.01	13.27	31.3% (12.9% Subgrade 3a; 18.4% Subgrade 3b)
Hardstanding	4.06	4	0.28	8.34	19.7% (9.6% Subgrade 3a; 9.4% Subgrade 3b; 0.7% non-agricultural)
Gravel	1.64	0.99	0.12	2.75	6.5% (3.9% Subgrade 3a; 2.3% Subgrade 3b; 0.3% non-agricultural)
Temporary/ Reversible Development					
Green Spaces	12.75	4.55	0.72	18.02	42.5% (30.1 % Subgrade 3a; 10.7% Subgrade 3b, 1.7% non-agricultural)
Totals	**23.93**	**17.31**	**1.14**	**42.39**	**100% (56.5% Subgrade 3a; 40.8% Subgrade 3b; 2.7% non-agricultural)**

16.5 Assessment of Effects

16.5.1 The identified land and soil receptors that are potentially subject to impacts during construction are:

- Land and land use in terms of loss of agricultural / nature conservation land.

[15] British Society of Soil Science (2022). Working with Soil Guidance Note 3 '*Benefitting from Soil Management in Development and Construction*'. Available at: https://soils.org.uk/wp-content/uploads/2022/02/WWS3-Benefitting-from-Soil-Management-in-Development-and-Construction-Jan-2022.pdf. Accessed February 2024.

- Soil resources in terms of consideration of potential for structural damage due to handling.
- Soil resources in terms of consideration of potential for loss due to erosion.

16.5.2 Activities associated with the construction phase of the proposed development may result in the disturbance and damage to the soil present, which could result in a long-term adverse impact to the onsite soil resource due to reduced quality. Incorrect handling and storage of soils has the potential to damage soil. The traffic movements required during these construction works may also cause short-term damage to the soil through compaction or erosion.

16.5.3 Potential damage to soils through disturbance, handling and trafficking soils is the main risk during the construction phase. Clay soils are susceptible to compaction and structural damage during both the construction and operations phase when handled in wet conditions, however standard mitigation measures will provide appropriate protection. The majority of soils were of a clay texture (medium clay loam, heavy clay loam, clay, sandy clay loam) although a fine sandy loam topsoil was recorded at one location. Embedded mitigation measures are outlined in Section 16.6 of this chapter and provided in further detail within the Soil Management Plan which has been prepared (see Appendix 16.2) for submission as part of this ES, identifying the best practice measures that would be implemented onsite by the contractor to avoid soil damage.

16.5.4 All built infrastructure (i.e. buildings, structures and hardstanding) can be removed at the end of the development, but will require restoration to the baseline standard. The long-term nature of the impacts for these areas will be assessed as a permanent irreversible loss as a worst-case scenario.

Land

16.5.5 The site comprises a total of 42.39 ha of land, of which 23.93 ha is Subgrade 3a BMV land, 17.31 ha is Subgrade 3b non-BMV land and 1.14 ha is non-agricultural land. The combination of these grades equates to a Medium sensitivity for Subgrade 3b land, High sensitivity for Subgrade 3a land and negligible sensitivity for non-agricultural land for the receptor 'Land'.

Construction Phase

16.5.6 During the construction phase, all the land (42.39 ha) within the site will be removed from agriculture.

Built Environment

16.5.7 During the construction phase, in a worst-case scenario all built infrastructure would result in the permanent loss of 24.37 ha of land within the site of which 11.18 ha is Subgrade 3a land, 12.76 ha is Subgrade 3b land and 0.42 ha is non-agricultural land. Due to the higher amounts of Subgrade 3a and Subgrade 3b land recorded within the area proposed for built infrastructure, a medium to high receptor sensitivity has been applied for this assessment of effects. The magnitude of change compared to the baseline for the receptor land is High for built infrastructure as this entails the long-term permanent loss of over 20 ha of land.

16.5.8 The resulting effect on the receptor 'Land' due to built environment is considered Moderate to Major adverse and Significant in EIA terms.

Green Spaces

16.5.9 The disturbance to land on areas designated for green space in Proposed Site Layout (Drawing 204-P03) as green spaces have been assessed as being temporary and reversible in nature and would be subject to minimal disturbance and it is expected that soil volume would remain intact and soils would remain in-situ.

16.5.10 During the construction phase, 18.02 ha of land will be retained for vegetated green spaces and landscaping which would result in long term removal of land from agricultural production though the vegetation cover is designed to maintain nature conservation value. Of this land, 12.75 ha is Subgrade 3a land, 4.55 ha is Subgrade 3b land and 0.72 ha is non-agricultural land. This change is considered as reversible with the potential for land to be returned to agriculture.

16.5.11 Due to the higher amounts of Subgrade 3a land recorded within the area proposed for built infrastructure, a high receptor sensitivity has been applied for this assessment of effects. The magnitude of change compared to the baseline for the receptor land is Low for green space as this entails temporary reversible loss of agricultural land.

16.5.12 The resulting effect on the receptor 'Land' due to green spaces is considered Moderate or Minor (Potentially Significant) in EIA terms within Table 16.6. With consideration of the embedded mitigation measures that ensure suitable soil management, the land within the green spaces would have the potential to be returned to agriculture, therefore it is assessed that the effect on the receptor 'Land' due to green spaces is Minor adverse and Not Significant in EIA terms.

Operational Phase

It is expected that during the operational phase there would be no further discernible impact on the receptor 'land' and that therefore the magnitude of change associated with built environment and green spaces is negligible.

16.5.13 Following a medium to high receptor sensitivity for the receptor 'land' and a negligible magnitude of change associated with **green spaces and built environment** during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Soil Resources – Damage to Soils

16.5.14 Soils on the site are typically a medium clay loam textured topsoil overlying heavy clay loam or clay textured subsoils (fine sandy loam textured topsoil was also present at one location, and a sandy clay loam textured topsoil was present at another location) with 156 Field Capacity Days (FCD). For this assessment, a worst-case scenario is employed and given the presence of clay soils on site, the sensitivity of the receptor concerning damage to soil structure is considered to be High.

Construction Phase

Built Environment

16.5.15 The proportion of the site that has the potential to be affected by soil disturbance is circa 24.37 ha where the built infrastructure is proposed. In a worst-case scenario, the total affected area equates to 57.5% of the soils on site. In the worst-case scenario, the magnitude of change associated with damage to soil resource due to built infrastructure is considered to be Medium based upon Table 16.5.

16.5.16 The assumption has been requested that the topsoil arising from the project will be reused in a sustainable fashion that will preserve core soil functions and therefore this magnitude of change has been reduced to low in this assessment. This reflects the growing need in the industry to ensure that excess topsoils can be used sustainably to support ongoing development.

16.5.17 Following a high receptor sensitivity for the receptor 'damage to soil resources' and a low magnitude of change associated with built environment, the resulting effect is considered to be Moderate or Minor adverse and Potentially Significant in EIA terms.

16.5.18 Based upon the assumption that there are embedded mitigation measures to ensure the sustainable end use of soils, the resulting effect of the proposed built development on the receptor concerning the damage to soil resource has been reduced to Minor adverse and Not Significant.

Green Spaces

16.5.19 The proportion of the site that will be retained for green spaces is 18.02 ha which equates to 42.5% of the soil resource on Site. It is expected that following the implementation of embedded mitigation measures and as soil will remain in-situ the disturbance to soil within the green spaces will be minimal. The disturbance to soil within green space has been assessed as temporary and reversible therefore the magnitude of change associated green spaces is negligible as there will be no permanent change to the soil quality of the soil resource.

16.5.20 Following a high receptor sensitivity for the receptor 'damage to soil resources' and a negligible magnitude of change associated with green spaces, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Operational Phase

16.5.21 Any potential disturbance during the operational phase will be localised and small scale (e.g. maintenance, and management of grassed areas) and limited to the green spaces, therefore the magnitude of change associated with the operational phase is negligible for green spaces. For built environment, the magnitude of change associated with the operational phase is negligible as it is expected that following the construction phase there would be no further disturbance to soils from built environment.

16.5.22 Following a high receptor sensitivity for the receptor 'damage to soil resources' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Soil Resources – Loss of Soils

16.5.23 Loss of soil resources can occur through naturally occurring erosion. Table 16.13 shows the erodibility of the soil resources is limited to water erosion and is considered a very small risk. The soils on site are typically medium clay loam, heavy clay loam or clay textures. Soils of a sandy clay loam texture were also recorded. A fine sandy loam topsoil was recorded in one location. The sensitivity of the soil resource with respect to soil loss is considered to be Low to High (where higher sand fractions are recorded). For this assessment, a worst-case scenario is employed and the sensitivity for loss of soils is considered to be Medium.

Construction Phase

Built Environment and Green Spaces

The built environment and green spaces have been assessed together for the receptor 'loss of soils' as the magnitude of change for the loss of soil resources takes into account the total percent of soil resource remaining in-situ. The built environment would result in the stripping of 57.5% (24.37 ha) of the soil on Site. For the green spaces, 42.5% (18.02 ha) of the soil resource on Site would be retained in-situ. Therefore, the magnitude of change associated with this change compared to the baseline for the receptor 'loss of soil' is medium.

16.5.24 Following a medium receptor sensitivity for the receptor 'damage to soil resources' and a medium magnitude of change associated with green spaces and built environment during the construction phase, the resulting effect is considered to be Moderate adverse and Significant in EIA terms.

16.5.25 Based upon the assumption that embedded mitigation measures are in place to ensure the sustainable management of soils, the magnitude of change may be reassessed as low, and the resulting effect of the proposed built development on the receptor concerning the damage to soil resource has been reassessed as Minor adverse and Not Significant.

Operational Phase

16.5.26 During the operational phase, there would be no further loss of soil resource and there would not be any substantial change to the soils remaining in-situ on the site within the green spaces. The establishment and growth of functioning green spaces over the operational phase will maintain functions that will protect soil quality, functional local drainage patterns and support wider ecological functions.

16.5.27 Following a medium receptor sensitivity for the receptor 'loss of soil resources' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Table 16.13: Construction Effects				
Adverse Construction Effects				
Receptor	Impact	Receptor Sensitivity	Magnitude of change	Effect
Land	Loss of land (including BMV agricultural land) due to Built Environment	Permanent Loss: 24.37 ha of built development High: 11.18 ha Subgrade 3ª Medium: 12.76 ha Subgrade 3b Negligible: 0.42 ha Non-agricultural Medium to High receptor sensitivity applied for assessment of effects due to prevalence of Subgrade 3ª and Subgrade 3b land..	High (long term permanent > 20 ha)	Moderate to Major (Significant)
	Land (including BMV agricultural land) removed from agricultural production for use as Green Spaces	Temporary Loss: 18.02 ha of retained green spaces. High: 12.75 ha Subgrade 3ª Medium: 4.55 ha Subgrade 3b Negligible: 0.42 ha Non-agricultural High receptor sensitivity applied for assessment of effects deu to prediominantly Subgrade 3ª land found in these areas.	Low (temporary reversible loss)	Moderate or Minor (Potentially Significant) Reassessed as Minor (Not Significant) with consideration of embedded mitigation measures to ensure suitable soil management so land has the potential to be returned to agriculture.
Damage to Soil Resources	Soils prone to damage on agricultural land due to Built Environment	Low (FCD = 156, fine sandy silt loam) Medium (FCD =156, medium clay loams and sandy clay loams) High (FCD =156, heavy clay loams and clays) High as worst case in this assessment.	Low (57.5 % change in worst case in the soil quality of soil resource on site however the embedded mitigation measures ensure that soil quality will be retained)	Minor (Not Significant)
	Soils prone to damage on agricultural land due to Green Spaces as a result of land use change		Negligible (temporary and reversible change to 42.5% of the soil resource on site)	Minor (Not Significant)
Loss of Soil Resources	Removal of in-situ soil (considers Built Environment and Green Spaces)	Low for clay textured soils (very small risk of water erosion) High risk for fine sandy loam texture Medium as worst case in this assessment.	Low (42.5 % of soils remain in-situ however sustainable soil management will ensure impact on loss of soil is reduced)	Minor (Significant)

Adverse Operational Effects				
Receptor	Impact	Receptor Sensitivity	Magnitude of change	Effect
Land	Loss of land or removal of land from agricultural production (including BMV agricultural land) due to Built Environment and Green Spaces	High: Subgrade 3ª Medium: Subgrade 3b Negligible: Non-agricultural Medium to High receptor sensitivity applied for assessment of effects as a worst-case scenario.	Negligible (no further loss of land anticipated)	Minor (Not Significant)
Damage to Soil resources	Soils prone to damage on agricultural land due to Built Environment and Green Spaces	Low (FCD = 156, fine sandy silt loam) Medium (FCD =156, medium clay loams and sandy clay loams) High (FCD =156, heavy clay loams and clays) ***High as worst case in this assessment.***	Negligible for both Built Environment and Green Spaces (no further permanent change associated with operational phase)	Minor (Not Significant)
Loss of Soil Resources	All soils retained in-situ on agricultural land (considers Built Environment and Green Spaces)	Low for clay textured soils (very small risk of water erosion) High risk for fine sandy loam texture Medium as worst case in this assessment	Negligible for Built Environment and Green Spaces (no further change to soils retained in-situ on site)	Minor (Not Significant)

16.6 Mitigation

Land

16.6.1 In a worst-case scenario, the proposed development would result in the permanent loss of 24.37 ha of agricultural land (11.18 ha Subgrade 3a BMV land, 12.76 ha Subgrade 3b non-BMV land, and 0.42 ha of non-agricultural land) due to built infrastructure (buildings, structures and hardstanding) and it is not possible to mitigate this agricultural land loss.

16.6.2 As part of the proposed development, 18.02 ha of agricultural land (predominantly Subgrade 3a land) will be removed from agricultural and retained as green spaces. This section of land has the potential to be returned to agricultural land as the soil resource remains in-situ and provided that best practice measures are implemented to ensure sustainable soil management.

Soil Resources

16.6.3 To minimise the risk of potential damage to / loss of the existing onsite soil resources, a Soil Management Plan has been prepared (see Appendix 16.2), and good practice soil storage, handling and reinstatement methods will be adopted and maintained as standard for all construction-related operations. This embedded mitigation will be based on such guidance as Defra's 'Construction Code of Practice' and the Institute of Quarrying's 'Good Practice Guide for Handling Soils in Mineral Workings'. The measures will include, but are not limited to, the following:

- 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 plant / machine movements within defined areas in order to minimise compaction and damage to soil structure.
- Establishment of vegetative cover on stockpiles as soon as possible to maintain soil structure and prevent soil loss through erosion.
- Reducing the potential for soil compaction via the 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 demarcated working areas and loosening the area afterwards using recognised practices and equipment to remove any compaction.

Monitoring

16.6.4 Under the Town and Country Planning (EIA) Regulations 2017, the determining authority must consider whether it is appropriate to impose monitoring as a planning condition. In order to audit compliance with the Soil Management Plan and Construction Environmental Method Statements (or similar), the works will be monitored during soil handling activities; thereby ensuring that the soils are maintained in good condition permitting the continued, sustainable use of the soil resource.

16.7 Residual Effects

Land

16.8 Construction Phase

16.8.1 The site is 42.39 ha in size. The proposed built development will occupy 24.37 ha of land. During construction, the development of built infrastructure will result in a long term permanent loss of 24.37 ha of land, including the loss of 11.18 ha of Subgrade 3a BMV agricultural land (high receptor sensitivity), 12.76 ha of Subgrade 3b non-BMV agricultural land (medium receptor sensitivity), and 0.42 ha is non-agricultural land (negligible receptor sensitivity). Under the worst-case scenario, it would not be possible to mitigate the loss of this land. Thus, with a sensitivity of Medium to High and a High magnitude, the effect remains as per the assessment of effects as Moderate to Major adverse (**Significant**).

16.8.2 Of the 42.39 ha site, 18.02 ha of land will be retained for green spaces including 12.75 ha of Subgrade 3a BMV land, 4.55 ha of Subgrade 3b non-BMV land and 0.72 ha of non-agricultural land. Compared to its current and potential use, the agricultural productivity of this land will be lower during the operational phase, but the baseline land capacity (ALC Grade) for this area will remain unchanged. The assessment of effects for green spaces takes into account the embedded mitigation measures including the Soil Management Plan, therefore with the mitigation measures in place, with a high receptor sensitivity and a low magnitude, the effect remains as per the assessment of effects and Minor adverse (**Not Significant**).

Operational Phase

As per the assessment of effects, it is expected that during the operational phase there would be no further discernible impact on the receptor ‘land’ resulting in a negligible magnitude of change for proposed built environment and green spaces. With the combination of a negligible magnitude of change and medium to high receptor

sensitivity, the resulting effect is Minor adverse and **Not Significant** in EIA terms, as per the assessment of effects.

Damage to Soil Resource

Construction Phase

16.8.3 Via the adoption of the measures detailed within the Soil Management Plan and the implementation of best practice guidance (such as the Institute of Quarrying's 2021 guidance and DEFRA's 2009 guidance) during the construction phase, the effects concerning damage to soil resource have been minimised where possible.

16.8.4 For built environment, the sensitivity of the receptor is High and, with the mitigation measures in place, the magnitude of change of would be Low. As such, the level of effect would be Minor Adverse (Not Significant) as per the assessment of effects providing that any topsoil arising from the project will be reused in a sustainable fashion that will preserve core soil functions.

16.8.5 For green space, the sensitivity of the receptor is High and, with the mitigation measures in place, the magnitude of change of would be Negligible. As such, the level of effect would be Major or Moderate Adverse (Significant) as per the assessment of effects.

Operational Phase

16.8.6 As per the assessment of effects, it is expected that during the operational phase there would be no further discernible impact on the receptor 'damage to soil resources' resulting in a negligible magnitude of change for built environment and green spaces which when combined with a high receptor sensitivity, the resulting effect is Minor Adverse and Not Significant in EIA terms.

Loss of Soil Resource

Construction Phase

16.8.7 Via the adoption of the measures detailed within the Soil Management Plan and the implementation of best practice guidance (such as the Institute of Quarrying's 2021 guidance and DEFRA's 2009 guidance) during the construction phase, the effects on the loss of soil resource have been minimised where possible.

16.8.8 For built environment and green spaces, the sensitivity of the receptor 'loss of soil resource' is Medium and, with the mitigation measures in place, the magnitude of

change of would be Low. As such, the level of effect would be Minor Adverse (**Not Significant**) as per the assessment of effects.

Operational Phase

16.8.9 During the operational phase, there would be no further loss of soil resource and there would not be any substantial change to the soils remaining in-situ on the site within the green spaces. The establishment and growth of functioning green spaces over the operational phase will maintain functions that will protect soil quality, functional local drainage patterns and support wider ecological functions.

16.8.10 Following a medium receptor sensitivity for the receptor 'loss of soil resources' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and **Not Significant** in EIA terms, as per the assessment of effects.

16.9 Cumulative Effects

Assessment of Cumulative Effects

Inter-cumulative effects

16.9.1 There are not considered to be any relevant inter-cumulative effects on soil resources as the effects of soil loss are contained within the specific site. There may be considered to be relevant effects on agricultural land, which are considered below.

16.9.2 Note that for the purposes of this assessment, land noted as 'unsurveyed', 'urban' or 'non-agricultural' will be considered 'non-agricultural' land in the revised grading. Additionally, where Provisional Grade 3 land is encountered, a split will be made between Subgrade 3a and Subgrade 3b for the revised ALC grading for purposes of cumulative assessment.

16.9.3 Appendix 16.3 sets out the baseline conditions relevant to the proposed developments considered under the assessment of cumulative effects. Overall, Appendix 16.3 shows that the total land-take associated with the considered developments is 304.94 ha of which 293.35 ha is agricultural land. Of this, 72.78 ha is considered as BMV land. Appendix 16.3 also shows that the total land-take associated within the administrative boundaries of SCC is 264.44 ha of which 252.85 ha is agricultural land. Of this, 52.53 ha is BMV land.

16.9.4 Within the administrative boundaries of SCC, Table 16.9 shows that the total amount of land is 13,774.9 ha, of which 5,424.7 ha is agricultural land. Of this, 2,712.35 ha is

estimated as BMV land. If the proposed development proceeded, which encompasses 42.44 ha of agricultural land, and all the developments considered also proceed (252.85 ha of agricultural land), this would occupy an estimated 5.44 % (295.29 ha) of the agricultural land within administrative boundaries of SCC (5424.7 ha), 1.43 % of this is BMV land (77.33 ha).

16.9.5 Under the IEMA guidance, permanent land loss of over 20 ha is considered a High magnitude of change from the baseline. Where this is considered within the assessment of the proposed development, it is assumed that over 20 ha of long-term temporary (permanent in worst-case) would be lost due to the development.

16.9.6 Under the IEMA guidance, the cumulative effect of the land-take associated with the developments and the proposed development is Major (Significant). However, some of this land loss is temporary and reversible, and providing appropriate guidance and mitigation measures are in place for these developments, the associated impact on agricultural land can be minimised.

16.10 Conclusion

Land

Construction Phase

16.10.1 The site is 42.39 ha in size. The proposed built development will occupy 24.37 ha of the existing land. The development of built infrastructure will result in a long-term permanent loss of 24.37 ha of agricultural land, including the loss of 11.18 ha of Subgrade 3a BMV agricultural land (high receptor sensitivity) and 12.76 ha of Subgrade 3b non-BMV agricultural land (medium receptor sensitivity), and 0.42 ha of non-agricultural land (negligible receptor sensitivity). It would not be possible to mitigate the loss of this land. The combination of a medium to high receptor sensitivity and a high magnitude of the effect on the receptor land is Moderate to Major adverse (Significant).

16.10.2 The area of vegetated green spaces will cover 18.02 ha of the land including 12.75 ha of Subgrade 3a BMV agricultural land, 4.55 ha of Subgrade 3b non-BMV agricultural land, and 0.72 ha of non-agricultural land. Compared to its current and potential use, the agricultural productivity of this land will be lower during the operational phase, but the baseline land capacity (ALC Grade) is expected to remain unchanged assuming that the land is managed as specified in the soil management plan and therefore this change is reversable. The combination of a high receptor sensitivity (as a worst-case)

and a low magnitude of change, the effect on the receptor land has been assessed as Minor adverse (Not Significant) taking into account the embedded measures.

Operational Phase

16.10.3 During the operational phase there would be no further discernible impact on the receptor 'land' and that therefore the magnitude of change associated with built environment and green spaces is negligible. Following a medium to high receptor sensitivity for the receptor 'land' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Damage to Soil Resources

Construction Phase

The implementation of embedded mitigation measures provided in the Soil Management Plan will ensure that the soil resource is managed sustainably and to ensure the quality of soil is maintained.

16.10.4 Soils on the site are typically medium clay loam topsoil overlying heavy clay loam or clay subsoils (fine sandy loam topsoil was also present at one location, and a sandy clay loam topsoil was present at another location) with 156 Field Capacity Days (FCD). The receptor sensitivity of the soil resource in terms of structural damage is high (as a worst-case scenario).

The total effected area of soil disturbance associated with built environment is 24.37 ha which equates to 57.5% of soil resource on site however with the mitigation measures in place ensuring any topsoil arising from the project will be reused in a sustainable fashion that will preserve core soil functions, the magnitude of change of would be Low. For built environment, the sensitivity of the receptor is High and the magnitude of change is Low and as such, the level of effect would be Minor Adverse (Not Significant).

16.10.5 The proportion of the site that will be retained for green spaces is 18.02 ha which equates to 42.5% of the soil resource on Site. It is excepted that following the implementation of embedded mitigation measures and as soil will remain in-situ the disturbance to soil within the green spaces will be minimal. The disturbance to soil within green space has been assessed as temporary and reversible therefore the magnitude of change associated green spaces is negligible. Following a high receptor

sensitivity and a negligible magnitude of change associated with green spaces, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Operational Phase

16.10.6 During the operational phase, there would be no further disturbance to soils resulting from built environment, and for green spaces any potential disturbance would be localised and associated with maintenance of green spaces which would adhere to sustainable soil management practices and best practice guidance. Therefore the magnitude of change associated with the operational phase is negligible for both the built environment and green spaces. Following a high receptor sensitivity for the receptor 'damage to soil resources' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.

Loss of Soil Resource

Construction Phase

16.10.7 The implementation of embedded mitigation measures provided in the Soil Management Plan will ensure that the soil resource is managed sustainably and to ensure the quality of soil is maintained.

16.10.8 Loss of soil resources can occur through naturally occurring erosion. The soils on site are typically medium clay loam, heavy clay loam or clay textured. Sandy clay loam textured soils were recorded and a fine sandy loam topsoil was recorded in one location. As a worst-case scenario, the receptor sensitivity for loss of soils is considered to be Medium.

16.10.9 The built environment and green spaces have been assessed together for the receptor 'loss of soils' as the magnitude of change for the loss of soil resources takes into account the total percent of soil resource remaining in-situ in the site. For built environment and green spaces, the sensitivity of the receptor 'loss of soil resource' is Medium and, with the mitigation measures in place, the magnitude of change of would be Low. As such, the level of effect would be Minor Adverse (Not Significant)

Operational Phase

16.10.10 During the operational phase, there would be no further loss of soil resource and there would not be any substantial change to the soils remaining in-situ on the site within the green spaces. The establishment and growth of functioning green spaces over the

operational phase will maintain functions that will protect soil quality, functional local drainage patterns and support wider ecological functions.

16.10.11 Following a medium receptor sensitivity for the receptor 'loss of soil resources' and a negligible magnitude of change associated with green spaces and built environment during the operational phase, the resulting effect is considered to be Minor adverse and Not Significant in EIA terms.