Meridian Solar Farm

EN010169

Volume 7

Other **Documents**

7.**14** Outline Soil **Management Plan** (Rev 1) (Clean)

APFP Regulation 5(2)(q)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

September 2026

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1. Introduction

1.1. Background

1.1.1. Meridian Solar Farm Limited (hereafter referred to as 'the Applicant') is seeking consent for the construction, operation and decommissioning of the Meridian Solar Project (hereafter referred to as the 'Scheme').

1.1.2. This Outline Soil Management Plan (SMP) has been prepared to support the DCO Application and presents a framework for soil management during the construction, operation, and decommissioning phases of the Scheme, with the aim to provide a clear and consistent approach to soil management during these phases.

1.1.3. Should the Scheme be consented, a detailed SMP will be produced for the Scheme following the appointment of a Principal Contractor in accordance with a Requirement of the **Draft DCO** (Doc Ref. 3.1) and prior to the commencement of construction. The detailed SMP will be required to be in accordance with the measures included in this Outline SMP.

1.2. Scheme Description

1.2.1. The Scheme would comprise the construction, operation (including maintenance) and decommissioning of a solar PV electricity generating station with associated infrastructure, including co-located Battery Energy Storage System (BESS), Inter-Array Connections to link the land parcels that form the Solar Development Areas, and an up to 13km overhead line Grid Connection (with one short undergrounded section) which would run north towards a point of connection (PoC) at the proposed Weston Marsh B National Grid Electricity Transmission (NGET) substation, to the north of Weston.

1.2.2. The Solar PV generating station, associated BESS, on-site substations and other associated infrastructure would be located within four land parcels (A, B, C and D) referred to collectively as the Solar Development Area, as shown in **ES Figure 1-1: Scheme Location** (Doc Ref. 6.2).

1.2.3. The Inter-Arrays would be the areas within which 132kV connection cables (the 'Inter-Array Connections') would link the land parcels of the Solar Development Area. The configuration of the Inter-Array Connections (132kV) would comprise underground cabling between Land Parcels A and B ('the Underground Inter-

Array') and an overhead line between Land Parcels C and D ('the Overground Inter-Array').

1.2.4. The Grid Connection Route would be the area between the Solar Development Area and the National Grid Weston Marsh B Substation in which a 400kV overhead line (the 'Grid Connection') would be located. There is one section where the Grid Connection would route underground to avoid conflicts with an existing 132kV overhead line. Cable Sealing End Compounds (CSECs) would join the proposed underground cable at that section with the proposed overhead line. A full description of the Scheme is included in **ES Chapter 2: The Scheme** (Doc Ref. 6.1). An overview of the Scheme and its environmental impacts is provided in the **ES Non-Technical Summary** (Doc Ref. 6.1).

1.3. Purpose of the Outline SMP

1.3.1. This Outline SMP covers the main construction, operation and decommissioning activities envisaged at the time of preparing the ES.

1.3.2. The aim of the Outline SMP is the preservation of the soil resource during construction, operation and decommissioning, avoiding both the loss of soil material from the Scheme and the loss of soil functional capacity for supporting agricultural production.

2. Soil Management Programme

2.1. Introduction

2.1.1. This section sets out the Scheme components and general arrangements for the Scheme.

2.2. Scheme Components

2.2.1. The most extensive component of the Scheme are the Solar PV panels on mounting structures. The mounts will be secured by pile-driven posts in the ground. The alternative are 'feet' supported on concrete footings. These would only be used in areas where steel poles cannot be used, for example due to existing utilities.

2.2.2. The Scheme will consist of the following infrastructure which is less extensive across the Order Limits:

- Solar stations (inverters, transformers, and switchgear);
- On-site 400kV substation and BESS compound;
- On-site 132kV substations;
- Underground Inter-Array Connections;
- Overhead Inter-Array Connections;
- Fencing, security and lighting;
- Surface water drainage;
- Works to third party assets;
- Access tracks and site accesses;
- Areas of habitat management and permissive paths; and
- Electricity connection to National Grid via the Grid Connection Route comprised of:
    - 400kV overhead line,
    - Cable sealing end compounds (CSECs); and
    - Underground transmission electrical cables.

2.3. Roles and Responsibilities

2.3.1. Terminology used for key roles and responsibilities during the construction phase in managing environmental impacts may change but will likely include the following. Experienced professionals may fulfil the functions of more than one position. The identified roles include, but are not necessarily limited to:

- **Site Manager** – Overall responsibility for activity on-site and will be based on-site full time.
- **Construction Project Manager** – Overall responsibility for ensuring all elements in the DCO, SMP and all environmental legal and other requirements are implemented, and appropriately resourced, managed, reviewed and reported.
- **Environmental Manager** – Responsible for the overall management of environmental aspects on site, ensuring environmental legislation and best practices are complied with, and environmental mitigation and monitoring measures identified are implemented. The Environmental Manager will oversee environmental monitoring on-site and carry out regular environmental site inspections, reporting and responding to any incidents or non-compliance. The Environmental Manager will liaise with relevant environmental bodies and other third parties as appropriate.
- **Specialist Technical Advisor** – Provides any pre-construction surveys and supervises implementation of any specific mitigation measures. The Specialist Technical Advisor will provide training on the application of field testing of soil conditions to nominated staff on-site.

2.3.2. These roles and responsibilities are indicative and will be confirmed in the detailed SMP.

2.4. Construction Programme

2.4.1. The construction phase is anticipated to take up to four years to complete and it is assumed that construction would commence in 2029. The operational phase is estimated to begin in 2033. Peak construction is anticipated to be 2031 for the Solar Development Area and Inter-Array Connections and 2030 for the Grid Connection Route. The overall peak construction year for the purposes of the Environmental Impact Assessment (EIA) is anticipated to be 2031.

2.5. Operation Programme

2.5.1. The operational phase of the Scheme is anticipated to commence in 2033 lasting for 40 years from the date of final commissioning. Maintenance activity during the operational phase would be minimal and will be principally related to vegetation management, equipment maintenance and servicing, replacement of components (where required), periodic inspections, and monitoring to ensure the continued effective operation of the Scheme. Disturbance to soil is not expected unless cabling needs to be replaced, with vehicle traffic mainly limited to purpose built gravel tracks, where practicable. Maintenance and safety inspections of all Scheme equipment would be carried out by the Applicant or an appointed contractor.

2.6. Decommissioning Programme

2.6.1. The decommissioning of the Scheme is anticipated take up to approximately 24 months. Upon the start of the decommissioning phase, it is assumed for the purposes of the ES assessment that all above-ground physical infrastructure would be dismantled and removed from the Solar Development Area, Inter-Array Connections and Grid Connection Route. This would include the removal of all PV panels, mounting poles, solar stations, substations, BESS, 400kV overhead line and pylons, CSECs, 132kV overhead line and poles. In addition, below ground infrastructure, such as concrete foundations to these elements would be removed to a depth agreed with the relevant landowner from the area within the Order Limits and recycled or disposed of in accordance with good practice and market conditions at that time. Soil stored in bunds on-site would be used for site restoration.

2.7. Implementation of the SMP

2.7.1. The measures included in this Outline SMP are based on the potential environmental impacts that have been identified in **ES Chapter 5: Agriculture and Soils** (Doc Ref. 6.1).

2.7.2. The Outline SMP is designed with the objective of achieving compliance with the relevant environmental legislation and securing the environmental mitigation measures set out within **ES Chapter 5: Agriculture and Soils** (Doc Ref. 6.1).

2.7.3. A range of 'standard' or good industry and best practice mitigation management measures have been accounted for in the environmental assessments presented within the ES and these will be implemented during construction of the Scheme,

in relation to soils. This Outline SMP demonstrates how these commitments in the ES will be implemented. It also sets out the monitoring and auditing activities designed to demonstrate that such environmental mitigation measures are carried out and that they are effective.

2.7.4. The appointed Principal Contractor during construction and decommissioning or the Operator during operation will be responsible for implementing the environmental mitigation measures documented in the Outline SMP, subject to grant of the DCO, as a contractual responsibility to the Applicant. The Applicant will ultimately be responsible for compliance with the requirements of the DCO.

2.7.5. Depending on the final construction programme, there may be more than one detailed SMP prepared for the Scheme during construction; for example, where different contractors are involved in different aspects of the Scheme. This will be determined by the appointed Principal Contractor once the detailed construction programme is known.

2.7.6. Intrusive surveys and soil management must be undertaken whilst complying with any mitigation measures set out within the **Outline Archaeological Mitigation and Management Strategy** (Doc Ref. 8.7), and under the supervision of an Archaeological Clerk of Works, where required.

3. Baseline Soil Data

3.1. Survey Data

3.1.1. The detailed Agricultural Land Classification (ALC) assessment of the Solar Development Area, included in **ES Appendix 5-2: Agricultural Land Survey Report (Parcels A&D)** (Doc Ref. 6.3) and **ES Appendix 5-3: Agricultural Land Survey Report (Parcels B&C)** (Doc Ref. 6.3), provides the information on soil physical characteristics that will assist in the development of the detailed SMP.

3.1.2. The ALC survey data reported in these documents covers the Solar Development Area only. Additional ALC surveys are to be undertaken in areas of the Solar Development Area that were inaccessible during the pre-application surveys in order to inform the preparation of the detailed Soil Management Plan. An excavation license from the Ministry of Defence under the Protection of Military Remains Act 1986 would be required to undertake the ALC survey in areas associated with World War II aircraft crash sites, as identified in the **Outline Archaeological Mitigation and Management Strategy** (Doc Ref. 8.7).

3.1.3. In addition, ALC surveys of the Inter-Array Connections and the Grid Connection Route will be undertaken post-consent. It is considered that a detailed ALC survey for the entirety of the Inter-Array Connections and the Grid Connection Route would not guarantee avoidance of Best and Most Versatile (BMV) agricultural land and that a targeted soil survey is most appropriate to determine requirements for restoration. This approach reflects the flexibility incorporated within the **Works Plans** (Doc Ref. 2.3) for the siting of the infrastructure within the Order Limits.

3.1.4. The results of ALC surveys would be very unlikely to lead to a change in the alignment of the Inter-Array Connections and the Grid Connection Route within the Order Limits. The Inter Array Connections and the Grid Connection Route have, as a worst-case, been assumed to be wholly on ALC Grade 1 and 2 land based on Natural England's provisional mapping within **ES Chapter 5: Agriculture and Soils** (Doc Ref. 6.1). During the operational phase, it is only the areas of the wooden poles within the Overhead Inter-Array Connection and the pylon bases and infrastructure associated with CSECs within the Grid Connection Route which are taken out of agricultural use. These are small areas distributed over several kilometres.

3.1.5. In addition, due to other environmental constraints across the Site (such as existing watercourses, vegetation, below ground archaeology, residential receptors etc.) and considering that permanent impacts on soils can be avoided

through appropriate soil management measures, there is limited potential for the soil survey results to determine the location of infrastructure. Furthermore, the preference of landowners is to keep infrastructure close to field boundaries to limit disturbance to the overall farming of a field, regardless of the location of individual patches of soils with a higher ALC grade.

3.1.6. Therefore, the soil sampling of the Grid Connection Route and the Inter-Array Connections to be undertaken post-consent will provide more targeted data for informing the detailed SMP. This approach is also precedented among other Nationally Significant Infrastructure Projects (NSIPs), such as Tillbridge Solar Project, Sunnica Energy Farm and Yorkshire GREEN.

3.2. Baseline Condition

3.2.1. The areas surveyed within the Solar Development Areas are predominantly arable land typically surrounded by steep man-made drainage ditches, accessed by gates, openings and tracks for use by agricultural machinery. Based on observations, the arable crop is comprised of a mix of mustard seeds, wheat, cereals, and maize, with areas also comprising maintained grassland. Each year, the fields are expected to be subject to a succession of cultivation passes and trafficking by high axle load vehicles such as grain trailers and combine harvesters.

3.2.2. Published data from the Soil Survey of England and Wales for Soils and their use in Eastern England[1] indicates the presence of the following soils within the Solar Development Area:

- Wallasea 2 Association (813g) (within Parcels A, B and C) - These include deep, stoneless clayey soils, calcareous in places and some deep calcareous silty soils; and
- Wisbech Association (812b) (within Parcel D) – These include stoneless calcareous coarse silty soils.

3.2.3. The ALC surveys indicated two types of soil in both Parcels A & D and two types of soil in Parcels B & C. Whilst the soils present some similarities the identified soils are not consistent across all areas. These are summarised within Table 3-1 below, presented as generalised profiles of the soil types, for which there is localised variability. Complete soil logs and photographs are provided within **ES**

[1] Hodge, C.A.H. (1984) Soils and Their Use in Eastern England. Soil Survey of England and Wales. ISBN 10: 0708402976 ISBN 13: 9780708402979

Appendix 5-2: Agricultural Land Survey Report (Parcels A&D) (Doc Ref. 6.3) and **ES Appendix 5-3: Agricultural Land Survey Report (Parcels B&C)** (Doc Ref. 6.3).

3.2.4. In summary, topsoils are heavy to medium textured for the majority of the area, their clay content making the soil vulnerable to persistent structural degradation if disturbed in a plastic consistence. This can be alleviated in a topsoil through appropriate cultivation when friable. Subsoil compaction rapidly becomes more difficult to remedy through cultivation with increasing depth.

Table 3-1: Summary of Surveyed Soil Types

Depth (mm)	Texture	Colour	Stones (%)	Mottles	Structure
Parcels A & D - Soil Type 1AD					
0-350	Heavy Silty Clay Loam (HZCL)	Very Dark Greyish Brown (10YR 3/2)	0	No	Coarse Subangular Blocky
350-800	Silty Clay (ZC)	Dark Brown (7.5YR 3/2)	0	Few Fine Ochreous (2.5YR 4/6) Mottles	Coarse Prismatic
800-1200	Sandy Clay (SC)	Brown (10YR 4/3)	0	Many Ochreous (10YR 4/6) and Grey (2.5Y 5/1) Mottles	Coarse Prismatic
Parcels A & D - Soil Type 2AD					
0-400	Medium Silty Clay Loam (MZCL)	Dark Brown (10YR 3/3	0	No	Medium Subangular Blocky
400-900	Very Fine Sandy Silt Loam (vfSZL)	Dark Brown (10YR 3/3)	0	Few Fine Ochreous (7.5YR 5/8) and Grey	Fine Subangular Blocky

Depth (mm)	Texture	Colour	Stones (%)	Mottles	Structure
				(7.5YR 6/1) Mottles	
900-1200	Silty Clay (ZC)	Dark Yellowish Brown (10YR 4/4)	0	Many Ochreous (7.5YR 5/8) and Grey (7.5YR 6/1) Mottles	Coarse Prismatic
Parcels B & C - Soil Type 1BC					
0-300	Coarse sandy silt loam (cSZL)	Dark brown (10YR 3/3)	0	No	Subangular blocky
300-1200	Fine loamy sand (fLS)	Dark yellowish brown (10YR 4/4)	0	Few fine ochreous (7.5YR 5/8) and Grey (7.5YR 6/1) mottles	Fine subangular blocky
Parcels B & C - Soil Type 2BC					
0-350	Heavy silty clay loam (HZCL)	Very dark greyish brown (10YR 3/2)	0	No	Subangular blocky
350-700	Silty clay (ZC)	Dark brown (7.5YR 3/2)	0	Few fine ochreous (2.5YR 4/6) mottles	Coarse prismatic

Depth (mm)	Texture	Colour	Stones (%)	Mottles	Structure
700-1200	Clay (C)	Brown (10YR 4/3)	0	Few fine ochreous (10YR 4/6) and Grey (2.5Y 5/1) mottles	Coarse prismatic

3.2.5. The ALC grading of the Solar Development Area is detailed within **ES Appendix 5-2: Agricultural Land Survey Report (Parcels A&D)** (Doc Ref. 6.3) and **ES Appendix 5-3: Agricultural Land Survey Report (Parcels B&C)** (Doc Ref. 6.3), and summarised within Table 5-9 and Table 5-10 of **ES Chapter 5: Agriculture and Soils** (Doc Ref. 6.1). In summary, the Solar Development Area comprises a mixture of Grade 1, 2, 3a and 3b agricultural land.

3.2.6. The provisional ALC grading of the Inter-Array Connections and the Grid Connection Route is summarised within Table 5-11 of **ES Chapter 5: Agriculture and Soils** (Doc Ref. 6.1).

3.2.7. The provisional ALC mapping for the Underground Inter-Array Connection identifies all land as Grade 2 ALC land. The provisional ALC mapping for the Overhead Inter-Array Connection and the Grid Connection Route identifies both Grade 1 and Grade 2 ALC land.

4. General Principles

4.1. Construction and Decommissioning

4.1.1. The principal risks to soil resources occur during the construction and decommissioning phases but the good practice measures described apply also during maintenance through the operational phase.

4.1.2. Key threats to the soil resource at construction and decommissioning sites are trafficking of vehicles/plant and poor handling, which can cause damage to soil structure through compaction and smearing (when wet soil is compressed to form a dense smooth layer, reducing water infiltration and aeration). These effects compromise the ability of the soil to perform functions, such as providing adequate water, air and nutrients to plant roots. The risk of compaction and smearing increases with soil wetness.

4.1.3. To minimise the risk of damage to soil structure, the detailed SMP will include measures to:

- Prepare a plan of topsoil units within the Site that should not be combined or exchanged in soil handling operations;
- Minimise trafficking of vehicles/plant over in situ or bunded soils to occur outside demarcated working areas;
- Minimise trafficking of vehicles/plant on reinstate soil (topsoil or subsoil);
- Establish and maintain a grass sward over the Solar Development Area before trafficking over by construction plant and delivery vehicles;
- Avoid soil handling when its moisture content is above the plastic limit (the moisture content at which soil begins to behave as a plastic material and the soil is deemed too wet to handle without causing damage to the soil structure). This is more likely to be the case between October and March, which should be considered when scheduling the construction works. Where this is not practicable, soil consistency (its cohesion and deformation properties) should limit soil handling activity. Soils should be handled (or trafficked) when in a friable condition. The consistency of the soil can be determined in the field by a soil specialist and/or the Environmental Manager (who will be subject to specialist soil training) prior to any soil handling activity. A field suitable method for assessing whether soils are in a dry and friable condition based on plastic limits is set out in Part One (Supplementary Note 4 – Table 4.2) of the Institute of Quarrying's Good

Practice Guide for Handling Soils in Mineral Working[2], and this approach together with the associated rainfall protocols will be adopted. Representative soil samples can also be taken to have the moisture content for the plastic limit assessed by a soil laboratory prior to work commencing, with moisture probes at representative locations collecting continuous data on soil moisture content, providing early warning of soil material approaching the plastic limit. Defra's Code of Construction Practice[3] should be followed at all times in this regard;

- Soil handling should be by excavator and dump truck as per sheets A to D of the Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings[2];
- Avoid handling of soils to be carried out during periods of prolonged, heavy rainfall. If a soil sample readily deforms into a cohesive ball, the soils should not be handled. Deformation of soils in this state will severely restrict water infiltration and aeration;
- Minimise mixing of topsoil with subsoil, or of soil with other materials;
- Ensure soil is only stored in designated soil storage areas;
- Ensure plant and machinery only work when ground or soil surface conditions enable their maximum operating efficiency (i.e. when machinery is not at risk of being bogged down or skidding causing compaction or smearing);
- Maintain all plant and machinery in good working condition to ensure that the soil is stripped correctly, for example to ensure that the depth of the strip can be accurately controlled, and to minimise the risk of contamination through spillages; and
- Keep daily records of operations undertaken, and site and soil conditions during soil handling activities;
- Use low ground pressure (LGP models) and tracked vehicles, where possible, when working directly on bare or vegetated soils to minimise the extent and/or intensity of the soil loosening/decompaction required after reinstatement;

[2] The Institute of Quarrying (2021). Good Practice Guide for Handling Soils in Mineral Workings.
[3] Department for Environment, Food and Rural Affairs (2008). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

- Develop a decompaction strategy following detailed design of the Scheme. The purpose of the decompaction strategy will be to set out the decompaction work necessary to address any subsoil compaction that has arisen due to of the Scheme's construction, operation and decommissioning. The decompaction strategy should not attempt to rectify any existing or unrelated subsoil compaction caused by standard arable land management practices;
- Once temporary working areas and haul roads are no longer required, the land will be reinstated including removal of any stones. Alternative methods of soil stabilisation to avoid stoning of soils will be considered and, if adopted, appropriate methods of reinstatement will be included in the detailed Soil Management Plan and applied; and
- Include a target specification for the restored soils which will be established according to location and soil types, end use and the existing baseline ALC grade.

4.1.4. The Plastic Limit can be assessed in the field and a methodology is given in Supplementary Note 4 of the Good Practice Guide for Handling Soils in Mineral Workings[2]. Soil is in a plastic condition when it is moist enough to be rolled between hand and a smooth surface (metal plate or ceramic tile) into a roll of 3.2mm (1/8 inch) thickness. If the soil roll crumbles before reaching this thickness it is not plastic. Once a plastic consistency has been reached following rainfall, soil handling work and trafficking over unprotected soil should be suspended until the soil has dried sufficiently to no longer be plastic.

4.1.5. The majority of the proposed Solar Development Area will comprise rows of solar panels mounted over previous arable land. There will be no requirement to move or seal soil for this land. Therefore, the risks to the soil resource are minimal compared to minerals extraction or built development of a similar scale. Elements of the Scheme that will require the stripping and storage of topsoil within the Site include infrastructure requiring a foundation (such as on-site substations, BESS, solar stations, CSECs), access tracks, and temporary working areas. Soil excavated for cable trenches within the Site will be returned as quickly as practical to the backfilled trench and will not need to be placed in storage bunds for the duration of the development.

Soil Storage Bunds

4.1.6. The building and storage of soil storage bunds across the Scheme would follow the guidance given in Sheets B and C of the Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings[2] . Soil stripping and storage will be

mostly confined to topsoil with very little excavation of subsoil. Where there is any requirement to store subsoil, this will be in bunds separate to the units of topsoil material.

4.1.7. The separation of topsoil into separate units for stripping, storage and eventual restoration, will be determined by a suitably qualified Soil Scientist. A map of topsoil units will be prepared as a requirement of the SMP and retained to ensure topsoil units are restored to their original location. Mapped soil units will be taken from the ALC survey data for the Site. For this reason, a dedicated soil survey for these parts of the Scheme will be a requirement of the detailed SMP.

4.1.8. The detailed SMP will require the recording of material source area, location and maximum dimensions of the soil storage bunds, creating a log of the volume of each soil unit stored.

4.1.9. Additionally, bunds for the storage of agricultural soils shall conform to the following criteria:

- Topsoils and subsoils shall be stored separately;
- Where continuous bunds are used dissimilar soils shall be separated by a third barrier material;
- Topsoil bunds shall not exceed 3m in height and subsoil (or subsoil substitute) bunds shall not exceed 5m in height;
- Materials shall be stored like upon like materials, so that topsoil shall be stripped from beneath subsoil bunds and subsoil from beneath overburden bunds; and
- Soil bunds stored for six months or longer will be seeded with an herbaceous species mix. Vegetation management would be implemented to prevent woody vegetation from establishing. The slope of soil bunds will not exceed 25 degrees.

4.2. Operation

4.2.1. During operation, occasional vehicle movements within the Site will be necessary for maintenance and supervision.

4.2.2. All vehicle movements should be confined to access tracks unless there is a specific need to take a vehicle off the access track. All use of plant and transport vehicles within the Site for maintenance during the operational phase should comply with the same guidance for construction and decommissioning given above in Section 4.1.

4.2.3. Vehicle movements for mowing and/or supervision of livestock will be matched to periods of higher grass growth and dryer soil conditions. Where the Site does have wet conditions and plastic soils during the growing season, mowing operations and/or livestock grazing should be postponed until field tests demonstrate that topsoil within the Site has dried to a friable consistence.

5. Requirements of the SMP

5.1. Supervision

5.1.1. Throughout the construction and decommissioning phases, regular inspections should be made for compliance with good soil management practices as reflected in the SMP. If problems are identified, then specialist technical advice will be sought.

5.1.2. Specific site inspections should take place prior to and post decommissioning work to identify any areas of specific remediation work required, and that any such remediation work has been completed successfully. An example would be looking for any areas of subsoil compaction that have developed where service vehicles have been used off the access track routes, specifying appropriate subsoil cultivation and assessing the effectiveness of that cultivation.

5.2. Inter-Array Connections and Grid Connection Route

5.2.1. A suitably experienced soil scientist should carry out a soil resource investigation of the Inter-Array Connections and Grid Connection Route ahead of construction work commencing to inform the specification for separation of soil horizons during excavation and backfilling, appropriate plant to minimise degradation of handled and trafficked soil, and plastic limits for suspension and recommencement of work following rainfall. As above, the soil scientist should visit the working site and inspect the completed work to check for compliance and any emerging issues.

5.3. Soil Stripping

5.3.1. Topsoil should be stripped separately from the underlying subsoil to avoid the topsoil being covered by tracks, hardstanding and structures. For the access tracks the topsoil can be thinly spread to the side of the track from where it can be recovered when the track is decommissioned. For areas of soil stripping for the laying of foundations, the topsoil should be stored in a bund not exceeding 3m in height. The location of bunds would be established in the detailed SMP.

5.3.2. Track and compound hardstanding surfaces should be laid over the subsoil with a separating geotextile membrane. Drains can be laid below the track and hard standing where appropriate, for instance if there is the need to intercept a spring line.

5.3.3. Where subsoil needs to be stripped to achieve a desired level, it should be handled and stored separately to topsoil in bunds of up to 3m height. Stripped subsoil can be used to build up levels within the Site, if required, but should not be spread without topsoil having been stripped from the receiving area first.

5.3.4. Soil handling work should not commence until the soil has dried to below the plastic limit. Work should be suspended for heavy rainfall. If the rainfall is sufficient to wet the soil at the surface to a plastic consistence, then work should not restart until it has dried sufficiently to return to a friable consistence.

5.4. Cabling Works

5.4.1. Excavation of cable trenches should separate topsoil and subsoil and replace these in order when backfilling the trench. Where there is excess soil material to backfill, the level should be maintained by removing subsoil to storage and returning all of the topsoil. On completion of the cable trench work there should be no degradation of the pre-work ALC grades, as informed by the detailed ALC survey. Minimising the mixing of subsoil and topsoil will ensure appropriate reestablishment of the land.

5.4.2. Where soil material is excavated for post holes, topsoil should be spread thinly to the side of the excavation, with subsoil removed to a storage bund or reused for building up levels.

5.4.3. Where trenchless crossing techniques (such as Horizontal Directional Drilling) are used, soil survey will need to include the surface area occupied and excavated by construction plant. The subterranean route of directional digging work will not require soil survey as the zone of disturbance will be below that of crop rooting. Trenchless crossing employing horizontal directional drilling or other methods will also be confined to passing below existing buildings, infrastructure, watercourses, trees and woodland where required.

5.5. Solar PV Panels

5.5.1. Establishing vegetation ground cover as early as practicable will help reduce erosion risk. Plant working on the Site should be low ground pressure vehicles,

for instance using agricultural tractors and trailers to move materials off the access track routes rather than road going Heavy Goods Vehicles (HGVs).

5.5.2. Trafficking of plant and vehicles off the access tracks should not commence until the soil has dried to below the plastic limit. Work should be suspended for heavy rainfall. If the rainfall is sufficient to wet the soil to its plastic limit, then work should not restart until it has dried sufficiently to return to a friable consistence. Where wheel ruts or other signs of surface compaction do arise, these should be remediated by using an excavator to lift and loose tip the topsoil before reseeding. This should take place at the completion of the construction works once all plant and vehicle passes have been completed.

5.6. Operation

5.6.1. Continuity of vegetated ground cover during the operational life of the Scheme will help reduce soil erosion risk. Maintenance and replacement of materials will follow the same good practice measures guiding the construction and decommissioning phases.

5.6.2. The grassed soil surface will be trafficked during the operational phase of the Scheme. Sheep or other small livestock may be used for intermittent grazing of the Solar Development Area and vehicles will be used for inspection and maintenance activities. As for construction and decommissioning, vehicles should avoid leaving the access tracks within the Site while the soil surface is wet following rainfall.

5.6.3. If grazing is utilised, grazing livestock will be encouraged to move across the Site to manage grass growth. The programme of movement should take into account areas of prolonged wetness following rainfall, prioritising grazing of these areas in summer rather than spring and autumn. Mobile feed and water troughs can be relocated to avoid loss of vegetation and build-up of compaction for the surrounding area.

5.6.4. It should be noted that the effects of vehicles and livestock in the Site will be low compared to routine agricultural land management. The Site will be managed as low input grassland and will carry a lower stocking density than area typical fertilised field in the area. Vehicles used within the Site for inspection and maintenance will be considerably smaller and lighter than those used for arable cultivation where heavy ballast is required for tractors to be able to draw a plough. Agreed soil management guidance for the operational phase of the development can be agreed as part of the detailed SMP alongside construction

and decommissioning work or embedded within the detailed Operational Environmental Management Plan (OEMP).

5.6.5. An extended period of time under grass is expected to result in a benefit to soil health, specifically soil organic matter (SOM) across the Solar Development Area, in particular from the reduction in cultivation, allowing the development of improved soil structure. Soil erosion risk is reduced from the protection of perennial vegetation and from enhanced infiltration capacity.

5.6.6. The detailed SMP will set out features to be observed as measures of poor soil health. Observations should include poor growth of ground cover vegetation, with evidence of chorosis (yellowing of plant tissues as an indicator of nutrient deficiency or disease) and for surface water ponding, suggesting inhibited water infiltration capacity. Specialist technical advice will be sought if unsatisfactory conditions are observed. The specialism may derive from the agricultural community or a soil scientist.

5.7. Decommissioning

5.7.1. As for decommissioning, removal of Scheme infrastructure will involve trafficking of vehicles over the grassed soil surface. Such work should only take place when the topsoil is below (drier than) the plastic limit.

5.7.2. Decommissioning will aim to restore all agricultural land without any degradation of the current ALC Grade, as informed by the detailed ALC survey. Following removal of hard standing such as infrastructure requiring a foundation and access tracks, the newly exposed subsoil should be loosened then lightly consolidated by a toothed excavator bucket to a depth of 30cm prior to the replacement of topsoil. Subsoil and topsoil would be derived from soil storage bunds on-site. For areas in which infrastructure requiring a foundation and operational access tracks have been located, a catch crop sown (a short-term crop to prevent bare soils). An aftercare period will not be necessary for the majority area where soil has remained in situ as the extended period of time under grass should leave the soil profile in better structural condition than that found under the current arable production.

5.7.3. Any minor variability from the current ALC grading identified in any post restoration surveys should be acknowledged and an assessment could be made as to whether this could be justified (on a case-by-case basis) as a result of professional judgement. It is considered that if the measures prescribed in the Construction Code of Practice for the Sustainable Use of Soils on Construction

Sites[3] and the Good Practice Guide for Handling Soils in Mineral Workings 2021[2] are followed that successful restoration should be achieved.

5.7.4. Aftercare measures for soils that have been stripped, stored, moved and reinstated will be ensured by making provision, to the owner or manager of the land, for specialist technical advice from soil scientists, agronomists or agricultural engineers, as necessary.

Glossary

Term	Definition
Agricultural Land Classification (ALC)	The recognizable method for classifying agricultural land in England and Wales according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage, i.e., ALC assesses land quality based upon the type and level of agricultural production the land can potentially support. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5).
Best and most versatile (BMV) agricultural land	Agricultural land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3 a) agricultural quality as defined under the National Planning Policy Framework.
Grid Connection Route	A 400kV overhead line (via steel lattice style towers with a standard height of approximately 50m) to the National Grid planned Weston Marsh Substation, east of Spalding.
Inter Array Connections	The land option required for the Inter-Array Connections, comprising overhead lines up to 132kV (via wooden poles with a standard height of approximately 15 metres) and/or underground cabling within the land that separates the land parcels of the PV Area.
Site	The total land area required for the Scheme.
Solar Development Area	The land required for the Scheme comprising land parcels (A, B, C and D) which would host the energy generation facilities (and associated supporting infrastructure), Battery Energy Storage System (BESS) and On-Site Substation Compounds, excluding the Inter-Array Connections and Grid Connection Route.
The Applicant	Meridian Solar Farm Limited
The Scheme	Meridian Solar Project, comprising the construction, operation (including maintenance) and decommissioning of a solar PV electricity generating station with associated infrastructure, including co-located Battery Energy Storage System (BESS), Inter-Array Connection, and overhead line.

Abbreviations

Abbreviation	Term
ALC	Agricultural Land Classification
BESS	Battery Energy Storage System
CSECs	Cable sealing end compounds
DCO	Development Consent Order
EIA	Environmental Impact Assessment
HGVs	Heavy Goods Vehicles
OEMP	Operational Environmental Management Plan
PoC	Point of connection
PV	Photovoltaic
SMP	Soil Management Plan
SOM	Soil organic matter